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Indian Journal of Extension Education and Rural Development

FROM EDITOR'S DESK

It is indeed a matter of immense pleasure for me to put forward before you the current issue of IJEE & RD for the year 2021. In the present issue some 39 research papers on areas pertaining to significant contemporary issues of rural development and agricultural extension are included. The research papers related to Agriculture, Home Science, Management, Veterinary and Animal Husbandry, 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 her untiring and painstaking efforts in bringing out this issue in time. Prof. F.L. Sharma on Editorial Board deserves special thanks for his commendable work and shouldering the responsibility of bringing this task to reality even after his retirement. 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. He has always been instrumental in pooling efforts of editiorial board memebers to complite the work in time keeping in view the non-impact points of NAAS. We appreciate the continuous cooperation extended by the President of the society Prof. P.N. Kalla and Vice-presidents Prof. Archna Raj Singh & Prof. B.S. Bhimawat for their guidance and help in this regard. We are grateful to Prof. N.K. Panjabi, Secretary of the society for his continuous cooperation and free hand in completing the task well in time, financial resources are never been limiting factor for the good cause of society's development. 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 their research work through this platform. We expect the similar type of cooperation from the members in future too. We assure the contributors and members to come up to their expectations in the years to come. We are grateful to Dr. S.S. Sisodia, Professor & Head, Department of Extension Education, RCA for his cooperation, providing space and resources for anywork related to RSEE. Thanks are also due 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.

Best regards

S.K. Sharma
Chief Editor

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INDIAN JOURNAL OF EXTENSION EDUCATION AND RURAL DEVELPMENT

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CONTENTS

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EFFECTIVENESS OF COMMUNITY RADIO PROGRAMME IN IMPARTING EDUCATION ON DEVELOPMENTAL ISSUES AMONG THE RURAL PEOPLE

Dr. Arpita Sharma*

ABSTRACT

An investigation was undertaken with a view to assess the effectiveness of community radio programme for rural people. Total 100 respondents were selected from nine villages in Rudrapur block of Udham Singh Nagar district. Data were collected through questionnaire. The findings revealed that respondents were in middle age group, educated upto Intermediate level and belonged to General Caste category, had no formal social membership, preferred to attend informal meetings as festivals, religious ceremonies and melas and possessed high ICT ownership, used all types of ICT including modern, print and electronic. The community radio programmes were developed. The programme were recorded and broadcast through Pantnagar Janvani community radio station. Knowledge test was developed based on the content of community radio programme which was designed under the study. The results showed that there was significant difference in the mean knowledge scores before treatment and immediately after treatment in community radio programme. Community radio programnme cater to the needs of the respondents in context of enhancement of knowledge level in significant manner.

INTRODUCTION

Community radio can be regarded as most appropriate medium of mass communication in developing countries with very low literacy rates, poor transportation systems and very low purchasing power. Community radio is local and participatory medium of communication. (Sharma, 2011)

It is a new concept to ensure People Participation at grass root level for their local development (Das, 2011). It provides the platform to the rural people to take part in each and every step like programme designing, recording, broadcasting and evaluation. It is a medium of empowerment. The goal of Development Communication is to mobilize rural women at grass root level and sensitize them so that they could become self-reliant and develop themselves by their own efforts. Among all Communication tools community radio is at heart of the possibilities of an emerging "Information Society" that is people centered, inclusive and development oriented; where everyone can create, access, utilize, share information and knowledge, enabling individuals, communities and people to achieve their full potential in promoting and improving their quality of life. According to Dagron (2001) Community radio is a vibrant community broadcasting system to enhance pluralism and diversity. It is a truly people's radio that perceives listeners not only as receivers and consumers, but also as active citizens and creative producers of media content. This form of radio is fully consistent with the letter and spirit of the Milan Declaration on Communication and Human Rights (1988) which has asserted that communication media have a responsibility to help sustain the diversity of the world's cultures and languages and that they should be supported through legislative, administrative and financial measures. (Sharma, 2012)

Past researches showed that people in the rural areas are suffering from various types of problems due to lack of knowledge, information and education on many aspects. (Sharma, 2016). Community radio can be used as a powerful tool to empower rural community as this is local and participatory in nature. Present research investigation was

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conducted with the following objectives: [1] To study socio-economic characteristics of rural people. [2] To assess the effectiveness of community radio programme.

RESEARCH METHODOLOGY

Present research investigation was undertaken with a view to assess the effectiveness of community radio programme for rural people. Total 100 respondents were selected from nine villages in Rudrapur block of Udham Singh Nagar district. Data were collected through questionnaire. Group discussion was organized to know their need. On the basis of need assessment, community radio programme were recorded and broadcast. Before and after implementation of the programme knowledge test was also undertaken. Data were analysed with the proper statistical tool.

RESULTS AND DISCUSSION

General Profile of the Respondents

The general profile of the respondents was studied in terms of age, education, caste, family type, occupation, income, social participation, ICT exposure, ICT ownership, purpose of utilizing ICT and ICT credibility. The findings have been presented as follows:

Age: As revealed in Table 1, maximum number of respondents (45 per cent) belonged to middle age group (30-40 years) followed by young age group (30 per cent) whereas, only 25 per cent respondents belonged to old age group (Above 40 years). From the overall view, it can be concluded that majority of respondents belonged to middle age group. Similar results were also reported by Sharma (2012).

Education: Education is needed for the overall development of a person. It provides knowledge and skill to make life better and helps prevent oneself from various problems. Education was measured in terms of completed formal or non formal education.

The distribution of respondents according to their level of education is presented in the Table 1. Data

Table 1: Distribution of Respondents according to General Information

(N=100)

S. No.	Category	No. of respon-dents	%
A.	**Age**		
1	Young (25-30)	30	30
2	Middle (30-40)	45	45
3	Older (Above 40)	25	25
B.	**Education**		
1	Illiterate	2	2
2	Can read and write	9	9
3	High School	36	36
4	Intermediate	41	41
5	Graduate	10	10
6	Post Graduate	2	2
C.	**Caste**		
1	General	39	39
2	Other Backward Caste	38	38
3	Schedule caste/ Schedule tribe	23	23
D.	**Family Type**		
1	Nuclear	22	22
2	Joint	78	78
E.	**Social Participation**		
1	No membership	87	87
2	Membership of one organization	8	8
3	Office holder	5	5
F.	**Informal Social Participation**		
1	Mela	79	79
2	Natak/Katputli Nritya	66	66
3	Baithak	48	48
4	Festivals	49	49
5	Religious Ceremonies	63	63
6	Folk songs	78	78
G.	**ICTs Ownership**		
1	Radio	43	43
2	Television	100	100
3	Newspaper	59	59
4	Magazine	38	38
5	Mobile/Telephone	100	100

reveal that maximum number of respondents (41 per cent) were educated up to intermediate level followed by High School (36 per cent). Total 9 per cent respondents could read and write. A limited number of respondents (10 per cent) had studied graduation. Only 2 per cent respondents were found to be post graduate. It is interpreted that respondents understands the need of education. The findings of the present study were in line with those of Singh and Kushwaha (2009).

Caste: Maximum respondents (39 per cent) belonged to General caste followed by Other Backward Caste (38 per cent). Only 23 per cent respondents belonged to Schedule Caste and Schedule tribe (35 per cent). From the overall views, it can be concluded that majority of respondents belonged to General Caste.

Family Type: There could be families which are joint and other could be nuclear. The data enclosed in Table 1 depict that the percentages of respondents in nuclear family (22 per cent) were less as compared to percentage of respondents in joint families (78 per cent).

Thus, it can be concluded that in the villages, still joint family system is dominant over nuclear family. The findings are in line with those of Singh (2012) who reported that majority of the respondents belonged to joint families followed by nuclear families.

Social Participation

It is defined as the voluntary sharing in person to person and in group to group relationship beyond the immediate household.

Formal social participation: Formal social participation refers to membership in any recognized organization like Self Help Group, Aanganwadi workers, Primary School, Primary Health Centers, Block Office. Office bearers like anganwadi workers and teachers in school. It was found that majority of respondents (87 per cent) had no membership, while only 8 per cent respondents were found be having membership of one organization (Self Help Group). Only five per cent respondents were office holders. This signifies that respondents under study were not much aware of the various social institutions.

Thus, it can be concluded that selected village did not have social activity hence the social participation of most of the respondents were negligible. The respondents who had some to formal social participation were the member of Self Help Group, but these women did not know about the other organizations. The result of present study have full agreement with the figures documented in an earlier study conducted by Sharma (2016) in their study on rural women of Uttarakhand reported that social participation of most of the respondents was nil.

Informal social participation

Informal social participation refers to the participation in festivals, religious ceremonies, dramas, puppet plays, fairs etc. From the perusal of Table 1 it was found that large proportion (79 per cent) visited mela. Melas are a part and partial of the cultural heritage of India. Traditionally, such melas are held at temples and other places of worship. Respondents attended melas in the temples or farmers' fair organized by Pantnagar University. These Melas of the temples did attract a sizable gathering, but the chief point of attraction, in due course of time, turned out to be cultural programme rather than any educational content. These villages are nearer to Govind Ballabh Pant University of Agriculture & Technology. Respondents were visiting farmers' fair twice a year. About 66 per cent respondents were found to be attending Natak/ Katputli Nritya. Katputli Nritya (Puppet play) is one of the features of farmer's fair of Pantnagar University. Sometimes dramas were organized by the university students of Home Science College in the study area. Total 48 per cent respondents reported that they attend Mahila Baithak. About 63 per cent respondents visited their neighbour during religious ceremonies. They were meeting each other in the festivals like Holi, Diwali, Chat, Makar sankranti, Idh. They attended the religious ceremonies like Havan, yagh. Only 78 per

respondents celebrated festivals with folk songs. Folk songs are an inseparable part of our life. They are main source of entertainment, self expression and inspirations. All social events, marriages and births, religious and seasonal festivals were found to be celebrated with songs and dances. Folk songs and dances are the most potent sources of entertainment and also provide space networking. Respondents in study area had more informal meetings rather than formal meetings or memberships.

From the overall view, it can be concluded that maximum respondents attended informal meetings as mela, festivals and religious ceremonies.

ICTs Ownership

ICTs can play a useful role in dissemination of information about health, agriculture and developmental programme to the general public. According to Mishra (2008) ICTs can be used for creating proper awareness, imparting education and prevention of various health diseases. Man today learns almost everything through different ICTs like television, radio, newspaper, magazines, books and films. The mass media are agency to disseminate information for the purpose. This variable was operationalized as the number of media possessed by an individual. The different media possessed by the respondents are studied in this variable.

From the perusal of Table 1, it can be inferred that all the respondents (100 per cent) owned television and mobile. Total 59 per cent respondents read newspaper followed by magazine (38 per cent). Radio was found to be possessed by only 43 per cent and 1.4 per cent respondents respectively. The findings were supported by Beshnoi *et al*. (2005) in her study found that majority of respondents possessed television with cable connection.

Development of Community Radio Programme

New and innovative topics were selected. Respondents were asked whether they know about these issues or they have no knowledge about those issues. Majority of respondents (99 per cent) were unaware about Expert System for different crops followed by You Tube Channels for farming (98 per cent). Maximum respondents (97 per cent) were unaware about Farmers portals and websites for welfare of farmers followed by Business apps helps to start enterprise (96 per cent). Total 89 per cent respondents were unaware about Government schemes for farmers in 2020. Thus, topics on which community programme were designed, developed and broadcast under the study were:

Table 2: Development of Community radio programme

S.No.	Category	Aware	Unaware
1.	Government schemes for farmers in 2020	11	89
2.	Business apps helps to start enterprise	4	96
3.	You Tube Channels for farming	2	98
4.	Farmers portals and websites for welfare of farmers	3	97
5.	Expert System for different crops	1	99

Knowledge test

To assess the difference in knowledge level, a knowledge test was undertaken before and after implementation of community Radio Programme with pre and post test methodology. This knowledge test was incorporated for all respondents to have relative assessment of the effect of community radio programme. The knowledge test thus, developed comprised of 30 questions based on five issues. Further, with a view to facilitate statistical analysis, scores were assigned to answer and for analysis on comparable basis, the aggregate scores for each respondent was calculated.

Relative Effectiveness of Community Radio Programme

After broadcast of Community radio programmes, Knowledge test was used to assess the post knolwdge level of respondents.

Thus, null hypothesis that respondents do not have higher post knowledge scores than pre knowledge scores is rejected and alternate hypothesis that respondents have higher post knowledge scores than pre knowledge scores is accepted.

It was concluded that the Community Radio programme had significant effect in terms of gain in knowledge. Respondents' knowledge is increased after applying the Community Radio programmes. This is supported by the findings of Beshnoi and Ahmed (2006) who found that there was significant difference in the pre and post test scores of overall knowledge of the respondents.

Table 3: Mean Scores of Pre test and post test

Pre test score X_1	Post test score X_2	Gain (X_2-X_1)
10.0	49.0	39.0

Respondents had poor initial knowledge about various issues as indicated by low score that is X_1 10.0 in pre test. Tremendous improvement in the knowledge of the respondent was evident due to their participation as their post-test score increased from 10.0 to 49.0. The gain in knowledge was 39.0.

From the overall view, it can be concluded that respondents got higher knowledge scores after administered community radio programme. This was found that community radio programme were effective to increase the knowledge level of the respondents.

CONCLUSION

On the above discussion, it can be concluded that majority of respondents have less knowledge about new and innovative techniques as well as schemes which were initiated by Government. Community radio can be a useful tool for empowerment of rural community. Community radio broadcast need based programme for the welfare of community. Thus, it can be inferred that community radio is useful tool for the development.

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SCIENTIFIC TOOL FOR MEASUREMENT OF ICT KNOWLEDGE OF EXTENSION PROFESSIONALS

S.R. Verma*, R. Sammauria, F.L. Sharma*** and P.N. Kalla******

ABSTRACT

The aim present study is to develop a scientific tool for measurement of ICT knowledge of Extension Professonals. Total 75 items were selected for inclussion of final knowledge test through knowledge of extension professionals will be measured. The range of the difficulty index was 8.33 to 93.33 and discrimination index was 0.10 to 0.92.

INTRODUCTION

The present era is rightly termed as an "Information era". In this 'Age of Knowledge' information and wide access to it is considered as wealth. People want adequate and authentic information as early as possible. In recent years, there is visible shift from the old ways to the modern ways of information delivery system. ICTs are increasingly being adopted as effective tool for reaching rural communities. Yet the benefits of the information revolution are still much debated, particularly, in case of developing countries like India.

Information and Communications Technology (ICT) is a global term that includes all technologies for the manipulation and communication of information encompassing: computers, internet, cell phones, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them. ICTs in fact encompass any medium for recording and broadcasting information like magnetic disk, optical disk, CD/ DVD, flash memory etc. Information and Communication Technologies are defined as electronic and digital technologies for storing, processing, transferring of information and communication. They are enabling technologies that allow quicker and more efficient exchange and processing of information.These new technologies are based on the silicon chips, the laser, fiber optics and a set of varying and diversified technologies. These include a wide variety of computing hardware (PCs, servers, mainframes, networked storage), personal hardware comprising mobile phones, personal devices, MP3 players, and much more; the full gamut of application software ranges from the smallest home developed spreadsheet to the largest enterprise packages and online software services; and the hardware and software needed to operate networks for transmission of information, again range from a home network to the largest global private networks operated by major commercial enterprises and of course, the internet.

Over the last three decades, remarkable developments have taken place in information and communication technology. The ICTs like desktop and laptop computers, tablet PCs, internet enabled technologies like e-mail, e-commerce, e-learning, e-conferencing, MIS, and other online services, cell phones, smart phones, tablet phone and mobile enabled services like SMS, MMS, GPRS, Mass messaging, Interactive voice response services, multimedia devices like web camera, digital camera, handy cam, data card, blue-tooth, pen drive, CD-ROMs & DVDs, various types of call centers, information kiosks, touch screen systems, expert systems, teleconferencing, video conferencing, computer assessed services, print media, electronic media, wireless application protocol (WAP), points of presence (pops), mixed media, satellite phone, FM radio, community radio, web based GIS and

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remote sensing have become fairly common among people.

The relevance of ICTs for agricultural development in general and for agricultural extension in particular is extremely high for a country like India. Agricultural extensionists act as direct link between the researchers and the farmers. In order to perform their role effectively and efficiently, they must have steady access to updated agricultural information. The basic problems in attaining access to updated information are lack of awareness, knowledge and attitude of the extension personnel. Thus, there is a need to assess the knowledge of extension personnel on advanced ICT tools and its role in agriculture.

Therefore it is need of time to construct and develop such tools which can accurately measure the knowledge level of extension professionals about ICT tools and techniques. Keeping in mind the above background, Scientific Tool for Measurement of ICT Knowledge of extension professionals was developed and tested for enabling future researchers in the area of ICT application in agriculture.

RESEARCH METHODOLOGY

Knowledge may be defined as a body of understood information possessed by an individual or by a culture. Knowledge was operationalized as extent of information known or possessed by the extension professionals on selected ICT tools. In the present study knowledge level of extension personnel on ICT refers to the level of knowledge possess by an individual on different ICT tools, their utility and applications in agriculture. For that purpose a test was developed. A test is a set of questions, each of which has a correct answer, to which the people respond (Ray and Mondal, 1999). For standardizing the selected items, the procedure suggested byAnastasi (1961) and followed by Srinivas *et al.* (2014) and Naveen kumar and Sendil kumar (2015) was adopted.

Steps for construction of knowledge test: With the help of following steps the researcher has developed the entire tool.

Item collection:

The content of knowledge test is composed of questions called items. In the entire study all the items are related to information & communication technologies. The items for the test were collected from different sources. All the statements related to knowledge of information & communication technologies were prepared with the help of relevant literature available, experts of ICT and experience of the researcher. To ensure that no important aspects have been left out, these items were again discussed with the concerned subject matter specialists and extension workers.

Initial selection of items:

Following criteria was taken into consideration for initial selection of item.

i. The item which was able to discriminate the well informed people from poorly informed people was selected.
ii. The items which were not understandable by people and the items which can be correctly answered by all or none were not included for the knowledge test.
iii. Knowledge item is the matter of fact and statement. So the items related to the fact and statements were selected.
iv. Item that motivate thinking rather than simple memorization were selected.

On the basis of above criteria 83 items were initially selected out of total 90 items collected for the test.

Administration & scoring of knowledge test items:

For purpose of study, 60 agricultural extension personnel of grass root level and middle level agricultural officers were selected randomly from Bundi and Kota district of Rajasthan state. Bundi and Kota districts were selected purposively. All the 83 knowledge items were administered to randomly selected 60 agricultural extension personnel and their responses were recorded and used for calculating the difficulty index and

discrimination index of each item.

Scoring pattern:

The respondents were asked to indicate their responses to each item in the knowledge test, and the correct answers were assigned score of 1, 2, 3 & 4 and incorrect answers a score of '0'. The total knowledge score for each item was calculated by summing up the scores given by all the respondents to the item.

Item Analysis:

The item analysis yields two indices i.e. difficulty index and discrimination index which was computed by following steps.

i. The items were checked and modified before administering as per necessity.

ii. The schedule was administered to the randomly selected respondents (60 respondents) for item analysis. These respondents will not be included in the sample for final study.

iii. The knowledge score of the individual respondent was calculated. The number of correct answer given by the respondents out of total items was the knowledge score.

iv. The knowledge score was arranged from highest to lowest order of magnitude or arranged in descending order.

v. The respondents were divided in to six groups (G1, G2, G3, G4, G5, G6) and arranged in descending order of the knowledge score.

vi. For the item analysis two middle groups G3, G4 were eliminated. Only four group with high and low score were considered for computation of difficulty index and discrimination index.

Calculation of Difficulty Index:

On the basis of below given formula Pi was calculated which is shown in the following table.

Formula: $P_i = n_i \div N_i \times 100$

Where:

P_i = Difficulty index in % of i_{th} item.

n_i = Number of respondents given correct answer to the i_{th} item.

N_i = Total number of respondents to whom the i_{th} item was administered.

Calculation of Discrimination Index:

On the basis of below given formula discrimination index was calculated which is depicted in the following table.

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

Where:

S_1, S_2, S_5, S_6: Were the frequencies of correct answers in group G1, G2, G5, G6

N = Total number of respondents in the sample of item analysis.

RESULTS AND DISCUSSION

Initial attempt was to prepare knowledge items that were found suitable for measuring the knowledge of agricultural extension personnel on ICT tools. For assuring the content validity, thorough review of relevant literature and discussion with experts were carried out for the purpose. Accordingly, 90 knowledge items were prepared. After making necessary modifications, a total of 83 items were screened out.

Final selection of items for test:

i. The final selection of the items was done on the basis of difficulty index & discrimination index.

ii. The range of the difficulty index was 8.33 to 93.33

iii. The range of the discrimination index was 0.10 to 0.92

iv. These values of indices were fixed on the basis of calculated value depicted in the table.

v. On the basis of difficulty index the 03 items were deleted.

vi. On the basis of discrimination index the 05 items were deleted.

vii. On the basis of both indices the total 08 items were deleted out of 83 and 75 items were selected for final scale.These selected items are presented in the table.

S.No.	Item/Statement	Difficulty Index	Discrimination Index
1.	What is computer?	91.66	0.25
2.	What is PC?	70.0	0.18
3.	What are the advantages of computer?	67.08	0.52
4.	Name the major manufacturer companies of computer.	54.16	0.60
5.	What is approximate cost of computer (PC)?	93.33	0.35
6.	Name the major parts of the computer.	62.91	0.85
7.	What is brain of the computer?	63.33	0.75
8.	Name the important input devices of computer	42.5	0.80
9.	What is the nature of printer as device?	42.33	0.35
10.	Name the important hardware of the computer.	52.08	0.35
11.	Name the software commonly used for computer application in agriculture.	29.16	0.90
12.	What is the latest version of operating system?	13.33	0.36
13.	What is the function of RAM in computer?	40.0	0.32
14.	What is the function of ROM?	8.33	0.65
15.	Give names of storage devices.	49.58	0.25
16.	What for saveas option in computer?	23.33	0.85
17.	What is the function of following shortcut keys	45.41	0.89
18.	What is use of sort option in computer?	11.66	0.78
19.	How do you create a new folder?	61.66	0.80
20.	How will you close the files, documents and programmes?	90.33	0.22
21.	Name commonly use font type for English typing.	60.0	0.92
22.	What is byte?	20.0	0.88
23.	What is Internet?	85.0	0.55
24.	Name the important internet service providers.	72.08	0.72
25.	What are the advantages of the Internet?	50.83	0.43
26.	What is WWW?	35.0	0.45
27.	What is high speed internet service?	43.33	0.85
28.	What is WiFy?	51.66	0.90
29.	What is data card?	56.66	0.30
30.	Name the essential devices for Internet conferencing (Audio and video).	32.50	0.80
31.	State the uses of Internet.	45.41	0.65
32.	What is mail ID?	61.66	0.60
33.	Give major search engines for searching desired information.	43.88	0.70
34.	Name the important websites for getting agriculture informations.	56.33	0.78
35.	What is LAN?	50.0	0.88
36.	What is WAN?	16.66	0.90
37.	What is mobile phone?	92.00	0.22

38.	Name the important manufacturer companies of mobile phone.	83.75	0.30
39.	Name the different types of cell phones.	43.75	0.45
40.	What is sim card?	92.0	0.26
41.	What are the basic requirements to buy a sim card?	79.16	0.15
42.	What is memory card?	83.33	0.54
43.	What are the advantages of mobile phone?	77.91	0.58
44.	State the name of mobile phone service provider	80.83	0.65
45.	Which type of mobile is useful for internet browsing?	60.0	0.70
46.	What are the uses of mobile phone?	71.25	0.84
47.	What is GPRS service?	43.33	0.92
48.	What type of agriculture information can be accessed through cell phone?	71.11	0.91
49.	What is Bluetooth service?	45.83	0.50
50.	What is IFFCO Kisan Sanchar Limited (IKSL)?	58.33	0.10
51.	What is 3 G service?	55.0	0.42
52.	What is Kisan Call Center?	92.0	0.32
53.	What is dialing number of Kisan call center?	90.00	0.15
54.	What are the timings for calling Kisan call center?	55.0	0.64
55.	What are the advantages of Kisan Call Center?	67.5	0.60
56.	What is the language used by experts for farmer's quarry?	60.0	0.60
57.	Name the mode of service to the farmers by Kisan Call Center.	31.66	0.55
58.	Name the fields in which Kisan Call Center provides the informations.	75.11	0.44
59.	Name the location of nodal office for Kisan call center in Rajasthan.	31.66	0.70
60.	Who is nodal officer of Kisan Call Center in Rajasthan?	19.66	0.80
61.	What is toll free number of CFCL agro services "Hello Uttam".	15.0	0.86
62.	What is toll free number of Mahindra KrishiMitra agro- advisory services?	20.0	0.82
63.	At how many levels information can be had through Kisan Call Center	42.22	0.75
64.	What is information kiosk?	48.33	0.85
65.	What kind of informations can be obtained from information kiosks?	21.66	0.78
66.	In which year Common Service Center (CSC) was started	26.66	0.86
67.	Who establish the Common service centers (CSCs)?	18.0	0.90
68.	What are the advantages of the information kiosk?	37.91	0.85
69.	What is common structure of information kiosk?	20.0	0.75
70.	Who is responsible for establishing Dairy Information Services Kiosks (DISK)?	41.66	0.90
71.	Name the services provided by Dairy Information Services Kiosks (DISK).	22.91	0.88
72.	What is Jan Mitra project?	21.66	0.55
73.	Who initiated E-Chopal?	80.0	0.55
74.	What designated name is for operator of common service center at village level?	33.33	0.91
75.	How many villages are covered by one CSC?	30.0	0.90

Reliability of the test:

According to Karlinger (1967) "Reliability is the accuracy or precision of measuring instrument". Here test-retest method was used for measuring the reliability of knowledge test. The test was administered to the same group of respondents numbering 30 at an interval of 15 days. The agreement between the scores was obtained from the two applications of same scale by means of correlation coefficient (rtt), which is called coefficient of dependability. The correlation coefficient (rtt) calculated was 0.83 which was significant at 1 per cent level of significance indicating that the scale is reliable.

Validity of the test:

The validity of the test depends upon the fidelity with which it measures what it is expected to measure. To find out the validity of the test content and construct validity of the test was examined. Questions were properly selected to cover the whole universe of the content of the knowledge. The selected questions were presented to a panel of subject matter specialists of information & communication technologies to find out the jury validity. All the experts rated the test as highly valid for measuring the knowledge of respondents about information & communication technologies. Only those questions which secured 80-85 per cent occurrence of expert's opinion were included in the final knowledge test.

Administration & scoring of knowledge test items:

The selected items on the basis of indices were incorporated in the final format of the interview schedule for administration to the sample respondent. The obtained score of these respondents will reflect the knowledge level of the sample.

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PERCEPTION AND SUGGESTIONS OF STUDENTS OF AGRICULTURE UNIVERSITY JODHPUR TOWARDS STUDENT READY PROGRAMME

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ABSTRACT

Student READY is part of the B.Sc. (Ag.) degree programme, which orient agricultural graduates in various rural developmental programme. This has a strong potential to prepare a better agricultural technocrats with high level of skill in combination with the modern outlook and management capacity. This study was conducted to know the students' perception on Students READY Programme at AU Jodhpur to seek suggestions from students for effective implementation. The data was collected from 132 students of three Colleges of Agriculture, AU Jodhpur by using pre structured interview schedule. The findings revealed that majority of the students belonged to rural background, and their families earn annual income of over two lakh/annum. It was noted that cent Per cent students were using mobile phone along with Internet. The Perception of the students regarding Student READY was satisfactory and its helped in the overall development of the students. All students suggested that stipend should be increased and should be for one entire cropping season rather than for one semester.

INTRODUCTION

Agriculture education in India have four essential components namely knowledge, skills, ability and experience. These components teach that what to do, how to do, how to simplify and convert functional skill in useful form and how to in minimize loses and increase efficiency. Therefore, it is very important to explain each component in details by a scheme through constituent bodies of ICAR. The efforts are made in the form of rural agriculture work experience (RAWE) as per the recommendation of Randhawa Committee (1992). This is redefined as student ready programme the scheme was launched by Hon'bl PM on 25th july, 2015 to conceptualize and reorient graduate of agriculture and allied subjects. This scheme ensure employability among the students and develop entrepreneur by improve knowledge, effective skills and compatible ability through gain experience. The scheme helps the students to start their own enterprises and become "job creator in place of job seeker" in the field of agriculture and allied sectors. As per the recommendation of 5th deans committee of ICAR agriculture university Jodhpur has adopted student READY and offers it for the students of B.Sc.Ag(Hons) final year in all three constituent colleges. In order to know the effectiveness of this programme among students the present study was undertaken to measure the perception level and get suggestions of students towards Student READY programme.

RESEARCH METHODOLOGY

The present study was conducted in all three Constituents colleges of AU Jodhpur namely CoA Jodhpur, Sumerpur and Nagour. Total 132 students those who were studying in B.Sc. (Hons) Ag Part 4th academic year 2020-2021 were selected as respondents. A structured interview schedule was use for the data collection. The data were collected through personal interview techniques with the help of RAWE coordinators of respective college. The collected data were tabulated and analyzed as per the modified scale of Arpita Sharma (2018). The data were analyzed with the help of Frequency, Percentage.

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RESULTS AND DISCUSSION

The collected informations reveals that majority (93.18%) of the students belongs to rural background and only 06.82 per cent from urban background. These results show that the Agriculture subject is preferred by rural communities because they direct related to this field. The fact given in Table 1 shows that majority (30.31%) of the parents were illiterate but 21.97 per cent got education upto Senior Secondary, rest of parents educated upto Middle level (13.64%) and only 12.12 per cent passed Primary school. This is very interesting that the education level does not effect on the choice for opting Agriculture stream for their wards. It was also noted that 84.85 per cent parents were farmers by profession and remaining 07.58 per cent work in the private enterprises, 06.06 per cent Govt. Employee and only 01.51 per cent have their own business. It was very noticeable that only twenty seven per cent student's families earn less than 1 lakh/annum (low category) followed by 57.58 per cent families earned between 1-2 lakh/annum (medium category) and only 15 per cent families get more than 2 lakh/annum (high category). It may be noted here that the Agriculture is still unstable and annual income of the farmer is not good to meet all family requirements. The students were categorized in to three categories as the data of table 1 shows that majority (87.12 per cent) of the students comes under medium category and 05.30

Table 1. General Information of the students (n=132)

Profile	Category	Frequency (f)	Percent (%)
Backgroud	(i) Rural	123	93.18
	(ii) Urban	9	6.82
Education Level of Parents	(i) Illiterate	40	30.31
	(ii) Primary	16	12.12
	(iii) Middle	18	13.64
	(iv) Secondary	15	11.36
	(v) Senior Secondary	29	21.97
	(vi) Graduate and above	14	10.6
Occupation of Parents	(i) Agriculture	112	84.85
	(ii) Govt Employee	8	6.06
	(iii) Private	10	7.58
	(iv) Business	2	1.51
Annual income of Family	Low:<1 lakh	36	27.27
	Medium:b/w 1-2 lakh	76	57.58
	High:>2	20	15.15
OGPA	Low:<6.57	10	7.58
	Medium: b/w 6.58 to 8.0	115	87.12
	High:>8.1	7	5.3
Mass media use	(i) Radio	25	18.94
	(ii) Television	75	56.81
	(iii) Newspaper	100	75.75
	(iv) Farm magazine/Journal	65	49.24
	(v) Internet	132	100
	(vi) Mobile	132	100

(Source: Own calculation)

per cent and 07.58 per cent stands in high and low category respectively. It was very exciting to mention here that Cent Percent students were using mobile phone along with internet but the knowledge perceived about recent agricultural information was not satisfactory. As the data shows that about 75.00 per cent students read Hindi newspapers daily and none prefer to read English newspaper but around fifty per cent student watch Television to Aquent with Agricultural innovations

Perception of students in achievement of Student READY: the perception of the students towards students READY was measured by a frequency and percentage. The students were asked to give their views on the selected statements as fully agree, somewhat agree and not agree. The students responses were noted and it reveals that 97.73 per cent students were fully agreed that Student READY improved my communication skills followed by Students READY developed confidence and professional competence to solve field problem (96.97%). While 93.18 per cent students were fully agree that Student READY provided me practical training in crop production followed by it helped me to get familiar with rural life (92.42%). And 90.91 per cent students were agree that Student READY helped me to understand village situations followed by Student

Table 2. Perception of students in achievement of Student READY

S. No.	Statement	Degree of Agreement		
		FA	SWA	NA
1.	Student READY helped me to get familiar with rural life	122 (92.42%)	10 (07.58%)	
2.	Student READY helped me to understand village situations	120 (90.91%)	12 (09.09%)	
3.	Student READY helped me to understand rural institutions	97 (73.48%)	35 (26.52%)	
4.	Student READY helped me to understand the socio economic conditions of farmers.	82 (62.12%)	50 (37.88%)	
5.	Student READY helped me to understand adoption patterns and adoption gaps	90 (68.18%)	36 (27.28%)	6 (04.54%)
6.	Student READY helped me to understand farmers' problems	108 (81.82%)	24 (18.18%)	
7.	Student READY helped me to understand farming system and farming	95 (71.97%)	37 (28.03%)	
8.	Student READY helped to improve my diagnostic skills	65 (49.24%)	59 (44.70%)	8 (06.06%)
9.	Student READY provided me practical training in crop production	123 (93.18%)	9 (06.82%)	
10.	Student READY improved my communication skills	129 (97.73%)	3 (02.27%)	
11.	Student READY provided me an opportunity to work with various Agri based institutions	87 (65.91%)	43 (32.58%)	2 (01.51%)
12.	Student READY given me competency to prepare farm plans for individual farm families	99 (75%)	33 (25%)	
13.	Student READY provided opportunity to meet role models in agriculture and increase my confidence	110 (83.33%)	22 (16.67%)	
14.	Student READY helped me to get acquainted with ongoing TOT programmes in agriculture	80 (60.60%)	43 (32.58%)	9 (06.82%)
15.	Student READY developed confidence and professional competence to solve field problem	128 (96.97%)	4 (03.03%)	

READY provided opportunity to meet role models in agriculture and increase my confidence (83.33%) whereas 81.82 per cent of the students had fully agreed that Student READY helped them to understand farmers' problems. It was also noted that Seventy-five per cent students fully agreed that Student READY given their competency to prepare farm plans for individual farm families. In this statement students are somewhat agreed, on that the programme help to improve their diagnostic skills (44.70%). It can be clearly noted from the above findings that improvement in communication skills were rated as the most achieved objective followed by Student READY developed confidence and professional competence to solve field problem.

In student READY programme extension teacher play a very important role as a bridge. They help students in every level of the programme because they understand the language both of the student and of farmers and solve their problems by understanding them. Since the major share of activities in student READY is of extension only, it is natural to find high rating by students for gain in communication skills.

Suggestions for improvement in Student READY Programme as given by students

We asked students about their suggestions for improvement in the programme. Most of the student come from the rural background and they have less sources of money so cent -per cent student suggest to increase the stipend followed by suggestion for Time of programme should be such that it will cover all the operations of all (98.46 per cent). About (96.97 per cent) students want that programme should be for one entire cropping season rather than for one semester while 93.18 per cent respondents wanted that time for each module in student READY to be increased. Where 92.49 per cent students

Table 3. Suggestions for improvement of student READY Programme

S. No.	Statement	Agree	Percent	Rank
1.	Time for each module in Student READY to be increased	123	93.18	IV
2.	Stipend should be increased	132	100	I
3.	Should be for one entire cropping season rather than for one semester	128	96.97	III
4.	University should increase its credibility and accessibility among farmers. This will change farmers' attitude towards AUJ and its students	65	49.24	X
5.	Convenience and time availability of farmers to be take care of	107	81.06	VIII
6.	Choose areas where majority of people are engaged in agriculture.	121	91.66	VI
7.	A mini Student READY of 1-2 weeks to do before actual Student READY to understand farmers about their problem and plan for the original Student READY.	36	27.28	XI
8.	Adequate publicity to be given prior to each programme	17	12.87	XII
9.	Activities on practical problem solving in field to be encouraged	122	92.42	V
10.	More exposure to transfer of technology programmes is required	117	88.63	VII
11.	Time of programme should be such that it will cover all the operations of all.	130	98.48	II
12.	Teachers should always act as role models.	85	64.39	IX

suggest that activities on practical problem solving in field to be encouraged. More than ninety per cent of the respondents (91.66 %) suggest to choose areas where majority of people are engaged in so they can learn actual conditions of agriculture and farmers. more exposure to transfer of technology programmes is required by (88.63%) of students. Convenience and time availability of farmers to be take care of (81.06%). Only 27.28 per cent of the student suggest that a mini student READY of 1-2 weeks to do before actual student READY to understand farmers about their problem and plan for the original student READY), And 12.87 per cent think that Adequate publicity to be given prior to each programme.

CONCLUSION

Student READY Programme is an exposure to the principles of "learning by doing" and "seeing is believing", which provides a direction to the students to think and act on their own. It offers a direction to the students to develop their knowledge, attitude and skill to graduate out as an expert and contribute in holistic development of agriculture. By this interview schedule, we find that mostly students were coming from rural background because of low education level they don't have much to do except agriculture so the primary occupation of respondent's parent's is agriculture and they have less than two lac annual income by farming. . Use of cell phone in this generation is increasing day by day. In this era of internet, we can expect that internet is the first choice of every students when it comes to use of mass media. In conclusion we found that student ready programme increase communication skill and develop personality. Moreover, in this programme student develop their confidence level and professional competence to solve field as we as their own problems. By collection data from student's suggestion for this programme is to increase the stifund because they come from such background where their parents can't efford such expenses and student also want time of programme should be such that it will cover all the operations and cover one entire cropping season rather than for one semester.

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MEASUREMENT OF KNOWLEDGE OF BENEFICIARIES ABOUT BACKYARD POULTRY FARMING PRACTICES

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ABSTRACT

Poultry farming is a viable activity and has got immense scope for growth in India. Poultry is making a significant contribution to improve the economy of rural and urban population. The present study has been aimed to measure knowledge of beneficiaries about Backyard poultry farming practices. The present investigation was conducted in the justification of SKNAU Jobner Jaipur Rajasthan. Jaipur district was purposively selected for the study purpose because maximum number i.e.120 farmers were benefited from this district.Out of a total 120 beneficiaries from Jaipur district, 80 beneficiaries were selected randomly for the study purpose.The data were collected with the help of personal interview technique through a suitable well-structured interview schedule for measuring knowledge of beneficiaries. For measuring the knowledge level of respondents, a knowledge Index was developed & score "1" was awarded for "Yes" answer & "0" for "No" answer The study concluded that majority of the beneficiaries i.e. 70.00 per cent belonged to middle level of knowledge, followed by high level of knowledge (21.30 per cent) and only 8.80 per cent beneficiaries were having low level of knowledge.Poultry beneficiaries showed a high level of knowledge about poultry farming practices on Housing (68.83 MPS), Feeding and Watering (64.50 MPS), Breeds and Breeding (56.02 MPS),Health care (54.47 MPS) and Marketing (53.29 MPS).

INTRODUCTION

In India, poultry farming occupies a pivotal position in bringing about the rapid economic growth. Indian poultry industry as it exists today is a mixture of traditional backyard system of poultry keeping and modern space age technology. The later has evolved from the former and has organized itself into a vertically integrated and organized form during last 40 years. The modern industry has achieved an impressive growth during this short period. The growth of industry has not only been in size but also in productivity, sophistication and quality. Modern intensive system of poultry accounts for about 70% of total poultry meat and egg production in the country at present. The traditional system of poultry keeping although still prevalent in tribal and rural areas of the country is losing its importance day-by-day under the impact of modernization and industrialization. Poultry farming does not only supplement the income of producer by way of eggs, meat and compost but also helps in increasing the employment avenues. Poultry industry is suitable from all walks of life.

Organized poultry farming, as opposed to backyard farming was introduced in the early sixties, as a part of the government approach for planned development of the agricultural sector. Initially, it gained ground as a commercial activity due to the extension work undertaken by the various agencies like the Department of Animal Husbandry, Agricultural Universities and Technical Cooperation Mission of Food and Agriculture Organization (FAO).

There exists a symbiotic relationship in men-land-livestock ecosystem. Livestock comprising of mainly cattle, buffaloes and poultry have a complementary, supplementary and sustainable relationship with crop under mixed farming system prevalent in our country. Poultry occupies a pivotal position among livestock based vocations to bring

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about rapid economic growth particularly benefiting the weaker sections of the farmers. Further, it needs low capital investment and yet assures quick returns, within weeks in case of broilers and months in case of layers.

Majority of families engaged in agriculture get employment only during the time of ploughing, sowing, harvesting, threshing etc. Most of the farmers are engaged in agricultural operation for about 8-9 months in a year. Under such conditions it is customary to keep poultry as a source of extra income. Poultry has a crucial place in India as the eggs and chicken meat are rich source of protein, vitamin and minerals. Poultry provides rich organic manure and is an important source of income and employment to millions of farmers and other persons engaged in allied activities in the poultry industry.Hence, the present investigation was carried out with the objective-

1. To measure the knowledge level of beneficiaries about Backyard Poultry Farming practices.

RESEARCH METHODOLOGY

The present investigation was conducted in Sri Karan Narendra Agriculture University, Jobner, Jaipur, Rajasthan. A project under RKVY on Backyard Poultry is being operated since 2014. To measure the knowledge level of the beneficiaries regarding recommended Backyard Poultry Practices Jaipur district was purposively selected for the study purpose because maximum number i.e.120 beneficiaries were benefited from this district.Out of a total 120 beneficiaries 80 (approximate 70%) beneficiaries were selected randomly for the study purpose. The selected beneficiaries belonged to six tehsils of Jaipur districts namely- Phulera, Chomu, Renwal, Amber, Dudu, & Phagi. So all the tehsils were selected for the study purpose. Purposive and random sampling technique was applied for the selection of beneficiaries for this study. The data were collected with the help of personal interview technique through suitable well-structured interview schedule of measuring knowledge of beneficiaries. In formulating the questions and statements for the schedule, the investigator has taken opinion and guidance of the experts and other extension personnel. The collected data were tabulated and analysed by using mean per cent score, mean, standard deviation, percentage and ranks. Investigator made knowledge test was used to measure the level of knowledge about Backyard Poultry Farming practices. The beneficiaries were categorized into three groups based on their Knowledge Index. The knowledge index of each beneficiary was calculated by using the following formula:

Knowledge Index (KI) =

$$\frac{\text{Total knowledge score obtained}}{\text{Maximum obtainable score}} \times 100$$

RESULTS AND DISCUSSION

To get an overview of the beneficiaries regarding their knowledge level about backyard poultry farming practices, they were classified into three categories viz., (i) Low (ii) Medium (iii) High level of knowledge. These categories were formed on the basis of Mean (34.78) and Standard Deviation (5.05).

Table 1: Distribution of beneficiaries according to their knowledge level regarding Backyard Poultry Farming

n=80

S. No.	Knowledge categories	Frequency	%
1	Low knowledge (<29.73 score)	07	08.80
2	Medium knowledge (score between 29.73 to 39.83)	56	70.00
3	High knowledge (>39.83 score)	17	21.20
	Total	**80**	**100.00**

Mean= 34.78, SD= 5.05

A perusal of data presented in Table -1 show that majority of backyard poultry beneficiaries (70.00 per cent) belonged to middle level of knowledge, followed by high level of knowledge

Table 2: Knowledge of the beneficiaries regarding recommended Backyard Poultry Farming Practices:

n=80

S.No.	Poultry Farming Practices	MPS	Rank
A	**Housing**		
1	Shelter for poultry birds	93.75	II
2	Floor space requirement per poultry bird	79.16	V
3	Type of floor	61.25	VI
4	Litter material provided in poultry shelters	93.78	I
5	Electric supply essential in poultry shelters	81.25	IV
6	Roofing material provided in poultry shelters	48.12	VII
7	Ventilation in poultry shelters	81.30	III
B	**Feeding and Watering**		
1	Daily feed requirement of poultry chicks	62.50	IV
2	Daily feed requirement of adult poultry birds	63.55	III
3	Balance diet of poultry birds	85.00	II
4.	Supply feed three times in a day	25.00	V
5	Clean and regular water supply	87.50	I
C.	**Breeds and Breeding**		
1	Breeds of backyard poultry	79.75	I
2	Sources for purchasing of chicks	48.00	III
3	Care of brooding hen	74.06	II
4	Procedure used in eggs testing	05.83	IV
D.	**Health Care**		
1	Control of ticks, lice, fleas and mites	93.75	II
2	Deworming medicines	10.41	VII
3	Vaccination in poultry birds	56.25	IV
4	Cleanliness of poultry house	97.50	I
5	Cleanliness of medicines	35.62	VI
6	Diseases of poultry	84.58	III
7	Consultancy from veterinarian/experts	50.00	V
E.	**Marketing**		
1	Appropriate time of sale of poultry products	77.50	III
2	Maximum price of products and demand in the market	50.00	IV
3	Marketing channels for poultry birds	35.50	V
4	Selling price of eggs	93.75	I
5	Selling price of broilers/chicken	87.50	II

(21.30%). Whereas, only 8.80 per cent were having low level of knowledge. High level of literacy, extension orientation and social participation among the farmers might be considered as a reason for high rate of knowledge among the beneficiaries. These findings are in accordance with the findings obtained by Bhuniya *et al.* (2013) Kumar *et al.* (2017). Knowledge of the beneficiaries was assessed under some aspects of poultry farming. The results have been presented under the following heads:

A. Housing:

A perusal of data incorporated in Table-2 explain that the beneficiaries had very rich knowledge of the litter material provided in poultry shelters (MPS 93.78) which was placed at first place in rank hierarchy. Also, the beneficiaries had excellent knowledge about shelter for poultry birds (93.75 MPS) followed by method of providing ventilation in poultry houses(81.30 MPS), The extent of knowledge about electric supply in poultry house was 81.25 per cent. Beneficiaries had Good knowledge about floor space requirement per bird (79.16 MPS), whereas knowledge about type of floor was 61.25%. The beneficiaries had knowledge about roofing materials provided in poultry shelters was 48.12 per cent.

These findings are in accordance with the findings obtained by Kumar *et al.* (2017) and Pratap *et al.* (2017)

B. Feeding and Watering:

It can be inferred from data presented in Table-2 that majority of the beneficiaries (87.50 MPS) knew about clean& regular water supply, balance diet of poultry birds, daily feed requirement of the adult birds, daily feed requirements of poultry chicks and supply of feed three times in a day.

These findings are in accordance with the findings obtained by Jat and Yadav (2012) and Bunkar (2016).

C. Breeds and Breeding:

Table 2 shows that the beneficiaries had knowledge about the breeds of backyard poultry was the extent of 79.75 per cent. The knowledge about care of brooding hen was 74.06 MSP. It was found that the extent of knowledge about sources of chicks purchase and testing of eggs was 48.00 and 05.83 per cent respectively.

These findings are in accordance with the findings obtained by Babu (2013) and Kumar *et al.* (2017).

D. Health Care:

It is noted from the Table 2 that the beneficiaries had good knowledge about health care practices like cleanliness of poultry houses (97.50 MPS), control of ticks, lice, fleas & mites (93.75 MPS), diseases of poultry (84.58 MPS), vaccination of poultry birds (56.25 MPS) and consultancy from veterinarian/experts (50.00 MPS), cleanliness medicines(35.62 MPS) and deworming medicines (10.41 MPS).

The findings are in agreement with the findings reported by Jat and Yadav (2012) and Choudhary *et al.* (2017).

E. Marketing:

Table 2 also shows that the backyard poultry beneficiaries had good knowledge about selling price of eggs (93.75%) and broilers/chicken (87.50 MPS), the appropriate time of sale of poultry products (77.50%). It was found that beneficiaries (50.00 MPS) had average knowledge about maximum prices of products and demand in market. The knowledge about marketing channels for poultry birds was to be noted 35.50%.

The findings are in agreement with the findings obtained by Ravindra (2004) and Bhuniya *et al.* (2013).

Table 3 explains that the knowledge level was highest regarding Housing Practices (68.83 MPS), followed by Feeding & Watering Practices (64.50 MPS), Breeds & Breeding Practices (56.02 MPS), Health Care Practices (54.47 MPS) and Marketing Practices (53.29 MPS). The medium level of knowledge about backyard poultry rearing practices might be due to the factors like ignorance in getting

sufficient information, lack of conviction, medium level of education and income.

Table 3: Overall Knowledge of beneficiaries regarding recommended Backyard Poultry Practices

n=80

S. No.	Overall knowledge level	MPS	Rank
1	Housing Practices	68.83	I
2	Feeding & Watering practices	64.50	II
3	Breeds & Breeding Practices	56.02	III
4	Health Care Practices	54.47	IV
5	Marketing Practices	53.29	V

The findings are in accordance with the findings suggested by Jat and Yadav (2012) and Bunkar (2016).

CONCLUSION

The study concluded that majority of the beneficiaries (70.00 per cent) belonged to middle level of knowledge, followed by high level of knowledge (21.30 per cent) and only 8.80 per cent beneficiaries were having low level of knowledge. The study also explains that maximum knowledge was found with respect to Housing Practices (68.83 MPS) i.e. litter material provided in poultry shelters,shelters for poultry birds, Feeding and watering practices (64.50 MPS) i.e. clean water supply, balance diet of poultry birds, Breeds & Breeding Practices (56.02 MPS) i.e. the breeds of backyard poultry, care of brooding hen, Health Care Practices (54.47 MPS) i.e. cleanliness of poultry houses, control of ticks, lice, fleas & mites and minimum knowledge about Marketing practices (53.29 MPS) i.e. selling price of eggs and broilers/chicken, the appropriate time of sale of poultry products.

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DETERMINANTS OF ADOPTION OF SOLAR PUMPS BY THE FARMERS IN JODHPUR DISTRICT OF RAJASTHAN

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ABSTRACT

A solar pumping is a pump running on electricity generated by solar photovoltaic panels available from collected sunlight as opposed to grid electricity or diesel run water pumps. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance cost. The research study was conducted in Jodhpur district of Rajasthan. There are total seven tehsils in Jodhpur district of Rajasthan, out of which, two tehsils namely Osian and Balesar were selected on the basis of maximum number of installed of solar pumps. Ten villages from each selected tehsil were selected on the basis of maximum number of solar pumps beneficiaries. One hundred twenty five (125) respondents were selected from twenty selected villages these were having maximum number of solar pumps selected for study. The study clearly showed that majority of respondents (69.60 per cent) of overall respondents were in the medium level of adoption group, followed by 22 respondents (17.60 per cent) with low adoption and only 16 respondents (12.80 per cent) with high adoption level about solar pumps.

INTRODUCTION

Solar energy is the origin for all forms of energies which can be used either through the thermal route i.e. using heat for cooking, drying, heating by generating electricity or through the photovoltaic route which converting solar energy into electricity there can be specially used for lighting, pumping, cooling, electrical equipments and devices. Solar pumping robust fusion in rural development, available technology and ecological conservation for increasing living standards, farmers income and improving the living conditions of women by reducing labour intensity and reducing poverty.

The Jawaharlal Nehru National Solar Mission was launched on the 11th January, 2010 by the Prime Minister Govt of India. The Mission was set the ambitious target of deploying 20,000 MW of grid connected solar power by 2022 aimed at reducing the cost of solar power generation in the country through long term policy, large scale expansion goals and domestic production of critical raw materials, components and products, as a result to achieve grid tariff parity by 2022 (Source: Encyclopedia).

According to Ministry of New and Renewable Energy (MNPE) Rajasthan has potential of 142 GW of electricity from solar energy. Solar plant of 4,637 MW has been commissioned in state up to December 2019. Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM-KUSUM) Yojana was launched by the Government of India to increase the income of farmers and provide sources of irrigation for agricultural sector. Any farmers, group of farmers, panchayats and cooperatives can apply under *KUSUM Yojana* to get benefits of solar pumps. Govt provides 60 per cent subsidy to farmers and 30 per cent of total cost by govt as loan and remaining 10% contributes by the beneficiary.

RESEARCH METHODOLOGY

The research study was conducted in Jodhpur district of Rajasthan. There are total seven tehsils in

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Jodhpur district of Rajasthan, out of which, two tehsils namely Osian and Balesar were selected on the basis of maximum number of installed of solar pump. Ten villages from each selected tehsil were selected on the basis of maximum number of solar pumps beneficiaries. 125 benificieies were selected from twenty selected villages by these were having maximum number of solar pumps were selected for research study. Data and information were collected by investigator through personal interview technique with the help of interview schedule. Thereafter, data were tabulated and various statistical measures *viz.* per cent, mean, mean per cent scores, standard deviation, ranking and correlation were used to arrive at specific inferences.

RESULTS AND DISCUSSION

(i) Adoption level of farmers about solar pumps

Under this section it was tried to find out the level of adoption of farmers about solar pumps. The adoption of solar pumps by the beneficiaries was assessed by making three categories on the basis mean (50.73) and standard deviation (3.67) as low, medium and high adoption category. The data regarding level of adoption is given in Table 1.

The data presented in Table 1 show that majority of respondents (69.60%) were in the medium level of adoption group, followed by 22 respondents (17.60%) with low adoption, and only 16 respondents (12.80%) respondents with high adoption level about solar pumps. It might be concluded that most of respondents were belonged to group of medium adoption of solar pumps. It might be due to the frequent contacts of beneficiary farmers with personnels working in horticulture, Panchayat and extension department.

(ii) Aspect wise adoption level of respondents about solar pumps

It was found from the Table 2 that of use direct current pumps and accurate current pump and use solar pump for irrigation was rank first and second with 99.47 and 99.2 MPS respectively. It was noted that use drip/sprinkler irrigation through solar pumps (98.93 MPS), maintain the space of panels regularly (98.67 MPS) and save water through solar pump as compare to electricity / diesel pumps (98.40 MPS) were third, fourth and fifth ranked. Further the respondents had less adoption regarding use of satisfied with the water outflow of the pumps (72.53 MPS), training regularly related to operation and maintenance of solar pumps (69.87 MPS), use solar pumps in different fruit plant on farm (63.47 MPS), use solar pumps for vegetable crops (62.67 MPS), use of solar pumps for drinking water supply (47.20 MPS) and use solar water heater 36.80 MPS which were ranked fifteen, sixteen, seventeen, eighteen, nineteen and twenty, respectively. It was observed that it may be due to lack of knowledge and awareness about solar pumps operation and maintenance of solar pumps and solar water heater may causes less adoption of solar pumps.

The respondents also narrated that they could not get extension exposure regularly related to the solar pumps is the main problem. It might be due to the facts that extension workers, village development officer, extension agents and supervisor do not provided sufficient information and lack of information regarding profitability, communication gap between respondents and extension expert about solar pumps technology.

The similar results were also reported by

Table 1. Distribution of respondents on the basis of level of adoption about solar pumps

n=125

S.no	Adoption level	Frequency	Percentage
1.	Low Adoption level (score below 47.21)	22	17.60
2.	Medium Adoption level (score from 47.22 to 54.56)	87	69.60
3.	High Adoption level (Score up to 54.56)	16	12.80
	Total	125	100.00

Mean= 50.73, SD=3.67

Table 2. Aspect wise adoption level of respondents about solar pump

n=125

S. No.	Aspects	MPS	Rank
1	Did you use solar pumps for irrigation?	99.2	II
2	Did you use solar pump for vegetables crops?	62.67	XVIII
3	Did you use solar water heater?	36.8	XX
4	Did you use direct current (DC) and alternate current (AC) pump?	99.47	I
5	Did you use solar fence chargers?	94.13	XI
6	Did you use drip/sprinkler irrigation through solar pump?	98.93	III
7	Did you use solar pump in different fruit plants on your farm?	63.47	XVII
8	Did you save water through solar pump as compare to electricity/ diesel pumps?	98.4	V
9	Did you save the labor cost by using solar pump?	92.53	XII
10	Have you used the subsidy scheme?	94.4	X
11	Do you increase the irrigation efficiency through solar pump?	94.67	IX
12	Did you get trainings regularly related to operation and maintenance of solar pump?	69.87	XVI
13	Use of solar pump for drinking water supply?	47.2	XIX
14	Are you satisfied with the conversion efficiency of PV panel?	85.6	XIV
15	Are you satisfied with the performance of PV panel?	97.87	VII
16	Have you satisfied with the performance of battery storage?	98.13	VI
17	Are you satisfied with the water outflow of the pump?	72.53	XV
18	Are you satisfied by the performance of the solar pump?	88	XIII
19	Have you maintains the space of panels regularly?	98.67	IV
20	Have you clean the panels regularly?	97.6	VIII

MPS=Mean Percent Score

Raghuwanshi *et al.* (2020) who indicated that 65.83 per cent of the total respondents were in the medium level of adoption group, whereas 20.83 per cent respondents were in low adoption group and remaining 13.34 per cent were observed in the category of high level of adoption about solar energy technology.

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CONSTRAINTS AND SUGGESTIONS IN ADOPTION OF RECOMMENDED FINGER MILLET PRODUCTION TECHNOLOGIES

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ABSTRACT

The present research was undertaken to assess different constraints and suggestion of the farmers in adoption of recommended finger millet production technologies. The present study was conducted in 3 talukas of Dangs district falling under South Gujarat Heavy Rainfall Zone-I Agro Ecological Situation-I with a sample size of randomly selected 150 farmers. The study concluded that main constraints in adoption of recommended technologies for the farming community of finger millet crop were lack of availability of irrigation, insufficient capital, lack of knowledge about time of planting and spacing, the visit of the extension personnel is not in time and fluctuation in the prices of crops. The main suggestions from the farmers to overcome the constraints were improved varieties of crop should be made available, there is a necessity of nearby markets, the technical guidance should be made available in time and timely information about crop prices should be made available the dangs district of Gujarat state.

INTRODUCTION

Dangs district comes under South Gujarat Heavy Rainfall Zone-I Agro Ecological Situation-I having total 172366 ha land. Out of that, 53.74% is occupied with forest and only 33.80% of land comes under cultivation and cultivable fallow. The district is remote forest area and characterized mainly by tribal. The cropping pattern of the district is single rainfed crops. The major crops in kharif are paddy, finger millet, little millet, sorghum, black gram etc. Total sowing area is 7800 ha. and productivity is 1600 Qt/ha. Average productivity of finger millet crops is low in the Dangs district. It is mainly because of poor knowledge as well as poor adoption of scientific technology in cereal crop cultivation. A wide gap exists between the yield obtained and the potential yield. Well planned and comprehensive study to gather the desired information was felt necessary. The main objective in our agricultural strategies is to increase the total agricultural production as well as to puss the efficiency various input used by rural community. The constraints and suggestions of recommended technologies of finger millet by the farmers is prime importance. Present study was undertaken to assess the constraints and suggestions in adoption of recommended finger millet production technologies in the Dangs district of Gujarat state.

RESEARCH METHODOLOGY

The present study was conducted in the Dangs district of the Gujarat state. For the purpose of this study, Out of three taluka, Waghai, Ahwa and Subir 05 villages from each taluka was randomly selected. A total sample of 150 respondents, 10 from each village was selected at random for the study with the help of random sampling methods. Collection of data was accomplished by supplying the well-structured schedule from farmers. Constraints refer as the items of difficulties faced by the farmers in the adoption of recommended finger millet production technologies. The responses of respective farmers were gathered on open ended schedule. In this regards the farmers were asked to mention their constraints and valuable suggestion. The response about constraints and suggestions

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were summed up and converted into frequency and lastly in percentage. The ranking method was applied to realise its weightage in availing in adoption of recommended finger millet production technologies.

RESULTS AND DISCUSSION

The outcome of the present study has been presented here after applying the appropriate statistical analysis. The results have been described under the following sub heads in the light of the objectives of the study.

A. Socio-economic profile of the respondents

The data regarding socio-economic and personal characteristics of respondents were analyzed and presented in the following sequence.

1. Age

Table 1: Distribution of respondents according to their age

n= 150

Sr.	Age groups	Frequency	%
1.	Young age	25	16.6
2.	Middle age	94	62.7
3.	Old age	31	20.7
	Total	150	100
	Mean	46.94	
	SD	11.88	

It is clear from the data in the table 1 that less than Two third (62.70 per cent) of the respondents were in the middle age group. The respondents found in old and young age group were 20.70 per cent and 16.70 per cent, respectively.

2. Education

It becomes clear from the data in table 2 that slightly less than one half (48.70 per cent) of the respondents were found to have Primary level of education. The respondents from Secondary and Higher secondary level of education and its above level were 35.30 and 12.70 per cent, respectively. 03.30 percent respondent was found illiterate.

Table 2: Distribution of respondents according to their education

n= 150

Sr.	Level of education	Frequency	%
1.	Illiterate	19	12.7
2.	Primary level of education	73	48.7
3.	Secondary and Higher secondary level of education	53	35.3
4.	College level of education and above	5	3.3
	Total	**150**	**100.00**

3. Land holding

Table 3: Distribution of respondents according to their land holding

(n= 150)

Sr.	Land holding	Frequency	%
1.	Small and marginal farmer	50	33.3
2.	Medium farmer	61	40.7
3.	Big farmer	39	26.0
	Total	**150**	**100.00**

The data presented in table 3 indicate that 40.70 per cent of the respondents belonged to the medium farmers, while 33.30 and 26.00 per cent respondents belonged to the category of small and marginal farmers and big farmers respectively.

4. Social participation

Table 4: Distribution of respondents according to their Social participation

n=150

Sr.	Social Participation	Category of farmers	
		Number	%
1.	No membership	104	69.33
2.	Membership in one organization	38	25.33
3.	Membership in more than one organization	8	05.34
	Total	**150**	**100**

The data furnished in Table 4 indicates that near about more than one half of beneficiary farmers (69.33%) had belonged to no membership in any organization, followed by member in one organization (25.33%) and membership in more than one organization (05.34 %), respectively.

5. Occupation

Table 5: Distribution of respondents according to their Occupation

n=150

Sr.	Occupation	Category of farmers	
		Number	%
1.	Farming only	06	04.00
2.	Farming + Animal Husbandry	65	43.30
3.	Farming + Business	05	03.30
4.	Farming + Service	03	02.00
5.	Farming + Labour work	67	44.70
6.	Farming + Animal Husbandry + Service	04	02.70
	Total	**150**	**100**

It is clear from the Table 5 that majority (44.70%) of farmers had Farming + Labour work, while (43.30 %) had Farming + Animal Husbandry activities. So the main occupation of the farmers is Farming + Animal Husbandry+ Labour work

6. Risk orientation

Table 6: Distribution of respondents according to their level of Risk orientation

n=150

Sr.	Level of Risk orientation	Category of farmers	
		Number	%
1.	Low level of risk orientation (up to 17.53)	22	14.7
2.	Medium level of risk orientation (17.53 to 21.27)	106	70.7
3.	High level of risk orientation (Above 21.27)	22	14.6
	Total	150	100
	Mean	19.40	
	SD	1.87	

A glance at Table 6 reveals that majority of the respondents (70.70%) had medium level of risk orientation, followed by low (14.70%) and high (14.60 %) level of risk orientation, respectively.

7. Economic Motivation

Table 7: Distribution of respondents according to their level of economics motivation

n=150

Sr.	Level of economic motivation	Frequency	%
1.	Low level of economic motivation	21	14.0
2.	Medium level of economic motivation	117	78.0
3.	High level of economic motivation	12	8.0
	Total	150	100
	Mean	20.70	
	SD	1.55	

It is clear from the data in the table 7 that more than three forth (78 per cent) of the respondents were in the middle level of economic motivation, followed by 14.00 per cent of them with low and 8.00 per cent of them were with high level of economic motivation, respectively.

8. Scientific orientation

Table 8: Distribution of respondents according to their level of scientific orientation

n=150

Sr.	Level of scientific orientation	Frequency	%
1.	Low level of scientific orientation	21	14.0
2.	Medium level of scientific orientation	106	70.7
3.	High level of scientific orientation	23	15.3
	Total	150	100
	Mean	23.02	
	SD	2.33	

Table 9. Constraints in adoption of recommended technologies for the farming community of finger millet crop

n =150

Sr. No.	Constraints	Most important	Important	Least important	Not important	Total Score	Rank
1.	**Input supply constraints**						
(a)	Lack of availability of guaranteed and improved variety of crop	39 (26.00)	76 (50.67)	33 (22.00)	02 (1.33)	452	III
(b)	Lack of compost and chemical fertilizers	46 (30.66)	35 (23.33)	60 (40.00)	09 (06.00)	418	IV
(c)	**Lack of availability of irrigation facility**	**106 (70.67)**	**28 (18.67)**	**16 (10.66)**	**00 (00.00)**	**540**	**I**
(d)	Lack of supply of insecticides and pesticides in times	93 (62.00)	22 (14.67)	31 (20.67)	04 (02.66)	504	II
(e)	Lack of availability of skilled labour	04 (02.67)	59 (39.33)	57 (38.00)	30 (20.00)	337	V
2.	**Economical constraints**					**Total Score**	**Rank**
(a)	Non-availability of credit	16 (10.67)	38 (25.33)	52 (34.67)	44 (29.33)	326	IV
(b)	More cost of cultivation	11 (7.33)	66 (44.00)	64 (42.67)	09 (06.00)	379	II
(c)	High rates of labour wages	06 (04.00)	53 (35.33)	79 (52.67)	12 (08.00)	353	III
(d)	**Insufficient capital**	**59 (39.33)**	**65 (43.33)**	**25 (16.66)**	**01 (0.68)**	**482**	**I**
(e)	Non-availability of finance by the cooperative societies in time	00 (00.00)	07 (04.67)	80 (53.33)	63 (42.00)	244	V
(f)	High rates of interest on the loans	0 (00.00)	4 (02.66)	68 (45.33)	78 (52.00)	226	VI
3.	**Technological constraints**					**Total Score**	**Rank**
(a)	**Lack of knowledge about time of planting and spacing**	**68 (45.33)**	**55 (36.67)**	**24 (16.00)**	**3 (02.00)**	**488**	**I**
(b)	Lack of knowledge about availability of seedlings/grafts	38 (25.33)	73 (48.67)	37 (24.67)	02 (1.33)	447	II
(c)	Lack of knowledge about timely application of fertilizers	39 (26.00)	57 (38.00)	42 (28.00)	12 (08.00)	423	III
(d)	Lack of knowledge about export of the crops	31 (20.67)	41 (27.33)	55 (36.66)	23 (15.34)	380	IV
4.	**Extension constraints**					**Total Score**	**Rank**
(a)	**The visit of the extension personnel is not in time**	**37 (24.67)**	**72 (48.00)**	**38 (25.33)**	**3 (02.00)**	**443**	**I**
(b)	The extension personal are lacking in the knowledge of the crop cultivation	07 (04.67)	14 (09.33)	36 (24.00)	93 (62.00)	235	VI
(c)	Result and method demonstrations are not conducted	16 (10.66)	84 (56.00)	47 (31.33)	03 (02.00)	413	III
(d)	The visit are not organized by the extension workers to the Agricultural Universities, Research Centres etc.	23 (15.33)	75 (50.00)	48 (32.00)	04 (02.67)	417	II
(e)	Audiovisual aids are not used by the extension workers	17 (11.33)	47 (31.33)	79 (52.67)	07 (4.67)	374	IV
(f)	Lack of availability of literature in local language	01 (0.67)	20 (13.33)	68 (45.33)	61 (40.67)	261	V
5.	**Marketing constraints**					**Total Score**	**Rank**
(a)	**Fluctuation in the prices of crops**	**114 (76.00)**	**28 (18.67)**	**6 (04.00)**	**2 (1.33)**	**554**	**I**
(b)	The rates are not according to the grades of the crops	71 (47.33)	24 (16.00)	24 (16.00)	31 (20.67)	435	II
(c)	More cost of the packaging	10 (06.67)	23 (15.33)	33 (22.00)	84 (56.00)	259	IV
(d)	Middlemen takes more commission	43 (28.67)	35 (23.33)	26 (17.33)	46 (30.67)	375	III

It is found in the Table 8 that more than two third (70.70 per cent) of the respondent had medium level of scientific orientation, followed by 15.30 per cent of them with high and 14.00 per cent of them with low level of scientific orientation. Thus, it can be concluded that majority (70.70 per cent) of the respondents were with medium level of scientific orientation.

B. Constraints faced by the respondents

The main constraints in adoption of recommended technologies for the farming community of finger millet crop were lack of availability of irrigation facility (70.67 %), insufficient capital (43.33 %), lack of knowledge about time of planting and spacing (45.33 %), the visit of the extension personnel is not in time (48.00 %) and fluctuation in the prices of crops (76.00 %) as realized by the farmers.

C. Suggestions given by the respondents

The main suggestions from the farmers to overcome the constraints were improved varieties of crop should be made available (298 score), there is a necessity of nearby markets (297 score), the technical guidance should be made available in time (296 score) and timely information about crop prices (295 score) should be made available.

CONCLUSION

Majority of farmers had Middle age group, Primary level of education, Medium farmers, No membership in any social organization, main occupation is Farming + Labour work, Medium level of risk orientation, Medium level of economic motivation, Medium level of scientific orientation and Medium level of attitude towards finger millet crop.

The main constraints in adoption of recommended technologies for the farming community of finger millet crop were lack of availability of irrigation, insufficient capital, lack of knowledge about time of planting and spacing, the visit of the extension personnel is not in time and fluctuation in the prices of crops

The main suggestions from the farmers to

Table: 10 Suggestions from the farmers to overcome the constraints

n =150

Sr. No.	Suggestions	Yes	No	Total Score	Rank
1.	**The improved varieties of crop should be made available**	**148**	**02**	**298**	**I**
2.	The seeds should be available in time with reasonable price	115	35	265	VIII
3.	The chemical fertilizers should be made available timely and as per the requirements	66	84	216	XII
4.	The insecticides and pesticides should be made available in time and at cheaper rates	88	62	238	XI
5.	The co-operative institutions and banks should provide loans in time	99	51	249	IX
6.	**There is a necessity of nearby markets**	**147**	**03**	**297**	**II**
7.	**Timely information about crop prices should be made available**	**145**	**05**	**295**	**IV**
8.	The co-operative organizations should be established for marketing	141	09	291	V
9.	The crop processing industries should be established	97	53	247	X
10.	**The technical guidance should be made available in time**	**146**	**04**	**296**	**III**
11.	The export of crops should be done through co-operatives	139	11	289	VI
12.	The availability of skilled labour at required time and reasonable wages	128	22	278	VII

overcome the constraints were improved varieties of crop should be made available, there is a necessity of nearby markets, the technical guidance should be made available in time and timely information about crop prices should be made available

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ADOPTION OF WATERSHED TECHNOLOGY OF DESERT DEVELOPMENT PROGRAMME BY THE FARMERS

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ABSTRACT

The aim of present study are proper land use, protecting land against all forms of deteriorations, building and maintaining soil fertility, conserving water for farm use, proper management of local water for drainage, flood protection and sediment reduction and increasing productivity from land use. The study was conducted in Jodhpur and Barmer districts of Jodhpur region. Fifteen watershed area were randomly selected from Jodhpur and twelve from Barmer district. A sample of 100 beneficiary farmers from Jodhpur district and 80 beneficiaries farmers from Barmer districts and equall number of non- beneficiary farmers from both districts were selected. Thus, the overall sample consisted of 360 respondents i.e. 180 beneficiary and 180 non - beneficiary farmers of watershed technology of Desert Development Programme. The study show that the 66.67 per cent of the beneficiary farmers were found in medium adopter, whereas 18.33 and 15.00 per cent of the low and high adopters and in case of non- beneficiary farmers, that 52.22 per cent were medium adopters, whereas 35.56 and 12.22 per cent were low and high adopters of watershed technology of Desert Development Programme.

INTRODUCTION

Watershed development refers to the conservation, regeneration and the judicious use of all the natural resources particularly land, water, vegetation and animals and human development within the watershed area. Watershed development approach is based on participatory planning following a bottom up approach for developing a context appropriate plan for execution, empowerment and employment of people. Looking to the importance of watershed development programme, the present study to study the adoption of watershed technology of desert development programme by the farmers Jodhpur region of Rajasthan was undertaken.

RESEARCH METHODOLOGY

The study area was conducted in Jodhpur region in desert area of Rajasthan. Jodhpur region comprises six districts viz., Jodhpur, Jaisalmer, Barmer, Sirohi, Pali and Jalore, out of these, two districts namely Jodhpur and Barmer were selected randomly. Total nine panchayat samities i.e. 5 from district Jodhpur and 4 from Barmer district were selected randomly as per availability of watersheds under Desert Development Programme.

Total twenty seven watersheds from nine panchayat samities of both Jodhpur and Barmer district were selected and 100 beneficiary farmers from selected five panchayat samities of district Jodhpur and 80 beneficiary farmers from selected four panchayat samities of district Barmer were selected randomly. The equal number of non-beneficiary farmers was also selected from nearby non watershed areas who were having similar socio-economic status.

RESULTS AND DISCUSSION

The data pertaining to extent of adoption of watershed technology of Desert Development Programme were analyzed and presented based on mean and standard deviation (S.D) as follows :

S. No.	Adoption Category	Limit
1	Low adopters	Less than (Mean- S.D)
2	Medium adopters	Between (Mean- S.D.) and (Mean + S.D.)
3	High adopters	More than (Mean + S.D.)

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Table 1. Extent of adoption of watershed technology by the beneficiary and non- beneficiary farmers of Desert Development Programme

	Adoption categories	No. of Respondents	Per cent	Mean	SD
Beneficiary farmers (N= 180)	Low (scores below 38.52)	33	18.33	51.68	13.16
	Medium (scores from 38.52 to 64.84)	120	66.67		
	High (scores above 64.84)	27	15.00		
Non-beneficiary farmers (N= 180)	Low (scores below 33.35)	64	35.56	46.74	13.39
	Medium (scores from 33.35 to 60.43)	94	52.22		
	High (scores blow 60.43)	22	12.22		

The data presented in table 1 indicate that 66.67 per cent beneficiary farmers were found in the category of medium adopter of watershed technology of Desert Development Programme whereas 18.33 and 15.00 per cent of the beneficiary farmers were found in the category of low and high adopters of watershed technology of Desert Development Programme, respectively. Hence, it could be concluded that the majority of the beneficiary farmers were medium adopters of watershed technology of Desert Development Programme.

In case of non- beneficiary farmers, it was observed that 52.22 per cent were medium adopters of watershed technology of Desert Development Programme, whereas 35.56 and 12.22 per cent were low and high adopters of watershed technology of Desert Development Programme, respectively. Hence, it could be concluded that the majority of non- beneficiary farmers were medium adopters. It is also evident from the data given in table indicate that the adoption of watershed technology of Desert Development Programme was found higher among beneficiary farmers in comparison to non beneficiary farmers as indicated by their comparative mean score i.e. 51.68 and 46.74, respectively. This might be attributed due to the knowledge factor which on measuring has shown remarkable difference in both the categories of respondents i.e. beneficiaries and non- beneficiary farmers.

The findings are in conformity with the findings of Patel *et al*., (2002), Khandelwal (2009) and Kulshrestha *et al*. (2010).

CONCLUSION

The majority of the beneficiary farmers (66.67%) had medium adopters of watershed technology of Desert Development Programme, whereas 18.33 and 15.00 per cent of the beneficiary farmers were low and high adopters and in case of non-beneficiary farmers 52.22 per cent were medium adopters, whereas 35.56 and 12.22 per cent were low and high adopters of watershed technology of Desert Development Programme, respectively.

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IMPACT OF CLUSTER FRONT LINE DEMONSTRATION ON GREEN GRAM CROP

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ABSTRACT

The present study was conducted at KVK, Maulasar, Nagaur-II during 2018 to 2020 in the Kharif season with seventy five cluster frontline demonstrations at Nagaur district of Rajasthan. The results of demonstrations showed that farmers could increase the green gram productivity notably by adoption of improved production technology. From the present study, it was observed that the improved green gram variety GAM-5/GM-6 recorded the higher yield (6.17 q/ha) as compared to the farmers' practices (5.03 q/ha). The increase in the demonstration yield over farmer's practices was 21.49%. Technology gap, extension gap and the technology index values were 3.02 q/ha, 1.20 q/ha and 32.27%, respectively. The increment in yield of green gram crop under demonstrated plot was due to spreading of improved and latest technology viz., improved variety, seed treatment with bio-fertilizers, optimum seed rate, right dose & method of fertilizers, weed management and plant protection measures.

INTRODUCTION

India is the largest producer, consumer and importer of pulses. Pulses are a good and chief source of protein. Contribution of pulses to Indian agriculture has been tremendous besides being one of the important constituents of our diet which rich in protein. Among the grain legumes, green gram [*Vigna radiata* (L.) Wilczek], commonly known as Moong; is an excellent source of high quality protein (25%). In India Rajasthan, Maharashtra, AP, Bihar, Karnataka, Gujarat are the major growing states of greengram. In Rajasthan, green gram was cultivated in an area of 6.52 lakh ha with production 4.08 lakh tonnes and productivity 626 kg/ha during the year 2018-19 (Commissionerate of agriculture, Rajasthan-Jaipur, 2018-19). Even though pulse production increased significantly during the last decade but continuing the rapid growth is a challenge for researchers, extension agencies and policy makers to fulfill the domestic demand. Yield potential of green gram is also very low because of the fact that the crop is mainly grown in rainfed conditions and marginal lands with poor management practices (Use of local variety, poor INM, IWM & IPM practices) as well as inherent factors associated with the crop.

Keeping the above point in view, cluster frontline demonstrations on green gram was conducted with the objective to demonstrate newly released crop production technologies and its management practices in the farmers' field under different farming situations and at different agroclimatic regions under the supervision of agricultural scientists. The newly and innovative technology having higher production potential under the specific cropping system can be popularized through cluster front line demonstration programme.

RESEARCH METHODOLOGY

The present study was carried out in the Nagaur district which is located on the North-western part of Rajasthan state and lies at 27°20'N latitude and 73°74' E longitude with an altitude of 302 m above the mean sea level. Cluster frontline demonstrations (CFLDs) were conducted during kharif, 2018, 2019 and 2020 with evaluation the performance of GAM-5/GM-6, variety of green gram in Maulasar & Didwana block of the district. Variety GAM-5/

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GM-6 of green gram was demonstrated which potential yield is higher in medium to higher rainfall areas with loamy soils than low rainfall areas of Rajasthan. In this study, 100 farmers were selected from aforesaid blocks during consecutive years. Soils in the demonstrated area were sandy loam texture with pH ranges between 7.4 to 8.8 and EC 0.27 to 0.78. Before conducting the CFLD programme, farmers were identified in group meeting and specific production technology. All the technological intervention was taken as per prescribed package and practices for improved variety of green gram crop (Table 1). The grain yield, gap analysis, cost of cultivation, net return and additional returns parameters were recorded (Table 2 and 3). Assessment of gap in adoption of recommended technology before laying out the CFLD's through personal discussion with selected farmers. The training was organized about detailed technological intervention with improved package and practice for successful green gram cultivation. Scientists visited regularly demonstrated and farmer's fields. The feedback information from the farmers was also recorded for further improvement in research and extension programmes. The extension activities i.e. training, scientist's visits and field days were organized at the demonstrated sites. The basic information were recorded from the farmer's field and analyzed to comparative performance of cluster frontline demonstrations and farmer's practice. Different parameters were calculated to find out technology gaps (Yadav *et al.,* 2004).

Extension gap = Demonstrated yield- Farmer's practice yield

Technology gap= Potential yield- Demonstration yield

Additional return= Demonstration return- Farmer's practice return

Technology index =

$$\frac{\text{Potential yield} - \text{Demostration yield}}{\text{Potential yield}} \times 100$$

RESULTS AND DISCUSSION

Table.1 Detail of package and practices for green gram cultivation

S. No.	Technological intervention	Farmer's practice	Recommended Practice
1.	Variety	Heera moti, GM-4, SML-668	GM-4, MH-421, IPM 02-3, GAM-5
2.	Seed treatment	Carbendazim 50 WP @ 2g/kg	Carbendazim 50 WP @ 2g/kg seed, Imidacloprid 70 WS @ 5g/kg seed & Rhizobium and PSB culture 5-10 ml/kg seed
3.	Soil treatment	No Application	Quinalphos 25 kg/ha
4.	Spacing	Ununiform plant population	30 x 10 cm
5.	Time of Sowing	1-30 July	1July- 15 July
6.	Nutrient management	Imbalance use of fertilizers and 50 kg DAP at sowing.	Balance fertilization:-10-15 kg N, 30-40 kg P_2O_5 & 40 kg S/ha at sowing time. Spray of 2% NPK (18:18:18) at flowering time
7.	Weed management	Hand weeding	Imazethapyr 10SL 50g a.i./ha at 20-25 DAS
8.	Plant protection measures	Use of Monocrotophos 1 litre/ha	Spray of Imidacloprid @ 0.5ml/litre of water at 30 days for sucking pest and one spray of Streptocyclin 1g/10 litre of water for bacterial blight control

The result of the study indicated that gap existed in the potential yield and demonstration yield is due to soil fertility and weather conditions. By conducting cluster frontline demonstration of proven technologies, yield potential of greengram can be increased up-to great extent. The improved package and practices are more important with technological intervention for enhancing productivity and profitability of pulses (Table 1).

Grain Yield

The results (Table 2) reveal that average grain yield of green gram under cluster frontline demonstrations were 6.22, 7.25 and 5.48 q/ha as compare to 4.82, 6.15 and 4.40 q/ha recorded in farmer's practice and average yield increase of 29.58, 17.89 and 24.55 per cent during 2018, 2019 and 2020, respectively. The above findings were accordance with Sumathi, (2012), Ganesh, (2010) and Laxmi *et al.*, (2017).

Extension gap, technology gap and technology index

The extension gap 1.42, 1.10 and 1.08q/ha, technology gap 3.78, 2.75 and 2.52 q/ha and technology index 37.80, 27.50 and 31.50 was recorded (Table 2) during 2018, 2019 and 2020, respectively. The extension gap should be assigned to adoption of improved dissemination process in recommended practices which outcome in higher grain yield than the farmer's practice. The similarly observations were also obtained in green gram crop by Patil *et al*., (2015) and in blackgram by Sahare *et al*., (2018). The higher grain yield was attributed to higher potential with improved variety, seed & soil treatment, timely sowing, nutrient management, weed management, insect-pest and disease management in accordance of scientific package and practices.

Economics analysis

The economic analysis results reveal that the green gram recorded higher net returns and B:C ratio from demonstrated plot were 23592, 28371 & 28024 Rs/ha and 2.02, 2.17 & 1.82 during 2018, 2019 and 2020, respectively (Table 3). The higher net returns and B:C ratio in green gram demonstration might be due to the higher grain yield and better pricing of the produce in the market. These results are in line with the findings of Patil *et al*., (2015). Recommended practice proved beneficial in respect of yield and economics of green gram in consecutive blocks of Didwana & Maulasar in Nagaur District.

CONCLUSION

The findings of the study revealed that wide gap exist in demonstrated and farmer's practices in green gram due to technology and extension gap in Nagaur District of Rajasthan. It can be concluded that higher yield in demonstration was due to adoption of

Table 2. Yield performance, technology gap, extension gap and technology index of green gram under Farmers' Practice and Cluster Front Line Demonstration

CFLD conducted year	Crop	Variety	No. of Demonstrations	CFLD Area (ha)	Yield (q/ha)			% increased yield over local check	Technology gap (q/ha)	Extension gap (q/ha)	Technology Index (%)
					Potential of variety	Demonstrated plot	Local Check plot				
2018	Greengram	GAM-5	50	20	10	6.22	4.8	29.58	3.78	1.42	37.80
2019	Greengram	GAM-5	25	10	10	7.25	6.15	17.89	2.75	1.10	27.50
2020	Greengram	GM-6	25	10	8	5.48	4.40	24.55	2.52	1.08	31.50
Average						**6.17**	**5.03**	**21.49**	**3.02**	**1.20**	**32.27**

Table 3. Economics of green gram under Cluster frontline demonstrations

Conducted year	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		Net Return (Rs/ha)		BC Ratio	
	Demonstrated plot	Local Check plot	Demonstrated plot	Local Check plot	Demonstrated plot	Local Check plot	Demonstrated plot	Local Check plot
2018	23117	21800	46709	35955	23592	14155	2.02	1.65
2019	24200	23500	52571	44318	28371	20818	2.17	1.89
2020	24460	22500	52484	44637	28024	22137	1.82	2.33
Average	**23926**	**22600**	**50588**	**41637**	**26662**	**19037**	**2.01**	**1.96**

improved varieties and technologies. The per cent increment in yield of green gram in demonstrated plots over the farmers practice created greater awareness and motivated the other farmers to adopt the improved package of practices of green gram. These demonstration trials also enhance the relationship and confidence between farmers and KVK scientists. The participant farmers also play an important role as source of information and quality seeds for wider dissemination of the improved varieties of green gram for other nearby farmers. So FLD programme is a successful tool in enhancing the production and productivity of green gram crop through changing the knowledge, attitude and skill of the farmers. The programme of cluster frontline demonstration could be popularized for other pulse crops also in order to increase farmer's income and attain self-sufficiency in pulse production.

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DOUBLING FARMERS INCOME THROUGH ADOPTION OF INTEGRATED FARMING SYSTEM - A CASE STUDY

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ABSTRACT

A study was taken up integrating crop and goat rearing under irrigated in two hectare, considering small and marginal farmers of Jhajhpur block of Bhilwara district in Rajasthan.The trend in land holding per capita possess a serious challenge inrespect declining to the sustainability and profitability of farming. Considering the efficacy of this viable production system, the study was carried out purposely in a farm regarding the farm income through adopting integrated farming system in Ganeshpura village under Jhajhpur subdivision of district Bhilwara during 2019-20. The study revealed that the integrated farming system could address the issues of sustainability, livelihood security and income generation effectively and earned an average annual net income of Rs. 3.51 lakh with an average of Rs. 29254.00 per month. The net income increased 75.5 per cent by adopting improved good agricultural practices in integrated farming system.The benefit cost ratio was found highest (3.26) in poultry rearing as compared to other entreprises.

INTRODUCTION

The farmers concentrate mainly on crop production which is subjected to a high degree of uncertainty in income and employment to the farmers. In this context, it is imperative to evolve suitable strategy for augmenting the income of a farm.Integration of various agricultural enterprises viz., cropping, animal husbandry, fishery, forestry etc. have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labour employment. The integrated farming system approach introduces a change in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources.The farm wastes are better recycled for productive purposes in the integrated system. A judicious mix of agricultural enterprises like dairy, poultry, piggery, fishery, sericulture etc. suited to the given agro-climatic conditions and socio-economic status of the farmers would bring prosperity in the farming.

Association of two or more farming components that become part of entire system is termed as integrated farming system. Out of many farming systems involving goatry with agriculture, modern trend now-a-days is integration of livestock with agriculture. Integrated farming has immense potentiality to emerge out as an effective tool for improvement of rural economy due to low investment and high profitability (Nanda and Bandopadhyay, 2011). Demand of food is increasing constantly with increase in population. Food security is presently the major concern of developing countries like India. In this context, sustainable integrated farming can be a very good option for achieving optimum productivity with due environmental consideration. It maximizes production per unit area through incorporation of recycling wastes and residues from one farming system to the other. India being an agrarian economy produces huge quantities of plant and animal residues, the former. Bhuiyal *et al.* (2014) and Yadav and Sharma (2013) documented that the integrated farming system improve the efficiency of marginal and small farms that appeared to be the most efficient performers in the integration and arrangement of farming enterprises. In Ganeshpura village under Jhajhpur subdivision of district Bhilwara, majority of the farmers are either small or marginal, the income from only agriculture sector in

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their farm is not at all sufficient to run their families. As the economic condition of the farmers are very poor, they are incapable of expenditure in agriculrture for higher production. Banerjee *et al.* (2014) reported that the use of cow dung and duck manure for practicing aquaculture is a viable option for natural biodiversity. Under this system the nutrients from the poultry are recycled in the pond and this allows for escalation of production and income while reducing the affluent along with the dumping of the wastes would have had on the environment (Singh *et al.*, 2014, Misra *et al.*, 2016).

Integrated farming system with goatry would provide ways to reuse and recycle produce/waste material of one component as input in the other linked component and to reduce the cost of production of the economic produce of the component two and finally to enhance the net-income of the farm as a whole. Hence, the present study was conducted to assess the farmer's income through integrated farming system which can lead towards doubling the farm income.

RESEARCH METHODOLOGY

The Bhilwara district is situated in the South East part of state of Rajasthan between 25.1º & 25.58º N Latitude and 74.1º & 75.28º East Longitude at about 380 m above mean sea level. There is no perennial river in the district. The total human population of the district is 24.10 lacs (census 2011) with population density of 230 persons per sq. km. Administratively there are 8 subdivisions, 12 Tehsils, 12 Panchayat Samities, 384 Gram Panchayats and 1834 habitat villages in the district. The productivity was very low as compared to the standards. During the year 2019-20,Shri Manoj Kumar Meena came to contact and participated in extension activities of Krishi Vigyan Kendra, Bhilwara-II. IFS model comprising improved Pratapdhan breed of poultry as well as quail and Sirohi goat farming and Agriculture was demonstrated by KVK Scientists in his plot. The study was carried out to evaluate the farm income of Shri Manoj Kumar Meena through adopting the technology of Livestock based integrated farming system developed by KVK, Bhilwara-II.

RESULTS AND DISCUSSION

Shri Manoj Kumar Meena has already sold twenty (20) numbers of growing male and female of Sirohi goat to other farmers of the district during the financial year 2018-19 and 2019- 20. Seeing his success many of the farmers from nearby villages started adopting integrated farming system and came with good result. Presently, he getting an average annual net income of Rs. 3.51 lakh with an average of Rs. 29254.00 per month. The net income increased 75.5 per cent by adopting improved good agricultural practices in integrated farming system. The income received from different enterprises is given in the Table1. Integrated Farming System provided opportunities as crop insurance cover as money round the year was obtained from different farm produces. The integrated farming system not only increased the farm income but it also increased the sustainability by the ways given below - 1. Productivity: Increased economic yield per unit area - per unit time by virtue of intensification of crops, agricultural crop rotation and allied enterprise. 2. Profitability: The system as a whole provided opportunity to make use of produce/ waste material of one component as input on the other component at the least cost. 3. Potentiality/Sustainability: In Integrated Farming System, organic supplementation through effective utilization of by-products of linked components as a measure was possible and this certainly provided opportunity to promote soil health and to sustain the potentiality of the soil which was the production base. 4. Balanced food: In Integrated Farming System, components of different nature enabling to produce different sources of nutrition, namely, protein, carbohydrates, fats, minerals, vitamins, etc. were linked from the same unit area. It provided opportunity to mitigate malnutrition problem of the farmers.

Current scenario at present Shri Manoj Kumar Meena have been deriving his livelihood through integrated farming system and goatry along with poultry production from the six bighas of land and a

Table 1:Income received from different enterprises.

Activity	Enterprise	Area (in ha) Number	B:C ratio	Cost of Producton (Rs)	Gross Income (Rs)	Net Income (Rs)
Backyard Poultry	Poultry	70+30	3.26	54750	178500	123750
Quail Farming (100 quails)	Quail Farming	80+20	2.43	14600	35500	20900
Sirohigoat (10+1)	Goatry	10+1	2.83	52600	149000	96400
Agriculture	Agriculture	1.5 ha	2.22	90000	2,00000	110000

quail unit at village Ganeshpura, under Jhajhpur sub-division of district Bhilwara. Besides the seed production of improved variety of Mustard, Gram and Blackgram were taken on his farm. Many a times KVK, Arnia Ghoda, Shahpura, Bhilwara-II motivated and helped him to participat in different district and state level exhibitions for development of his skill and promoting marketing facilities. He was awarded with the following recognitions: Best Progressive farmer award by MPUAT in the occasion of Republic day 2021, Felicitation in Organic mela by Directorate of extension education, MPUAT,Udaipur at KVK, Banswara in March 2021.

Impact of the technology after observing the success of Mr. Manoj Kumar Meena through integrated farming system, many of the nearby farmers visited his farm to learn about the technology and thereby adopted the same in the succeeded period.

Support and guidance received from different departments

He has received technical support from KVK, Arnia Ghoda, Shahpura, Bhilwara-II for establishment of poultry, goatry, quails and seed production. Above all, different technical guidance has been provided by KVK , Arnia Ghoda, Shahpura, Bhilwara-II, DEE, and department of Animal Production, RCA under RKVY Quails Breeding Project, MPUAT,Udaipur in all the enterprises whenever Mr. Manoj needed.

CONCLUSION

Agronomic approaches for increasing overall productivity and sustainability of integrated farming system. The various agronomic approaches for increasing the overall productivity and sustainability of integrated farming system viz., adoption of improved cropping system according to the rainfall and soil moisture availability, selection of suitable grain crop species, tree species that supply pods/ leaves for a longer period or throughout the year, the surplus fodder leaves, crop residues etc. during the rainy season should be preserved as silage/hay for lean season. Integrated farming system is a low cost technology. It saves farmers time, allowing them to undertake double benefit from the same field or same area. To achieve optimum production with cost effective low investment recycling of wastes and residues from one farming to other system with due environmental consideration is very much necessary. Sustainable integrated farming practice is a very good option. This is a viable option for augmenting overall farm productivity and better economic return of livestok based farming community. It may be concluded that integrated farming system is increasingly being promoted as the best means of combining efficient, profitable production whilst seeking to protect the environment, preserve biodiversity and provide a safe working environment on the farm for employees.

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KNOWLEDGE LEVEL OF THE FARMERS ABOUT WATERSHED TECHNOLOGY OF DESERT DEVELOPMENT PROGRAMME IN JODHPUR REGION OF RAJASTHAN

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ABSTRACT

The state of Rajasthan in the first largest state in the country covering an area of 34.271 million hectares, which is more than 10 per cent of the total geographical area of the country. The population of the Rajasthan is over 69 million, according to 2011 cencus. Recording a decadal growth of 21.44 per cent.

INTRODUCTION

The present study was conducted in Jodhpur and Barmer districts of Jodhpur region. Fifteen watershed area were randomly selected from Jodhpur and twelve from Barmer district.

RESEARCH METHODOLOGY

Rajasthan state comprises seven regions viz., Jaipur, Jodhpur, Ajmer, Bikaner, Kota, Bharatpur and Udaipur. Out of which Jodhpur region was selected purposively because, this region has the highest number (2537) of watersheds under Desert Development Programme of Rajasthan .

Jodhpur region comprises six districts viz., Jodhpur, Jaisalmer, Barmer, Sirohi, Pali and Jalore, out of these, two districts namely Jodhpur and Barmer were selected randomly. Total nine panchayat samities i.e. 5 from district Jodhpur and 4 from Barmer district were selected randomly as per availability of watersheds under Desert Development Programme.

Total twenty seven watersheds from nine panchayat samities of both Jodhpur and Barmer district were selected and 100 beneficiary farmers from selected five panchayat samities of district Jodhpur and 80 beneficiary farmers from selected four panchayat samities of district Barmer were selected randomly. The equal number of non-beneficiary farmers were also selected from nearby non watershed areas who were having similar socio-economic status.

RESULTS AND DISCUSSION

To achieve the success of any development programme, it is imperative that the people must have some basic knowledge about watershed

Table 1: Distribution of farmers according to their level of knowledge about watershed technology of Desert Development Programme

Category	Level of knowledge	No. of Respondents	Per cent	Mean	S.D.
Beneficiary farmers (N=180)	Low (scores below 62.32)	31	17.22	83.12	20.80
	Medium (scores from 62.32 to 103.92)	121	67.22		
	High (scores above 103.92)	28	15.56		
Non-beneficiary farmers (N=180)	Low (Scores below 51.24)	53	29.44	72.63	21.39
	Medium (Scores from 51.24 to 94.02)	100	55.56		
	High (Scores above 94.02)	27	15.00		

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technology of Desert Development Programme. Keeping this in view, efforts were made to measure the present status of knowledge level of beneficiary and non beneficiary farmers regarding various aspects of watershed technology of Desert Development Programme. The knowledge score was calculated as sum of the total scores of the particular correct response converted into percentage.

It was observed from data given in Table 1depict that 67.22 per cent of the beneficiary farmers (121) were having medium knowledge about watershed technology of Desert Development Programme whereas, 17.22 and 15.56 per cent of beneficiary farmers had low (31) and high (28) level of knowledge, respectively about watershed technology of Desert Development Programme. Hence, it could be concluded from the findings that majority of the beneficiary farmers had medium level of knowledge about watershed technology of Desert Development Programme.

In case of non-beneficiary farmers, it was found that 55.56 per cent had medium level of knowledge whereas 29.44 and 15.00 per cent had low and high level of knowledge about watershed technology of Desert Development Programme, respectively. It could also be concluded that majority of non-beneficiaries farmers had medium level of knowledge about watershed technology of Desert Development Programme.

Thus, the conclusion may be drawn from the findings that remarkable difference between knowledge level of beneficiary farmers and non-beneficiary farmers was observed regarding watershed technology of Desert Development Programme. This might be due to the fact that the watershed activities were carried out effectively by the watershed personnel in actual field situation as have been planned.

This finding is in line with the findings of Jitarwal and Sharma (2007), Brar (2008), Bunkar *et al*. (2012) and Kulshrestha *et al*. (2015)

Aspect wise knowledge level of the farmers

The knowledge level of the farmers was further elaborated according to different aspects of watershed technology like knowledge about soil and water conservation technology, production technology and animal husbandry and house hold production technology of watershed under Desert Development Programme which is presented in table 2.

The data given in Table 2 show that the knowledge level of beneficiary farmers about watershed technology of Desert Development Programme ranged from 39.14 to 44.95 MPS. While it varies from 30.63 to 37.55 MPS in case of non-beneficiaries farmers regarding various aspects of watershed technology of Desert Development Programme. Further, it had also been observed that knowledge level of beneficiary farmers was found at par in each aspect than non beneficiary farmers. The production technology, got the first rank among beneficiary farmers, while animal husbandry and house hold production technology got third rank, whereas soil and water conservation technology ranked the second. In case of non-beneficiary

Table 2: Aspect wise knowledge level of beneficiary and non- beneficiary farmers about watershed technology of Desert Development Programme

S.No.	Aspect	Beneficiary (N=180)		Non beneficiary (N=180)	
		MPS	Rank	MPS	Rank
1	Soil and water conservation technology	40.33	II	37.55	I
2	Production technology	44.95	I	36.53	II
3	Animal husbandry and house hold production system	39.14	III	30.63	III
	Over all knowledge level	41.47		35.75	

farmers, the knowledge about soil and water conservation technology of watershed of Desert Development Programme was ranked first, whereas, production technology as well as animal husbandry and house hold production system aspects were ranked second and third with MPS 36.53 and 30.63, respectively.

Therefore, it was concluded from the findings that the knowledge level of beneficiary farmers about production technology of watershed was found highest among all the three practices, whereas knowledge about soil and water conservation technology of watershed was found highest among the non- beneficiary farmers.

CONCLUSION

Majority of the beneficiary farmers (67.22 per cent) had medium knowledge level whereas, 17.22 and 15.56 per cent of beneficiary farmers had low and high level of knowledge about watershed technology of Desert Development Programme, respectively. In case of non-beneficiary farmers, majority (55.56 per cent) had medium level of knowledge whereas, 29.44 and 15.00 per cent had low and high level of knowledge about watershed technology of Desert Development Programme, respectively. The knowledge level of beneficiary farmers about watershed technology of Desert Development Programme ranged from 39.14 to 44.95 MPS. While it varies from 30.63 to 37.55 MPS in case of non-beneficiary farmers regarding various aspects of watershed technology of Desert Development Programme.

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EFFECT OF ANIMAL HUSBANDRY OCCUPATION ON WORKING SELF-CONFIDENCE OF THE DAIRY FARMERS' SONS

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ABSTRACT

Inspite of the great significance of animal husbandry to develop the economy of farmers and rural India, during current days, new generations of dairy farmers are least interested to accept animal husbandry as a source of livelihood. It is obvious that the new generation should have the expected level of animal husbandry occupation adopting working self-confidence to perform various tasks involved in it. Considering this, a study on animal husbandry occupation adopting working self-confidence of the dairy farmers' sons was conducted on a random sample of 200 sons of dairy farmers of Anand and Kheda districts of Gujarat. The study reveals the overwhelming majority (95.50 per cent) of the dairy farmers sons had a very high level of animal husbandry occupation adopting working self-confidence to be a successful dairy farmer, followed by 4.50 per cent of them were with the high level of the animal husbandry occupation adopting working self-confidence to be a successful dairy farmers, while none of them was with a very low, low or medium level of the animal husbandry occupation adopting working self-confidence to be a successful dairy farmers. The degree of the animal husbandry occupation adopting working self-confidence of the dairy farmers' sons was noticed better amongst those sons of the dairy farmers, who had to some extent older age, married marital status, low level of fathers education, big size of the herd in family, high level of association with extension people, high motivation to achieve superior financial status, a high degree of confidence on own ability, positive orientation to apply the scientific way of life style and who were constructive towards farming as an occupation.

INTRODUCTION

The occupation adopting self-confidence is the belief, assurance and trust of an individual on his own ability to plan, execute, evaluate and make any task successfully to get expected return and profit from any occupations. It is the psychological and physical strength of viewing in own-self confidently and realistically in terms of capability to perform types of works. The working self-confident person believes that he or she has the ability to succeed at work or a job. Working self-confidence can also be viewed as firmness about own-self, own actions, decisions and opinions and self-reliance. It is a very useful and potential tool for everyone to attain desired goals and fulfil requirements through performing certain work. Animal Husbandry is an income-generating, self-dependable and employment generating occupation for the farmers. In spite of the great significance of animal husbandry to develop the economy of farmers and rural India, during current days, new generations of dairy farmers are least interested to accept animal husbandry as a source of livelihood. For the sustainable development of animal husbandry, it is essential to encourage and enrich the animal husbandry occupation adopting working self-confidence of farmers' sons for the sustainable development of animal husbandry for the future in our country. It is obvious that to be a successful animal husbandry practitioner, a person who wants to accept it as a livelihood should have a high level of occupational adopting working self-confidence to perform various tasks involved in it. Considering the significance of the occupational adopting working self-confidence to be a successful dairy farmer, it is considered as an important quality needed in the youth as newcomers to be known and declared as workable animal husbandry practising dairy farmers.

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Understanding this, a study on animal husbandry occupation adopting working self-confidence of the dairy farmers' sons was conducted with objectives (1) To study the level of animal husbandry occupation adopting working self-confidence of the dairy farmers' sons and (2) To study the factors related with animal husbandry occupation adopting working self-confidence of the dairy farmers' sons.

RESEARCH METHODOLOGY

The present research was conducted in the important milk-producing Anand and Kheda districts of central Gujarat. For the research, ten random villages from Anand and ten villages from Kheda district were selected. A random sample of a total of 200 young sons of practising dairy farmers between the age of 18 to 35 years was selected. The data were gathered personally using an interview schedule. A systematic and scientific reliable scale to measure animal husbandry occupation adopting self-confidence of the dairy farmers' sons was developed by researchers using "Scale Product Method" by following the procedure adopted by Gulkari and Chauhan (2014), Patel and Chauhan (2015), Khatri and Chauhan (2018) and Tankodara and Chauhan (2021). The coefficient of correlation was worked out to see the relationship between the independent and dependent variables.

RESULTS AND DISCUSSION

1. The animal husbandry occupation adopting working self-confidence of the dairy farmers' sons

It can be seen from Table 1 that the overwhelming majority (95.50 per cent) of the dairy farmers sons had a very high level of the animal husbandry occupation adopting working self-confidence, followed by 4.50 per cent of them were with the high level of the animal husbandry occupation adopting working self-confidence to be a successful dairy farmer, while none of them was with a very low, low or medium level of the animal husbandry occupation adopting working self-confidence to be a successful dairy farmer.

The positive attitude, high level of basic and animal husbandry related knowledge, expected level of practical skill and ability to do the tasks confidently, high level of working exposure to many of the animal husbandry related activities and association with this occupation from childhood might have helps them to have high to a very high level of the operational or working self-confidence to be a successful dairy farmer.

Table 1: Animal husbandry occupation adopting self-confidence of the dairy farmers' sons

n= 200

No.	AH occupation adopting self-confidence	Number	%
1	Very low (Up to 10 score)	00	00.00
2	Low (above 10 to 20 score)	00	00.00
3	Medium (above 20 to 30 score)	00	00.00
4	High (above 30 to 40 score)	09	04.50
5	Very high (above 40 to 50 score)	191	95.50
	Total	**200**	**100.00**

2. The factors related with animal husbandry occupation adopting working self-confidence of the dairy farmers' sons

The result shown in Table 2 indicates the relationship between the personal, economic, social, communicational and psychological factors of the dairy farmers' sons and their level of animal husbandry occupation adopting working self-confidence.

2.1 Personal factors

It can be observed that within the personal factors, the relationship of the personal factors of the dairy farmers' sons *viz*. age and marital status were significantly correlated with their degree of animal husbandry occupation adopting working self-confidence, while remaining personal variables like education and distance of native from district places were observed non-significantly correlated, fathers education was negatively significant with their level

animal husbandry occupation adopting working self-confidence. The result indicates that the animal husbandry occupation adopting working self-confidence of the dairy farmers' sons was observed better amongst those, who were married sons of considerably educated practising dairy farmers and ageing towards their middle age with above 30 years of age. It is obvious that the married and slightly older aged sons of considerably educated practising dairy farmers have more thoughtfulness to achieve good financial status, social and family accountability and will to establish in life as early as possible. Such situation, feeling, affinity and seriousness motivate them to develop all those possibilities, alertness and self-confidence helping to be effective and realistic human resources to handle available occupation like animal husbandry.

2.2 Economic factors

It can be noticed that within the economic factors, only herd size of the dairy farmers' sons was positively significant with their degree of animal husbandry occupation adopting working self-confidence while remaining factors viz. landholding, annual family income and family occupation of the dairy farmers' sons were non-significantly correlated with their degree of animal husbandry occupation adopting working self-confidence. The result clearly indicates that sons of those practising dairy farmers were highly self-confident in adopting dairy farming as an occupation, those were with more number of milch animals in their families. It is obvious while maintaining, managing and rearing more number of milch animals in the family, youths might have shown more interest and practical involvement, such interest and involvement might have helped them in developing an expected high level of working self-confident in adopting dairy farming as an occupation. The results additionally also discloses that sons of irrespective levels of the land holder, income holder and dependents on any number of occupation of practising dairy farmers exhibited the almost identical level of interest and working self-confidence in handling or adopting animal husbandry.

Table 2: Factors related with animal husbandry occupation adopting working self-confidence of the dairy farmers' sons

n= 200

No	Factors	Correlation Coefficient (r)
A	**Personal Factors**	
1	Age	0.403**
2	Education	-0.036
3	Marital Status	0.279**
4	Father's education	-0.194**
5	Distance from district	0.013
B	**Economic Factors**	
6	Landholding	0.102
7	Herd size	0.200**
8	Annual income	0.107
9	Occupation	-0.045
C	**Social and Communicational Factors**	
10	Type of family	0.052
11	Social participation	-0.046
12	Farm media exposure	0.117
13	Extension contact	0.204**
D	**Psychological Factors**	
14	Achievement motivation	0.249**
15	Self confidence	0.338**
16	Scientific orientation	0.187**
17	Economic motivation	0.120
18	Attitude towards farming	0.329**

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

2.3 Social and communicational factors

It is apparent that extension contact as a social and communicational factor was noticed positive and significant with the animal husbandry occupation adopting working self-confidence of the dairy farmers' sons, whereas other social and communicational factors like the type of family, social participation and farm media exposure were seen non-significant with the animal husbandry occupation

adopting working self-confidence of the dairy farmers' sons. Since independence, the farmers of the Anand and Kheda districts have been known as role model farmers in our country. The animal husbandry farmers have been regularly contacting and serving for the animal health services leading organizations as and when needed. These services are very effective and farmers friendly. Thus, great enthusiasm has been observing amongst the dairy farmers to take advantage of the extension services provided to them. Thus, such farmers' friendly services might have helped youth members of the dairy farmers to develop needed awareness, interest, skill, attitude, exposure and self-confidence to adopt dairy farming.

2.4 Psychological Factors

It can be observed that amongst the psychological factors, achievement motivation, self-confidence, scientific orientation and attitude towards farming had a significant relationship with level of animal husbandry occupation adopting working self-confidence of practising dairy farmers' sons, while economic motivation as psychological factor was non-significant with level of animal husbandry occupation adopting working self-confidence of practising dairy farmers' sons. It is obvious that practising dairy farmers' sons with high degree reliance on own ability with high degree of inspiration to achieve big economic status in life, immense trust and point of reference in applying science and technology in their everyday life with positive attitude to adopt farming as dependable family occupation will always with expected and high level of animal husbandry occupation adopting self-confidence.

CONCLUSION

The study reveals the overwhelming majority (95.50 per cent) of the dairy farmers' sons had a very high level of animal husbandry occupation adopting working self-confidence to be a successful dairy farmer, followed by 4.50 per cent of them were with the high level of the animal husbandry occupation adopting working self-confidence to be a successful dairy farmer. The study also concludes that the relationship between the degree of animal husbandry occupation adopting working self-confidence of the dairy farmers' sons was positively and significantly related with their age, marital status, herd size, extension participation, achievement motivation, self confidence, scientific orientation and attitude towards farming, while it was negatively significant with their father's education, while it was non-significant with their level of education, distance from district, land holding, annual income, occupation, type of family, social participation, farm media exposure and economic motivation.

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MILKING MANAGEMENT PRACTICES FOLLOWED BY CROSS BRED CATTLE OWNERS IN HANUMANGARH DISTRICT OF RAJASTHAN

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ABSTRACT

A field survey was carried out in Hanumangarh district of Rajasthan to find out the existing milking management practices followed by cross bred cattle owners. The sample collected was purposively selected from three blocks of canal belt area in the district and 300 respondents from selected 15 villages. The data were collected through personal interview with the help of structured interview schedule. It was concluded from the data that majority (81.67%) of the respondents milked their cows twice a day and more than three fourth respondents milked cows by knuckling method. Only 36.67 percent of the cattle owners followed stripping at the end of milking to draw last milk in udder and 60 percent respondents change milking person time to time. Wet hand milking practices (80.33%) was more prevalent in the area and cent percent respondents washed teats, udder and hands before milking. About one-third (34%) of the cross bred cattle keepers dip teats in antiseptic solution after milking. Less number of respondents suckled their male calf and all the respondents suckled their female calf after one month of parturition. Majority (63.33%) of the cattle keepers milked their cows at separate, clean and dry place with open mouth buckets (92.33%). Concentrate feeding and teat manipulation was the main practices for letdown of milk after death of newly born calf. Only 23.33 per cent respondents tested their cow milk for mastitis disease and 8.67 per cent cattle keepers sealing of teat canal at the end of lactation. Majority (69.33%) of the respondents dry their cows less than 45 days before next parturition. More than three fourth (76.33%) cattle owners cleaned milking utensils with tap water and 40.67 per cent respondents sold milk to co-operative dairy society centre at village. The practice of mastitis test, sealing of teat canal, duration of drying off and use of scientific pail were least adopted in the field condition. Hence, there is a huge scope to improve the milking management practices for more and clean milk production.

INTRODUCTION

Milk is a global food. It contains all the essential nutrients required for a healthy and balance diet for human being. India producing about 22.0 per cent (208 M T in 2020-21) of total world milk production and nation occupied ranked first among the world. Rajasthan state producing about 12.6 per cent milk of country and ranks second after Uttar Pradesh, while the state has 11.27 per cent livestock population of the nation according to 20th livestock census, 2019.

India has about 192.52 million cattle which accounts for 35.93 per cent of the cattle population of the India. Out of the total cattle species, 142.11 million is indigenous/ non-descript breed and 50.42 million is exotic/cross bred cattle which is about 26.19 per cent of total cattle. Further the numbers of milch animals of indigenous/ nondescript and exotic/cross bred cattle are 48.51 and 25.67 million, respectively. Rajasthan has 13.9 million cattle and stands sixth in nation. Out of the 13.9 million cattle, 11.6 million indigenous/ nondescript breed and 2.3 million exotic/cross bred cattle are reared in the state. In Hanumangarh district livestock is the second most important income source for the farmers and the population of cattle species in leading position (Cow-5,44,264, Buffalo-302203, indigenous / non-

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descript-3,94,301 and cross bred-1,49,963) in large dairy animals according to 20th livestock census.

As per ICMR (Indian Council of Medical Research) recommendation, per capita 300 gm milk per day is required for balance and healthy diet, whereas the per capita availability in Rajasthan is 870 gm / day. However, the productivity of milch cattle is poor; it can be enhanced through adoption of improved dairy husbandry techniques. Adoption of scientific milking management practices increases the quantity as well as quality of milk, which will enhance the animal owners' income by processing of extra production and exporting quality milk. The present study was carried out with the objective to collect the information on milking management practices followed by crossbred dairy cattle owners in canal irrigated area of Hanumangarh district.

RESEARCH METHODOLOGY

A field survey was carried out in canal irrigated area of Hanumangarh district of Rajasthan. Hanumangarh district has seven blocks namely Hanumangarh, Pilibanga, Sangaria, Tibbi, Rawatsar, Nohar and Bhadra. Out of seven blocks, three blocks were purposively selected i.e. Hanumangarh, Pilibanga and Tibbi block on the basis of irrigated area. These blocks had more than 90 per cent area irrigated by canal and tube wells. Five villages from each block and twenty cross bred cattle owners from each village were selected, provided that they possess 10 or more than 10 crossbred cow's population. Thus the entire sample consisted of 300 respondents from the selected fifteen villages in three blocks of the district. For selection of milking management practices in the present study, a list of various prevailing practices in the area was collected and accordingly an interview schedule was developed for selecting cross bred cattle owners due care was taken to ensure that they were evenly distributed in the village and truly represented milking management practices prevailing in the study area. The data from selected respondents were collected by personal interview techniques through an interview schedule. Data was tabulated and analyzed as per standard statistical tools to draw meaningful inferences.

RESULTS AND DISCUSSION

Data presented in the Table 1 indicated that majority (81.67 %) of the respondents followed two times milking, while 18.33 per cent drew milk three times in a day. The reason behind milking thrice was more milk production per day per cow. The observations recorded in the present study were encouraging than that of observations reported by Chowdhary *et al.* (2008), Patel and Sabapara (2019), Rathore *et al.* (2010b), and Sabapara *et al.* (2015). Hand milking by knuckling method (75.67%) was more prevalent in the study area. Only 19.33 and 5.00 per cent respondents milked their cows with milking machine and full hand milking method, respectively. None of the respondents milked by stripping method, while 36.67 per cent cattle owners used stripping to draw rest milk at the end of milking. The present results are encouraging than earlier finding of Chowdhry *et al.* (2008), Kumar and Mehta (2011), Patel and Sabapara (2019), Rathore *et al.* (2010b) and Sabapara (2015), who reported less use of milking machine in their studied area. These findings are contrary to the Bashir & Kumar (2013) and Kumar & Mehta (2011) who reported 62.5 and 73.33 per cent of the respondents followed full hand milking method in their study area, respectively.

All the respondents splashed normal water on teat and udder and washed their hands before milking. These results are in agreement with the earlier results of Chowdhary *et al.* (2008), Kumar and Mehta (2011), Kumar *et al.* (2017), Patel and Sabapara (2019), Manohar *et al.* (2013) and Rathore *et al.* (2010a). About one-fifth (19.67%) of the respondents milked their cows by dry hand and although majority of the respondents milked cows with wet hand, the practice of wet hand milking is not correct. These results are lower than Gill and Saini (2008), Kumar and Mishra (2011), Manohar *et al.* (2013) and Rathore and Kachwaha (2009). The present findings are encouraging than that of Bashir & Kumar (2013), Rathore *et al.* (2010b) and Sabapara *et al.* (2016).

Table 1: Milking management practices followed by cross bred cattle owners

Practices/Block	Hanumangarh (n=100)		Pilibanga (n=100)		Tibbi (n=100)		Overall (n=300)	
	n	%	n	%	n	%	n	%
Frequency of milking								
Twice	79	79	85	85	81	81	81.67	81.67
Thrice	21	21	15	15	19	19	18.33	18.33
Milking method								
Machine	18	18	16	16	24	24	19.33	19.33
Full hand	05	05	06	06	04	04	05.00	05.00
Knuckling	77	77	78	78	72	72	75.67	75.67
Stripping	00	00	00	00	00	00	00	00
Change of milking person								
Yes	59	59	67	67	54	54	60.00	60.00
No	41	41	33	33	46	46	40.00	40.00
Stripping at the end of Milking								
Yes	37	37	34	34	39	39	36.67	36.67
No	63	63	66	66	61	61	63.33	63.33
Milking habit								
Dry hand	22	22	17	17	20	20	19.67	19.67
Wet hand	78	78	83	83	80	80	80.33	80.33
Splashing of water on teat/udder before milking								
Yes	100	100	100	100	100	100	100	100
No	00	00	00	00	00	00	00	00
Washing of hand before milking								
Yes	100	100	100	100	100	100	100	100
No	00	00	00	00	00	00	00	00
Dipping of teat in antiseptic solution after milking								
Yes	37	37	39	39	35	35	36.67	36.67
No	63	63	61	61	65	65	63.33	63.33
Male calf is allowed to suckle after one month of parturition								
Before milking	10	10	14	14	11	11	11.67	11.67
After milking	05	05	08	08	03	03	05.33	05.33
Both times	00	00	00	00	00	00	00	00
Not allowed	85	85	78	78	86	86	83.00	83.00

Female calf is allowed to suckle after one month of parturition								
Before milking	64	64	59	59	71	71	64.67	64.67
After milking	25	25	27	27	16	16	22.67	22.67
Both times	11	11	14	14	13	13	12.67	12.67
Not allowed	00	00	00	00	00	00	00	00
If the cow do not let down milk after the death of calf then practice followed								
Offer concentrate feed and teat manipulation	86	86	79	79	83	83	82.67	82.67
Apply oxytocin injection	04	04	06	06	02	02	04.00	04.00
Dummy calf	03	03	05	05	03	03	03.67	03.67
None	07	07	10	10	12	12	09.67	09.67
Milking place								
Milking at the same place	42	42	33	33	35	35	36.67	36.67
Milking at separate, clean and dry place	58	58	67	67	65	65	63.33	63.33
Type of milking pail								
Open mouth bucket	93	93	96	96	88	88	92.33	92.33
Scientific milking pail	07	07	04	04	12	12	07.67	07.67
Test for mastitis diagnosis								
Yes	29	29	22	22	19	19	23.33	23.33
No	71	71	78	78	81	81	76.67	76.67
Sealing of teat canal at the end of lactation								
Yes	07	07	11	11	08	08	08.67	08.67
No	93	93	89	89	92	92	91.33	91.33
Drying off period								
Less than 45 days	74	74	68	68	66	66	69.33	69.33
More than 45 days	18	18	25	25	19	19	20.67	20.67
No dry period & continue milked	08	08	07	07	15	15	10.00	10.00
Cleaning of milking utensils								
Hot water	21	21	27	27	23	23	23.67	23.67
Tap water	79	79	73	73	77	77	76.33	76.33
Disposed of milk								
Dairy co-operative society	47	47	41	41	35	35	41.00	41.00
Vendors	32	32	27	27	38	38	32.33	32.33
Door to door supply	21	21	32	32	27	27	26.67	26.67

Data in the Table 1 shows that majority (60.00%) of the respondents change the milking person time to time, while 40.00 per cent did not change the milking person. Similar observations were reported by Bashir & Kumar (2013), Kumar *et al.* (2014) and Rathore *et al.* (2009). However, present result was contrary to the finding of Patel & Sabapara, (2019), Manohar *et al.* (2013) and Rathore *et al.* (2010b), who reported more percentage of milking person changed in their study area. More than one-third (36.67 %) of the cross bred cattle owners adopted practice of dipping teat in antiseptic solution after milking. The practice of teat dipping in antiseptic solution is very beneficial especially in high milk yielder animals. Antiseptic solution treatment protect from mastitis disease, which is a common problem in high milk yielder cross bred cows.

It was revealed from the table that majority (83 %) of the respondents did not allow to suckle their male calf after one month of parturition. Only 11.67 and 5.33 per cent cross breed cattle keepers allowed to suckle their male calf before and after milking, respectively after one month of parturition. The results are contrary to the earlier findings recorded by Gupta *et al.* (2008), Kumar & Mishra (2011), Rathore *et al.* (2010b) and Patel and Sabapara (2019), who reported more calf suckling percentage in their study area. It is well known that there is no buyer of male calf especially cross bred male calf and secondly the cross bred cow can give milk without calf easily. So the cross bred cattle keepers left the male calf as stray animal after 20-25 days of parturition. It was observed that about two-third (64.67 %) of the respondents allowed to suckle their female calf before milking, whereas 22.67 and 12.67 per cent of the respondents allowed their female calf to suckle after milking and both times, respectively. After critical analysis of female calf suckling data after one month of parturition, it was concluded that majority (64.67 %) of the cross bred cattle keepers adopted good habit of suckling i.e., before milking. The practice of calf suckling before milking responsible for fully let down of milk i.e., increase secretion of oxytocin hormone, increase fat percentage of milk and less risk of teat injury. The present observation are similar to the Gupta *et al.* (2008) and encouraging than reported by Kumar & Mehta (2011), Kumar & Mishra (2011), Manohar *et al.* (2013), Rathore & Kachwaha (2009), Sabapara *et al.* (2016) and Patel & Sabapara (2019).

Data in table shows that about two-third (63.33 %) of the respondents milked cows at separate, clean and dry place, while 36.67 per cent respondents milked cows at the same place. The present finding supported with the earlier findings of Kumar & Mehta (2011) and Rathore *et al.* (2010b). These findings are encouraging than that of Gupta *et al.* (2008), Kumar & Mishra (2011), Patel & Sabapara (2019) and Sabapara *et al.* (2015), who reported less number of respondents milked their cows at separate, clean and dry place and more number of respondents milked their cows at the same place. Milking of cows at separate, clean & dry place is necessary for clean milk production. Majority (92.33 %) of the respondents used open mouth bucket for milking. Only 7.67 per cent respondents used scientific milking pail, which is essential for clean milk production. Present findings are encouraging than Gill & Saini (2008), Kumar & Mishra (2011), Kumar *et al.* (2017), Patel & Sabapara (2019). Rathore *et al.* (2010a) and Sabapara *et al.* (2016), who observed less use of scientific milking pail in their studied area. It can be concluded from the data that 82.67 per cent of the cross bred cattle keepers offered concentrate feed and teat manipulation, where as 4.00 and 3.67 per cent of the cattle keepers used oxytocin injection and dummy calf if the cow did not letdown milk after calf death, respectively. These results are in agreement with earlier findings presented by Bashir and Kumar (2013), Kumar and Mishra (2011), Kumar *et al.* (2017), Patel & Sabapara (2019), Rathore *et al.* (2010a) and Sabapara (2016).

The findings presented in the table that 23.33 per cent of the cattle keepers done test time to time to diagnose mastitis disease. These findings are encouraging than Patel & Sabapara (2019), Sabapara (2016) and Sabapara *et al.* (2016), who

reported that none of the respondents followed mastitis disease test in their surveyed area. The present results are lower than Gill & Saini (2008), who reported 44 per cent of the respondents followed practice to detect mastitis disease in Ludhiana district of Punjab. The difference may be due to less awareness and available facilities in study area. Majority of cross bred cattle keepers (91.33 %) did not follow sealing of teat canal at the end of lactation. Sealing of teat canal by antibiotic ointment at the end of lactation is important scientific practice to maintain good udder health during dry period of cows but only 8.67 per cent of the respondents followed this practice. These results are encouraging than Chowdhary *et al.* (2008), Gupta *et al.* (2008), Kumar & Mishra (2011), Patel and Sabapara (2019) and Rathore *et al.*, (2010b).

Regarding practice of drying of cross bred milch cows, it was observed that more than two-third (69.33 %) of the respondents was drying off their cows less than 45 days. Whereas, 20.67 and 10.00 per cent respondents were drying off their cows for more than 45 days and continuously milking without drying off, respectively. The present results are contrary to Bashir *et al.*(2013), Kumar and Mehta (2011), Kumar *et al.* (2017), Patel and Sabapara (2019), Rathore & Kachwaha (2009), Rathore *et al.* (2010a), Rathore *et al.* (2010b) and Sabapara *et al.* (2016), who reported more drying off period in their surveyed area. The difference may be due to species of animal and breed of cows with different studies areas. More than three-fourth (76.33 %) of the respondents cleaned their milking utensils by tap water, while 23.67 per cent used hot water for milking utensils cleaning. The present findings are in accordance with Kumar & Mishra (2011), Patel & Sabapara (2019), Rathore *et al.* (2010b) and Sabapara *et al.* (2015). It was observed that 41.00, 32.33 and 26.67 per cent of cross bred cattle keepers disposed off their cow milk through dairy cooperative society centre at village, private milk vendors and door to door supply, respectively. The present results are contrary to Patel & Sabapara (2019), Sabapara (2016) and Sabapara *et al.* (2015), who reported that more number of respondents disposed off their milk at village level milk co-operative society. It might be due to the fact that Gujarat has better net work of milk cooperative society. These findings are well supported by the earlier studies of Gupta *et al.*(2008), Manohar *et al.* (2013) and Rathore *et al.* (2010a).

CONCLUSION

It can be concluded that majority of the cross bred cattle owners milked their cows twice in a day with wet hand by knuckling method of milking. All the respondents washed their hands and splashed water on teats/ udder before milking. Less number of cattle keepers followed the practice of dipping teat in antiseptic solution after milking. More number of respondents suckled their female calf before milking and very few respondents suckled their male calf after one month of age. The practice of mastitis test, sealing of teat canal at the end of lactation, drying off duration, milking in scientific pail and cleaning of milking utensils were less adopted in the field condition. Hence, there is a huge scope for scientific milking management practices to be adapted in Hanumangarh district and that can be accomplished by organizing pashupalak gosthi, awareness camps, demonstration and treatment camps by KVKs and state animal husbandry department.

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FACTORS AFFECTING KNOWLEDGE ABOUT ANIMAL HUSBANDRY PRACTICES OF DAIRY FARMERS' SONS

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ABSTRACT

The investigation was carried out to examine the factors affecting knowledge of practising dairy farmers' sons regarding animal husbandry practices to manage dairy farming as an occupation. The study clearly states that majority (94.00 per cent) of the dairy farmers' sons had high to very high level of knowledge regarding animal husbandry. The outcome of the correlation coefficients indicates that knowledge regarding animal husbandry practices was observed superior amongst those sons of the practising dairy farmers sons, who had comparatively older age, married marital status, more distance of their village from their district places, to some extent keeping the bigger size of the herd, higher annual family income, adopted joint type of family, better inclination with the extension personnel and association with only animal husbandry or farming as a source of family income, high inspiration to achieve higher status in their life, high self-assurance in taking the right decisions based on their own ability and capacity, more faith in the scientific ways and standard of living life and handling occupations, high enthusiasm to acquire better economic success in life and who had an encouraging mindset towards farming as an occupations.

INTRODUCTION

Knowledge is an acquaintance, alertness or thoughtful on any object or something like the fact, feeling, impression, truth, information and descriptions. The knowledge is obtained through familiarity, direct or indirect personal experience or education by perceiving, discovering or learning. Knowledge is known as understood information owned by the person. Knowledge is a crucial requirement to be a successful workable human resource to carry out any job, work or tasks. To perform dairy farming successfully, it is expected to have scientific knowledge amongst the youth animal husbandry practitioners. The productivity and production of livestock are highly dependent on the knowledge of package of practices of animal husbandry possessed by the animal husbandry practitioners. Animal welfare is primarily concerned with the well-being of the animals. Furthermore, good dairy farming practices for the environment are implementing an environmentally sustainable farming system; having an appropriate waste management system and ensuring that dairy farming practices do not have an adverse impact on the local environment. Considering this, it is expected that knowledge regarding animal husbandry practices should be there amongst the dairy farmers' sons to handle dairy farming as a parental occupation successfully. Thus, a study on factors affecting knowledge regarding animal husbandry practices of dairy farmers' sons was carried out with objectives *viz.* (1) To study the level of knowledge regarding animal husbandry practices of dairy farmers' sons and (2) To study the factors affecting knowledge regarding animal husbandry practices of dairy farmers' sons.

RESEARCH METHODOLOGY

The current investigation was undertaken in central Gujarat. The well-known milk-producing Anand and Kheda districts of the Charotar area of the state were selected for the study. From each selected district, five Talukas and from each Taluka, two villages, thus twenty random villages were selected. Finally, a random sample of a total of 200 sons of practising dairy farmers was selected for the study. The data were gathered individually using an interview schedule. The statistical tool *viz.* coefficient of correlation was computed to find out the

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relationship between the factors and knowledge regarding animal husbandry practices of dairy farmers' sons.

RESULTS AND DISCUSSION

1. The level of knowledge regarding animal husbandry practices

The result shown in Table 1 visibly indicates that majority (68.50 per cent) of the dairy farmers' sons had a very high level of knowledge about animal husbandry practices, followed by 25.50 and 6.00 per cent of them were with a high and medium level of knowledge about animal husbandry, while none of them was with very low and low levels of knowledge regarding animal husbandry practices. Thus it can be clearly revealed that the vast majority (94.00 per cent) of the dairy farmers' sons had high to very high level of knowledge about animal husbandry. It is very natural that, the dairy farmers' sons, while assisting their fathers while handling dairying, they receive chance to develop necessary awareness about various operations of dairy farming. Thus, the theories of 'learning by doing' and 'seeing is believing' help person to develop new knowledge. Thus, it can be believed that the informal ways of learning, secondary level of education, family guidance and consideration of dairying occupation as good source of earning might have helped the dairy farmers' sons to develop high to very high levels of knowledge regarding animal husbandry. The result of the study is in fulfil the findings of Khatri and Chauhan (2020) partially concurrence with the findings of Mali *et al.* (2014).

2. The factors affecting knowledge about animal husbandry practices

The result exposed in Table 2 indicates the relationship between the personal, economic, social, communicational and psychological factors of the dairy farmers' sons and their knowledge regarding the animal husbandry practices of dairy farmer's sons.

Personal factors

It can be observed that within the personal factors, the relationship of the personal factors of the dairy farmers' sons *viz.* age and marital status and distance from district place were positively and significantly correlated, while education and fathers' education were observed non-significant with the knowledge about the animal husbandry practices of the dairy farmers sons. It means that the knowledge on animal husbandry practices was observed high amongst those who had relatively grown-up age, married marital status, more distance of their residence from their district places. These findings are supported by findings of Khatri and Chauhan (2020), Jadav and Raval (2019) and Kumar *et al.* (2018).

Table 1: Dairy farmers' sons according to their knowledge regarding animal husbandry practices

n= 200

No	Level of knowledge	Number	%
1	Very Low (Up to 12 score)	00	00.00
2	Low (above 12 to 24 score)	00	00.00
3	Medium (above 24 to 36 score)	12	06.00
4	High (above 36 to 48 score)	51	25.50
5	Very high (above 48 to 60 score)	137	68.50
	Total	**200**	**100.00**

Economic Factors

It can be visible that from the economic factors, the correlation of economic factors of the dairy farmers' sons *viz.* herd size, and family annual income were positively and significantly correlated and occupation was negatively significant with the knowledge regarding animal husbandry practices of dairy farmers' sons, while land holding was noticed non-significant with their knowledge regarding animal husbandry practices. It clearly reveals that the knowledge regarding animal husbandry practices of dairy farmer's sons was observed high amongst those, who to some extent possessed bigger herd size and engaged with only animal husbandry or farming as sources of family income. These findings are supported by findings of Jadav and Raval (2019) and Kumar *et al.* (2018).

Social and Communicational Factors

It can be clear that type of family and extension contact as social and communicational factors were

Table 2: Factors affecting knowledge regarding animal husbandry practices

n= 200

No	Responsible Factors	Correlation Coefficient (r)
A	**Personal Factors**	
1	Age	0.287**
2	Education	0.101
3	Marital Status	0.143*
4	Father's education	-0.088
5	Distance from district	0.157*
B	**Economic Factors**	
6	Landholding	0.069
7	Herd size	0.390**
8	Annual income	0.175*
9	Occupation	-0.175*
C	**Social and Communicational Factors**	
10	Type of family	0.166*
11	Social participation	-0.024
12	Farm media exposure	0.690
13	Extension contact	0.161*
D	**Psychological Factors**	
14	Achievement motivation	0.361**
15	Self confidence	0.421**
16	Scientific orientation	0.241**
17	Economic motivation	0.187**
18	Attitude towards farming	0.221**

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

noticed positively significant with knowledge regarding animal husbandry practices of dairy farmers' sons, while other factors such as social participation and farm mass media exposure of the dairy farmers' sons did not exhibit any significant relationship with their knowledge regarding animal husbandry practices. It shows that informal learning from the members of joint family and recognized learning from extension personnel have helped them to improve knowledge on animal husbandry practices. These findings are more or less similar with the findings of Khatri and Chauhan (2020), Jadav and Raval (2019)

Psychological Factors

In the case of the psychological factors, achievement motivation, self-confidence, scientific orientation, economic motivation and attitude towards farming were positively and significantly correlated with knowledge regarding animal husbandry practices of dairy farmer's sons. It clearly discloses that knowledge regarding animal husbandry practices of dairy farmer's sons was observed higher, who were highly encouraged to attain a greater position in their life, highly secured in taking the accurate resolution based on own ability and capacity, more potential in applying the scientific ways and standard of living life and managing occupations, highly inspired to gain better economic success in life and who had an optimistic mindset towards agriculture as an occupation. This finding is supported by the finding of Khatri and Chauhan (2020).

CONCLUSION

The study clearly states that majority (94.00 per cent) of the dairy farmers' sons had high to very high level of knowledge regarding animal husbandry. The study also conclude that knowledge regarding animal husbandry practices of the practising dairy farmers' sons as the new generation to handle dairy farming as the family occupation was noticed positively significant with their characters *viz.* age, marital status, distance from district place, herd size, annual income, type of family, extension contact, achievement motivation, self-confidence, scientific orientation, economic motivation and attitude towards farming, while it was negatively significant with the association of family occupation.

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STATUS OF LOAN DISBURSEMENT BY DISTRICT CENTRAL COOPERATIVE BANKS IN SOUTHERN RAJASTHAN

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ABSTRACT

The status of loan disbursement by DCCBs in Southern Rajasthan was conducted in Southern Region of Rajasthan. The results of the study indicated that loan advanced from 2000 - 01 to 2017-18, the credit activities of all DCCBs in the south region, were shown an upward increase in total lending disbursement. The aggregate lending and deposits consisted of short term, medium term, and other loans. The total loan advanced by the DCCBs in the southern region increased from Rs. 23091 lakhs in 2000 - 01 to Rs. 209125 lakhs in 2017 - 18, registering an increase of about 9.05 times over the 2000-01. The total loan and advances provided by the DCCBs in the southern region reported a compound growth rate of 19.43 per cent per annum. The bank wise results revealed that the magnitude of compound growth of total loan in the Bhilwara DCCB was the highest (21.50 %) and significant at one per cent level of significance compared to other DCCBs in the Southern region. The study also indicated that short-term and medium-term agricultural loans issued were more as compared to short term and medium-term non-agriculture loans. Over 92.89 per cent of total loans and advances issued were short-term loans and remaining being medium term and other loans and advances during 2017-18.

INTRODUCTION

Co-operative movement was born out of adversity. Co-operative is a form of organization in which persons voluntarily associate together as human beings on the basis of equality for the promotion of the economic interest of themselves (Ingale, 1993).In India, the inspiration for the co-operative movement came largely from Germany. Mr. Fredrick Nicholson was sent to Europe to study the working of agricultural banks and to suggest measures for the introduction of co-operative movement in India. Based on his recommendations, mostly on the pattern of credit society in Germany, the co-operative structure was introduced in India. Later Co-operative Societies Act of 1904 and "The Co-operative Societies Act 1912" were passed to improve the status of weaker section of India. Co-operative movement in India is one of the largest movements in the world. Initially, it was started with a limited spectrum of activities, dispensation of rural credit has now entered in all fields of economic activity with social content (Olekar and Shiralshetti, 2007).

Co-operative movement in Rajasthan has been a pioneering state of the co-operative movement in the country. Thereafter, co-operative began to strike roots. In 1950, on the basis of the reports of the Gadgil Committee and the Saraiya Committee, the bank made a policy statement accepting the responsibility of agricultural credit facilities for credit-worthy borrowers.

The crop loan system became an instrument for agricultural development and the Apex bank accepted its responsibility in directing and developing the system through co-operative societies in the villages for the farmer since 1966.

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During this period the State Government authorized all central co-operative banks to extend medium term loans for repairs to old wells, purchase of electric motors and for other agriculture purposes (Borude, 1993).

Progress of Co-operative movement in Rajasthan from 1953 to 2019 showed that in 1953 total branches were 16 comprising 5 regional offices (Jaipur, Udaipur, Jodhpur, Kota and Bikaner) and 11 branches handled from Jaipur. During 2019 total branches of District Central Co-operative Banks (DCCBs) in India and Rajasthan were 363 and 29, respectively. Credit plays an important role in the development of agriculture sector in India. Extension of area under irrigation and cultivation of high value crops and horticultural crops require more capital investment. The farmers have very low capital base and are mainly dependent on credit. Due to non-availability of credit, it would be difficult for them to adopt advanced agricultural technologies and also leads to forced/distress sale of their produce at lower prices. Southern Rajasthan is mainly dominated by tribes and their economic condition is in general poor. Therefore, it is imperative to study the lending activities of DCCBs in southern region. So, the main objective of the present investigation was to find out the status of loan disbursement by DCCBs in Southern Rajasthan.

RESEARCH METHODOLOGY

Multistage sampling was used to collect the information. Southern Rajasthan comprises of seven districts namely Udaipur, Rajsamand, Chittorgarh, Bhilwara, Pratapgarh, Dungarpur and Banswara. Out of seven districts, five districts were selected randomly and their five branches selected on the basis of highest loan disbursement. The selected districts were Udaipur, Dungarpur, Banswara, Bhilwara and Chittorgarh and the Badgaon, Aspur, Pratapur, Shahpura and Kapasan branches, respectively.

Collection of data

The research was based on secondary data. The data was obtained from the selected DCCBs bank branch of five districts in Southern Rajasthan.

Analytical tools

The analysis of collected data was done by simple tabular method of analysis and compound annual growth rate.

Compound growth rate (CGR)

Compound growth rate of selected indicators were worked out to know the percentage increase or decrease over time. The exponential model of following form was used for this purpose

$$Y = ab_t e$$

Where, Y = Dependent variable (indicator)

a= Intercept

b= Trend value

t=Time period in years

e= Error term.

The percentage compound growth rate was estimated by using the formula:

CGR= (antilog of b-1) ×100.

The significance of the estimated compound growth rates were tested with the help of student 't' test.

RESULTS AND DISCUSSION

Credit plays an important role in the development of agriculture sector in India. So, the status of loan advanced were presented in this section.

Loan advanced

Due to the implementation of various agricultural development schemes the lending policies of District Central Co-operative Banks (DCCBs) have undergone many changes. In addition, banks have in due course diversified their operations as well. They started providing credit under differential interest rate system to small - scale industries and weaker section business activities. The implementation of the credit component of the District Rural Development Agency Plan, the Integrated Rural Development Program has received particular attention. All of these schemes were intended to assist small and marginal farmers and

landless farm labourers to benefit economic growth and development in the rural sector by maintaining production on their small holdings through intensive cultivation and undertaking subsidiary employment that would generate employment and income.

A) Growth in total loan and advances

Looking at the total loan advanced from 2000 - 01 to 2017-18, the credit activities of all DCCBs in the south region were evaluated and the details are provided in Table 1.

Over the period under study there was an upward increase in total lending disbursement as shown in Table 1. The aggregate lending and deposits consisted of short, medium, and other loans. The total loan advanced by the DCCBs in the southern region increased from Rs. 23091 lakhs in 2000 - 01 to Rs. 209125 lakhs in 2017 - 18, registering an increase of about 9.05 times over the 2000-01.

Growth in total loan advanced has shown a positive trend across all of the region's DCCBs. The maximum increase in the overall advanced loans was observed in Bhilwara (1066.10%) followed by Banswra, Chittorgarh, Dungarpur and Udaipur by 986.47 per cent, 864.66 per cent, 498.96 per cent and 387.64 per cent, respectively. Thus, it can be concluded that the growth in absolute terms as well as change in percentage terms of advanced loans was the highest in Bhilwara DCCB. This was mainly due to the expansion of the area under commercial and horticultural crops, which necessarily required more investment in input use and hence increased demand for loans in this field.

Out of total loans advanced by the DCCBs in southern region, loan and advances have increased in all the DCCBs during the study period. The compound growth rate of total loan and advances was higher during II period as compared to the period-I except Udaipur and Chittorgarh DCCB. Table 1further showed that over the entire study period, the total loan and advances provided by the DCCBs in the southern region reported a compound growth rate of 19.43 per cent per annum. The bank wise results revealed that the magnitude of compound growth of total loan in the Bhilwara

Table 1: Growth in total loan and advances by the DCCBs in Southern Region

District	Loan and advances		Per cent Change over 2000-01	Compound Growth Rate (%)		
	2000-01	2017-18		Period I (2000-01to 2008-09)	Period II (2009-10 to 2017-18)	Entire Period (2000-01 to 2017-18)
Udaipur	4539 (19.66)	22134 (10.58)	387.64	8.97**	5.78*	15.80**
Banswara	2965 (12.84)	32214 (15.40)	986.47	13.02**	19.62**	19.82**
Dungarpur	2024 (8.77)	12123 (5.80)	498.96	11.89**	15.10**	17.21**
Bhilwara	5866 (25.40)	68404 (32.71)	1066.10	11.89**	24.71**	21.50**
Chittorgarh	7697 (33.33)	74250 (35.51)	864.66	19.84**	11.53**	19.12**
Southern Region	23091 (100.00)	209125 (100.00)	805.65	14.90**	15.29**	19.43**

** = Significant at 1 per cent level of significance

*= Significant at 5 per cent level of significance

DCCB was the highest (21.50 %) and significant at one per cent level of significance compared to other DCCBs in the Southern region.

B) Total loans issued and its composition

The total amount of loan issued by all DCCBs in aggregate to its members in southern region increased from Rs. 23091 lakhs in 2000-01 to Rs. 209125 lakhs in 2017-18 as depicted in Table 2. The total loan issued was maximum in Chittorgarh DCCB (Rs. 7697 lakhs) followed by Bhilwara (Rs. 5866 lakhs), Udaipur (Rs. 4539 lakhs), Banswara

Table 2: Loans and advances issued and its composition during 2000-01and 2017-18 in respect of DCCBs in Southern Region

(Amount Rs. in lakhs)

District	Short Term loans		Total S.T.	Medium Term loans		Total M.T	Other loans and advances	Total loan and advanced
	Agril	Non Agril		Agril	Non Agril			
Udaipur								
2000-01	1861 (41.00)	0 (0)	**1861 (41.00)**	1820 (40.09)	46 (1.01)	**1866 (41.12)**	812 (17.88)	**4539** (100.00)
2017-18	18378 (83.03)	851 (3.84)	**19229 (86.87)**	753 (3.40)	465 (2.10)	**1218 (5.50)**	1687 (7.63)	**22134** (100.00)
Banswara								
2000-01	2106 (71.02)	155 (5.22)	**2261 (76.25)**	597 (20.13)	107 (3.60)	**704 (23.75)**	0 (0)	**2965** (100.00)
2017-18	30507 (94.70)	1183 (3.67)	**31690 (98.37)**	135 (0.41)	295 (0.9)	**430 (1.33)**	94 (0.30)	**32214** (100.00)
Dungarpur								
2000-01	835 (41.25)	470 (23.22)	**1305 (64.47)**	601 (29.69)	118 (5.83)	**719 (35.53)**	0 (0)	**2024** (100.00)
2017-18	10529 (86.85)	603 (4.97)	**11132 (91.82)**	272 (2.24)	577 (4.75)	**849 (7.0)**	142 (1.18)	**12123** (100.00)
Bhilwara								
2000-01	2432 (41.45)	664 (11.31)	**3096 (52.77)**	2256 (38.45)	499 (8.50)	**2755 (46.96)**	15 (0.27)	**5866 (100.00)**
2017-18	65315 (95.48)	163 (0.23)	**65478 (95.72)**	1211 (1.77)	1411 (2.06)	**2622 (3.83)**	304 (0.45)	**68404 (100.00)**
Chittorgarh								
2000-01	2245 (29.16)	2247 (29.19)	**4492** (58.36)	2693 (34.98)	512 (6.65)	**3205** (41.64)	0 (0)	**7697** (100.00)
2017-18	60867 (81.97)	5886 (7.93)	**66753** (89.90)	6066 (8.16)	1431 (1.94)	**7497 (10.10)**	0 (0)	**74250** (100.00)
Southern Region								
2000-01	9479 (41.05)	3536 (15.31)	**13015** (56.36)	7967 (34.50)	1282 (5.55)	**9249** (40.06)	**827** (3.58)	**23091** (100.00)
2017-18	185596 (88.74)	8686 (4.15)	**194282** (92.89)	8437 (4.03)	4179 (1.99)	**12616** (6.04)	**2227** (1.07)	**209125** (100.00)

Note: Figures in parentheses are percentage of total loan advances in respective district and southern region.

(Rs. 2965 lakhs) and Dungarpur (Rs. 2024 lakhs) during 2000-01. In terminal year of the study (2017-18), Chittorgarh DCCB had issued total loans amounting Rs.74250 lakhs and maintained top position in loan disbursement. The respective figures of Bhilwara, Banswara, Udaipur and Dungarpur DCCB were Rs.68404 Rs.32214 lakhs, Rs.22134 lakhs and Rs.12123 lakhs. This indicated that the Chittorgarh DCCB had offered maximum credit facilities to their members during the study period.

Short-term and medium-term agricultural loans issued were more as compared to short term and medium-term non-agriculture loans. Over 92.89 per cent of total loans and advances issued were short-term loans and remaining being medium term and other loan and advances during 2017-18. Futher the loans advanced for Agricultural purpose was more than non- agricultural purpose in the year 2000-01 to 2017-18. This indicated that more emphasis was on short-term loans by DCCBs in southern region. Bank wise study revealed that the short-term loans were the highest in Banswara DCCB (98.37%) followed by Bhilwara (95.72%), Dungarpur (91.82 %), Chittorgarh (89.89%) and Udaipur (86.87 %) DCCBs in 2017-18.The percentage share of medium-term loan and other loans was 40.06 and 3.58 per cent, respectively in 2000-01, which decreased to 6.04 per cent in case of medium term, and 1.07 per cent in other loans and advances, during 2017-18.

CONCLUSIONS

Cooperative is backbone of Indian farmers to provide need based credit. Credit plays an important role in the development of agriculture sector in India. The status of loan disbursement indicate that loan advanced from 2000 - 01 to 2017-18, the credit activities of all DCCBs in the south region were an upward increase in total lending disbursement. The aggregate lending and deposits consisted of short, medium, and other loans. The total loan advanced by the DCCBs in the southern region increased from Rs. 23091 lakhs in 2000 - 01 to Rs. 209125 lakhs in 2017 - 18, registering an increase of about 9.05 times over the 2000-01. The study also indicates that Short-term and medium-term agricultural loans issued were more as compared to short term and medium-term non-agriculture loans. Over 92.89 per cent of total loans and advances issued were short-term loans and remaining being medium term and other loan and advances during 2017-18.

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CONSTRAINTS FACED BY THE POSTGRADUATE STUDENTS IN USING SOCIAL MEDIA

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ABSTRACT

The present study was conducted in Rajasthan by selecting three agriculture colleges i.e. RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner purposely. Among these three colleges 240 PG students were selected randomly. The results of study indicated that "Operational constraints" (84.05 MPS) was perceived as most important constraint of postgraduate students and ranked first. The next important constraints faced by students were "socio-psychological constraints" and "economic constraints" with 84.00 MPS and 83.08 MPS which were second and third ranked, respectively by the respondents. It is further noted that less important constraints faced by students were "educational constraints" and "technical constraints" with 82.08 and 80.55 MPS, respectively.

INTRODUCTION

Social media are modern interactive communication channels through which people connect to one another, share ideas, experiences, pictures, messages and information of common interest. Social media provide tools by which people can communicate, share information and create new relationships. Penuel and Riel (2007) define social networking as "a set of people and the relationships between them". This definition is found today in the social networking services that promote the development of online communities of people. These sites allow user to make new friends, chatting with friends and family, sharing pictures and ideas that they cannot do offline. Social media provides more benefits that expand their perception of society, self and the humanity (Boyd, 2007). With this background in view, the present study entitled "Constraints Faced by the Postgraduates Students in using Social Media" was undertaken.

RESEARCH METHODOLOGY

The present study was conducted in Rajasthan which means "Land of Maharajas". Rajasthan state comprises of five Agricultural Universities, out of which three agricultural universities namely Maharana Pratap University of Agriculture & Technology, Udaipur, Sri Karan Narendra Agriculture University, Jobner and Swami Keshwanand Rajasthan Agriculture University, Bikaner were selected on the basis of post graduate programmes (M.Sc. and Ph.D. in Agriculture) are running for more than 20 years in various discipline. Therefore, the selected colleges are Rajasthan College of Agriculture (MPUAT, Udaipur), SKN College of Agriculture Jobner (SKNAU, Jobner) & College of Agriculture (SKRAU, Bikaner) for the present study. From the list so prepared, 80 post graduate scholars were selected from each identified college with the help of random sampling technique. Thus, a total of 240 post graduate students were included in the sample of study. For analysis of collected information, the appropriate statistical methods were used for interpretation. The degrees of constraints as perceived by the students were analyzed by taking a 3 point continuum i.e., most severe, severe and least severe. In order to find out the priority area of constraints in various areas related to getting information, Mean Percent Score (MPS) for each constraint were calculated.

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Mean per cent score were obtained by multiplying total obtained score of the respondents by hundred and divided by the maximum obtainable score under each practice. Formula of MPS is given as under:

$$MPS = \frac{\text{Total score obtained by the respondent}}{\text{Maximum obtainable score}} \times 100$$

RESULTS AND DISCUSSION

In present study, the term constraints means the barriers and obstacles which are faced by students in using social media. Constraints were categorized in 5 categories viz. technical, economical, operational, socio-psychological and educational.

1. Overall constraints faced by postgraduate students in using social media

The overall data reveal that in Table 1 "Operational constraints" (84.05 MPS) was perceived as most important constraint of postgraduate students and ranked first. The next important constraints faced by students were "socio-psychological constraints" and "economic constraints" with 84.00 MPS and 83.08 MPS which were second and third ranked, respectively by the respondents. It is further noted that less important constraints faced by students were "educational constraints" and "technical constraints" with 82.08 MPS and 80.55 MPS, respectively.

2. Aspect wise constraints faced by the postgraduate students in use of social media

For analysis of constraints faced by the students in use of social media, 26 major constraints were enlisted in five different categories as technical constraints, economic constraints, operational constraints, socio-psychological constraints, and educational constraints. Each statement was converted into mean per cent score and assigned rank accordingly.

A perusal data presented in Table 2 reveals that in first section was on technical constraints in which "slow speed for internet access" stands at first ranked with overall 82.38 MPS. The similar ranking pattern in RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner, it stands at first ranked with 80.08, 84.58 and 82.50 MPS, respectively. The next important problem faced by students "irregular power supply "with overall 79.85 MPS which were ranked second by the students. It was further noted that "server breakdown creates problem in internet access" and "computer is frequently infected with viruses" stands at third ranked with overall 79.58 MPS by the students.

The close observation of data depicts that least important constraints faced by students of "computer is frequently infected with virus" were assigned fourth ranked in RCA, Udaipur and COA, Bikaner, respectively. Whereas 77.91 MPS of students SKNCOA, Jobner which were "server breakdown creates problem in internet access" as least problems faced by students.

The reason for facing constraints that there is no availability of wi-fi facility and antivirus software in hostels. Similar findings are reported by Lalnunpuii and verma (2016), Savitha and Geetha (2016), Dey

Table 1: Categorization of different constraints faced by postgraduate students in using social media

n=240

S. No.	Constraints	RCA Udaipur		SKNCOA Jobner		COA Bikaner		Overall	
		MPS	RANK	MPS	RANK	MPS	RANK	MPS	RANK
1.	Technical constraints	79.68	V	81.45	V	80.52	V	80.55	V
2.	Economic constraints	83.00	III	82.91	III	83.33	II	83.08	III
3.	Operational constraints	83.83	II	85.16	I	83.16	III	84.05	I
4.	Socio-psychological constraints	84.44	I	84.09	II	83.47	I	84.00	II
5.	Educational constraints	81.94	IV	81.66	IV	82.63	IV	82.08	IV

and Parabhoi (2017), Brahma and Verma (2018), Honhaga (2018) and Kanchakkanavar (2018).

The second section of the Table 2 indicate that economic constraints faced by the postgraduate students in use of social media. In this section "unwanted charges on downloading of papers and articles" with overall 84.86 MPS which were ranked first by the postgraduate students. The next significant constraints faced by students "unbearable data pack charges" with overall 84.57 MPS which were second ranked by the respondents. Further analysis of table clearly indicate that "high charges of cyber café" (82.91 MPS), "high cost of computer" (81.66 MPS) and "high cost of maintenance of electronic devices" (81.25 MPS), these constraints were ranked third, fourth and fifth, respectively by the students. The added reason due to majority of students was from medium family income, they don't afford the charges on downloading paper.

The separate analysis of data shows that most important constraints faced by students of each college of agriculture universities. It clearly showed that "unwanted charges on downloading of papers and articles" was assigned first ranked in RCA, Udaipur and COA, Bikaner. Whereas, in case of students of SKNCOA, Jobner "unbearable data pack charges" was ranked first. The added reason was majority of students belonged to less family income, so they may not able to pay charges for downloading papers, articles and data packs. The least significant problems faced by students were "high cost of computer" and high cost of maintenance of electronic devices which were counted last ranked of the students of RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner, respectively.

In case of operational constraints perceived by the students in which "restriction on some websites for students to upload and download study material

Table 2: Aspect wise constraints faced by the postgraduate students in use of social media

n=240

S.No	Constraints	RCA Udaipur		SKNCOA Jobner		COA Bikaner		Total	
		MPS	RANK	MPS	RANK	MPS	RANK	MPS	RANK
A.	**Technical constraints**								
1.	Irregular power supply	79.16	III	80.41	III	80.00	III	79.85	II
2.	Slow speed for internet access	80.08	I	84.58	I	82.50	I	82.38	I
3.	Server breakdown creates problem in internet access	80.00	II	77.91	IV	80.83	II	79.58	III
4.	computer is frequently infected with viruses	77.08	IV	82.91	II	78.75	IV	79.58	III
B.	**Economic constraints**								
1.	High cost of computer	81.66	V	80.00	V	83.33	III	81.66	IV
2.	Unbearable data pack charges	82.91	III	85.41	I	85.41	II	84.57	II
3.	High cost of maintenance of electronic devices	82.50	IV	82.50	IV	78.75	V	81.25	V
4.	High charges of cyber café	83.33	II	82.91	III	82.50	IV	82.91	III
5.	Unwanted charges on downloading of papers and articles	84.58	I	83.75	II	86.25	I	84.86	I
C.	**Operational constraints**								
1.	Lack of knowledge about hardware ,software and internet explore	83.75	III	84.16	IV	84.16	II	82.02	V
2.	Lack of knowledge about availability of paid and unpaid sites	85.83	II	85.41	II	83.33	III	84.85	II
3.	Overload of information on internet	81.25	V	85.00	III	82.08	IV	82.77	III
4.	Difficult to find relevant information	82.08	IV	83.75	V	81.25	V	82.36	IV
5.	Restriction on some websites for students to upload and download study material / research papers	87.08	I	87.50	I	85.00	I	86.52	I
D.	**Socio-psychological constraints**								
1.	Lack of security and privacy	88.33	I	90.83	I	87.50	I	88.88	I
2.	Lack of interest in using social media	82.91	V	80.83	VI	81.25	VI	81.66	V
3.	Use of social media detached me from direct contact with family members	85.00	III	83.75	III	84.58	II	84.44	II
4.	Lack of faith on information given through social media	83.33	IV	85.41	II	82.08	IV	83.60	IV
5.	Lack of physical interaction with friends	85.33	II	82.08	IV	83.75	III	83.72	III
6.	Use of social media is wastage of both time and efforts	81.25	VI	81.66	V	81.66	V	81.52	VI
E.	**Educational constraints**								
1.	Use of social media decrease study hours	79.58	V	81.25	II	82.50	III	81.11	II
2.	Use of social media decrease in frequency of reading printed materials like books, journals, newspapers etc.	78.75	VI	78.33	VI	83.75	II	80.27	V
3.	Unavailability of required agriculture information on social media	80.41	IV	79.58	V	82.08	IV	80.69	IV
4.	Not useful for research purpose	80.83	III	80.41	IV	81.25	V	80.83	III
5.	Low level of education to understand developmental efforts on social media	82.91	II	80.83	III	78.75	VI	80.83	III
6.	Lack of training	89.16	I	90.00	I	88.75	I	89.30	I

/ research papers" stands first ranked with overall 86.52 MPS. Same pattern also visible in RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner with 87.08 , 87.50 and 85.00 MPS, respectively ,which were first ranked by the postgraduate students. It is noted that "lack of knowledge about availability of paid and unpaid sites" with overall 84.85 MPS which were second ranked by the respondents. It can be further analysis of data shows that "overload of information on internet" (82.77 MPS), "difficult to find relevant information" (82.36 MPS) and "lack of knowledge about hardware, software and internet explorer" (82.02 MPS), these constraints were ranked third, fourth and fifth respectively. In RCA, Udaipur "overload of information on internet" (81.25 MPS) was counted last ranked and in SKNCOA, Jobner and COA, Bikaner which was "difficult to find relevant information" assigned last ranked. The results are supported by the results of Darshan and Meena (2017) and Divya and Sudhier (2019).

The socio- psychological constraints faced by postgraduate students in which "lack of security and privacy" with overall 88.88 MPS which were first ranked by the postgraduate students. The similar ranking pattern in RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner, it stands at first ranked with 88.33, 90.83 and 87.50 MPS, respectively. Analysis of table reveals that "use of social media detached me from direct contact with family members" and "lack of physical interaction with friends" which were ranked second and third with overall 84.44 and 83.72 MPS. Further reported that "lack of faith on information given through social media" (83.60 MPS), "lack of interest in using social media" (81.66 MPS) and "use of social media is wastage of both time and efforts" (81.52 MPS), these problems were assigned fourth, fifth and sixth ranked accordingly. Least constraints faced by students of RCA, Udaipur "use of social media is wastage of both time and efforts" was assigned sixth ranked, whereas in SKNCOA, Jobner and COA, Bikaner "lack of interest in using social media" which were assigned last ranked in both colleges.

Reason behind due to security and privacy are topmost problem faced by students using social media. However, a majority of students still used their real name, photos and biographical information in their profile. Similar finding are reported that Mohamed and Sumitha (2011) who found that lack of security and privacy was major problem by using social media of the students. Similar findings are also revealed by Chikkamanju (2014) and Sevukan and Mohammed (2015).

The last section of the Table 2 observed that the postgraduate students in using social media "lack of training" stands first ranked with overall 89.30 MPS. Same pattern also show in RCA, Udaipur, SKNCOA, Jobner and COA, Bikaner, it stands at first ranked with 89.16, 90.00 and 88.75 MPS, respectively. The next significant constraints faced by students "use of social media decrease study hours" (81.11 MPS), "not useful for research purpose" (80.83 MPS) and "low level of education to understand developmental efforts on social media" (80.83 MPS) which were ranked second and third. It is further revealed that "unavailability of required agriculture information on social media" and "use of social media decrease in frequency of reading printed materials like books, journals, newspapers etc." it stands fourth and fifth ranked with 80.69 MPS and 80.27 MPS.

Separate data of each college depicts that in both RCA, Udaipur and SKNCOA, Jobner were faced problems "use of social media decrease in frequency of reading printed materials like books, journals, newspapers etc." was assigned sixth ranked and in COA, Bikaner "low level of education to understand developmental efforts on social media" (78.75 MPS) was counted last ranked of the postgraduate students.

This problem might be due to majority of students not having high knowledge and skill of using social media. The experts are not available in colleges for training to the students about various social media. Similar finding are reported by Ragul (2015), Kumar (2018) and Mani *et al.* (2019).

CONCLUSION

It can be concluded that operational constraints was

perceived as most important constraint of postgraduate students. Aspect wise constraints were found that "slow speed for internet access", "unwanted charges on downloading of papers and articles"," restriction on some websites for students to upload and download study material / research papers", "lack of security and privacy" and "lack of training" were the major constraints faced by students. There is need to provide internet facility and organized training programme to improve the academic performance of the postgraduate students.

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ASSOCIATION BETWEEN PERSONAL VARIABLES WITH THE LEVEL OF KNOWLEDGE ABOUT GLOBAL WARMING AMONG PG SCHOLARS

Monika Jilowa*, S. S. Sisodia, F.L. Sharma*** and H.K. Jain******

ABSTRACT

The present investigation was conducted in the Rajasthan College of Agriculture, MPUAT, Udaipur. A random sample of total 120 postgraduate research scholars was selected for the study. The data were collected through structural interview schedule. The dependent variable like knowledge about global warming was measured with the help of structural interview schedule. To determine the association between independent variables with the dependent variable like knowledge about global warming chi-square test was used. It was indicated that age, education, library and internet had significant association with knowledge about global warming. Age and academic performance was significant at 1 per cent level of significance with knowledge about global warming. Library and internet was significant at 5 per cent level of significance with knowledge about global warming.

INTRODUCTION

Agriculturally India self-praise of its rich and varied history of more than ten thousand years. Today India ranks second in farm output throughout the world.It is the largest economic sector and playing a significant role in the overall socio-economic development of India. India is one of the largest producers of milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper, wheat, rice, sugar, groundnut and inland fish in the world. With the adoption of new technology in farming, the farmers are also facing new problems like soil and water management, choice of crops, technical know- how, pest and diseases, marketing of produce, finance, surplus production and price fluctuations. The global warming and climate change is now becoming biggest problems for the Indian agriculturists.Global warming is to have significant impact on conditions affecting agriculture, including high fluctuation in temperature, carbon dioxide emission, natural hazards, precipitation and the interaction of these elements.

Saseendran et al. (2000) depicted that each degree hike in temperature, the deterioration in rice yield nearly 6 per cent. The above facts emphasize the need to not only study in detail the climate change vulnerability of agriculture to climate variability and extremes. Agriculture is fundamentally dependent on weather for higher productivity a few conclusions on the effect of climate change on agriculture from different studies indicated that there is an adverse effect of climate change on agriculture. Sinha and Swaminathan (1991) observed that rise of 2°C in temperature could decline the rice yield nearly 0.75 tons/ha, in the high yield by 0.45 tons/ha.This way the present study is an attempt to know the awareness and knowledge of post graduate research scholars about global Warming problem and their sensitivity to minimize global warming problems. The study also emphasizes to understand relationship between the characteristics of post graduate research scholars and their knowledge about global Warming problems. The findings of this study will have immense importance for extension workers, administrators, teachers and researchers who are directly or indirectly involved in the development of necessary human recourses for agriculture

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development. The findings of the research will be helpful to the agriculture arid natural resources management institutions and government in main streaming role of agriculture scholars in maintaining climate change as this research is a first of its kind to understand knowledge of the post graduate scholars about global warming.

RESEARCH METHODOLOGY

In Rajasthan, State Agricultural Universities are working at Udaipur, Bikaner, Jobner, Kota & Jodhpur. The selection of respondents, 120 research scholars were selected with the help of random sample technique which were studying in M.Sc. and Ph.D. at Rajasthan College of Agriculture, Udaipur. The interview schedule was used as a tool for collection of requisite information. To find out the association between dependent and independent variables i.e., Knowledge about the global warming chi-square test (x^2) was used.

Chi-square test

The chi-square statistic was used to test the hypothesis of association between two or more groups, populations or criteria.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

O_i = Observed frequency

E_i = Expected frequency

i = 1 to n

RESULTS AND DISCUSSION

To determine the association between independent and dependent variable i.e., level of Knowledge about the Global warming Chi-square test (χ^2) was used. It provides the overall impact of different personal variables with the level of knowledge about the Global Warming. The result of all variables are presented in following tables.

1. Association between age and knowledge of respondents about global warming

An observation of data in Table 1 shows that out of 47 respondents of less than 23 years age group, 11(23.40%) had viewed in category of high level of knowledge about global warming, while 24 (51.06 %) and 12 (25.53 %) respondents were found in the group of medium and low level of knowledge of global warming, respectively. In the 23-27 age group, 28, 11 and 9 respondents possessed medium, low and high category of knowledge about global warming, respectively. In case of above 27 age group, majority of the postgraduate students (52.00%) had medium level, followed by 28.00 per cent and 20.00 per cent belongs to low and high level of knowledge about global warming, respectively.

Table 1: Association between age and knowledge of respondents about global warming

n=120

S. No.	Age	Knowledge			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1.	Less than 23 years	12(25.53)[1] (40.00)[2]	24(51.06)[1] (36.92)[2]	11(23.40)[1] (44.00)[2]	47 (39.17)	
2.	23-27 years	11(22.92)[1] (36.67)	28(58.33)[1] (43.08)	9(18.75)[1] (36.00)[2]	48 (40.00)	**47.65****
3.	Above 27	7(28.00)[1] (23.33)[2]	13(52.00)[1] (20.00)[2]	5(20.00)[1] (20.00)[2]	25 (20.83)	
	Total	30 (25.00)	65 (54.17)	25 (20.83)	120	

1 = Percentage of row

2 = Percentage of column

*= Significant

Further analysis of Table 1 clearly indicates that the calculated chi-square value (47.65) was more than tabulated value at 1% level of significance. This reveals that their existed association between age of respondents and knowledge about global warming.

2. Association between education and knowledge about global warming

The results in Table 2 indicates that out of total 46 respondents of academic performance less than 7.00 OGPA, 54.35 per cent, 26.09 per cent and 19.57 per cent had medium, low and high level of knowledge about global warming. Among the respondents who had 7.00 to 8.00 OGPA, majority of the postgraduate scholars (56.25%) were belongs to medium, followed by 22.92 and 20.83 per cent were of low and high level of knowledge about global warming, respectively. Out of 26 respondents who had above 8.00 OGPA, 50.00 per cent had medium level of knowledge about global warming, while 26.93 per cent of respondents found to have low level of knowledge about global warming and rest of them 23.07 per cent belonged to high level of knowledge about global warming.

A further observation of Table 2 clearly shows that calculated chi-square value (44.56) was higher than tabulated value at 1% level of significance. Therefore, the null hypothesis was rejected and alternate hypothesis was accepted. This means that there is association between education of respondents and knowledge about global warming. It inferred that education played significant role in knowledge about global warming.

3. Association between participation in extracurricular activities with the knowledge about global warming

An observation of data in Table 3 shows that out of 18 postgraduate scholars of participate in school level, 38.89 per cent were of low level of knowledge about global warming. Whereas, 33.33 and 27.78 per cent respondents were observed in high and medium level of knowledge about global warming, respectively. In the college level participation in extracurricular activities, 56.37, 26.64 and 20.00 per cent had medium, low and high level of knowledge about global warming, respectively. In the university level, majority of the postgraduate scholars had medium level, followed by 21.28 and 17.02 per cent were belongs to low and high level of knowledge about global warming.

This finding is agreement with the findings of Mishra (2020).

Further analysis of Table 3 clearly indicates that the calculated chi-square value (8.32) was less than tabulated value. Therefore, the null hypothesis was accepted. This reveals that there existed no association between participation of respondents in extracurricular activities and knowledge about

Table 2: Association between education and knowledge of students about global warming

n=120

S. No.	OGPA	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	Less than 7.00 OGPA	12(26.09)[1] (40.00)[2]	25 (54.35)[1] (38.46)[2]	9 (19.57)[1] (36.00)	46	**44.56****
2	7.00-8.00	11(22.92)[1] (36.67)[2]	27(56.25)[1] (41.54)[2]	10(20.83)[1] (40.00)[2]	48	
3	Above 8.00	7(26.93)[1] (23.33)[2]	13(50.00)[1] (20.00)[2]	6(23.07)[1] (24.00)[2]	26	
	Total	30	65	25	120	

1 = Percentage of row

2 = Percentage of column

**= Significant at 1 per cent level of significance

global warming.

4. Association between sources of information collection with the knowledge about global warming.

Table 3 shows that out of 20 respondents who were fall in low group of sources of information, 40.00 per cent had high level of knowledge about global warming, followed by 35.00 per cent were placed in low level group and 25.00 per cent were under medium level of knowledge about global warming. In the medium group of sources of information, 56.36 per cent of postgraduate scholars had medium level, followed by 23.64 and 20.00 per cent of respondents were fall under low and high category of knowledge about global warming, respectively. Out of 45 respondents in the group of high category of sources of information, majority of the postgraduate scholars (64.44%) belongs to medium, followed by low (22.22%) and high (13.34%) level of knowledge about global warming, respectively.

Further analysis of Table 3 clearly indicates that the calculated chi-square value (8.71) was less than tabulated value. Therefore, the null hypothesis was accepted. This reveals that there existed no association between source of information collection of respondents and knowledge of respondents on

Table 3: Association between participation in extracurricular activities with the knowledge about global warming

n=120

S. No.	Participation	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	School Level	7(38.89)[1] (23.33)[2]	5(27.78)[1] (7.70)[2]	6(33.33)[1] (24.00)[2]	18	**8.32[NS]**
2	College Level	13(26.64)[1] (43.33)[2]	31(56.37)[1] (47.69)[2]	11(20.00)[1] (44.00)[2]	55	
3	University Level	10(21.28)[1] (33.33)[2]	29(61.70)[1] (44.61)[2]	8(17.02)[1] (32.00)[2]	47	
	Total	30	65	25	120	

1 = Percentage of row
2 = Percentage of column
NS= Non-significant

Table 4: Association between source of information collection with the knowledge about global warming

n=120

S. No.	Source of information collection	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	Less than 38	7(34.00)[1] (23.33)[2]	5(25.00)[1] (7.69)[2]	8(40.00)[1] (32.00)[2]	20	**8.71[NS]**
2	38-56	13(23.64)[1] (43.33)[2]	31(56.36)[1] (47.69)[2]	11(20.00)[1] (44.00)[2]	55	
3	Above 56	10(22.22)[1] (33.34)[2]	29(64.44)[1] (44.61)[2]	6(13.34)[1] (24.00)[2]	45	
	Total	30	65	25	120	

1 = Percentage of row
2 = Percentage of column
NS= Non-significant

global warming

5. Association between visit to library and knowledge of respondents about global warming.

Table 4 indicates that in category of 1 hour per day visit library, 45.83 per cent of the postgraduate scholars had low level of knowledge about global warming, followed by high (33.34%) and medium (20.83%) level of knowledge about global warming. Out of 54 respondents with 2 to 3 hours of visit to library, 57.40 per cent were of medium level of knowledge about global warming. While, 22.22 and 20.37 per cent were had low and high level of knowledge about global warming, respectively. In the group of above 3 hours of visit to library 69.05, 16.67 and 14.28 were belonged to medium, low and high level of knowledge about global warming, respectively.

This finding is agreement with the findings of Christian (2010).

A further observation of Table 5 clearly shows that calculated chi-square value (10.91) was higher than tabulated value at 5% level of significance. Therefore, the null hypothesis was rejected. This means that there is association between visit to library and knowledge about global warming. It inferred that visit to library played significant role in knowledge about global warming.

6. Association between use of internet and knowledge of respondents about global warming

An observation of data in Table 6 shows that majority of respondents (45.83%) in up to 1hour internet use had low level of knowledge about global warming. Among the postgraduate scholars who had 2 to 3 hours' internet use, 82.50 per cent of them had medium category of knowledge about global warming, followed by 22.22 per cent of the respondents had low level of knowledge about global warming and 20.37 per cent of the postgraduates were having high level of knowledge about global warming. Out of 40 respondents who belongs to above 3hours' internet use, 67.50 per cent of them were of medium group whereas, 16.67 and 15.00 per cent were fall under low and high group of knowledge about global warming, respectively.

A further observation of Table 6 clearly shows that calculated chi-square value (10.94) was higher than tabulated value at 5% level of significance. Therefore, the null hypothesis was rejected and research hypothesis was accepted. This means that there is association between internet use and knowledge about global warming. It inferred that internet use played significant role in knowledge about global warming.

Table 5: Association between visit to library and knowledge of respondents about global warming

n=120

S. No.	Visit to library	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	Up to 1hr	11(45.83)[1] (36.67)[2]	5(20.83)[1] (7.69)[2]	8(33.34)[1] (32.00)[2]	24	**10.91***
2	Up to 2-3 hr	12(22.22)[1] (40.00)[2]	31(57.40)[1] (47.69)[2]	11(20.37)[1] (44.00)[2]	54	
3	Above 3	7(16.67)[1] (23.33)[2]	29(69.05)[1] (44.62)[2]	6(14.28)[1] (24.00)[2]	42	
	Total	30	65	25	120	

1 = Percentage of row

2 = Percentage of column

*= Significant at 5% level of significance

Table 6: Association between use of internet and knowledge of respondents about global warming

n=120

S. No.	Internet use	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	Up to 1hr	11(45.83)[1] (36.67)[2]	5(8.92)[1] (7.69)[2]	8(33.34)[1] (32.00)[2]	24	**10.94***
2	Up to 2-3 hr	12(22.22)[1] (40.00)[2]	33(82.50)[1] (50.77)[2]	11(20.37)[1] (44.00)[2]	56	
3	Above 3	7(16.67)[1] (23.33)[2]	27(67.50)[1] (41.54)[2]	6(15.00)[1] (24.00)[2]	40	
	Total	30	65	25	120	

1 = Percentage of row
2 = Percentage of column
*= Significant at 5% level of significance

Table 7: Association between Reasons forced to explore knowledge and knowledge of respondents about global warming

n=120

Sr. No.	Reason forced to explore knowledge	Knowledge level			Total	Chi-square value
		Low Below 21	Medium 21-27	High above 27		
1	Below 5	6(30.30)[1] (32.25)[2]	10(45.45)[1] (22.05)[2]	5(24.24)[1] (38.09)[2]	21	**8.98**[NS]
2	5-10	16(22.00)[1] (35.48)[2]	27(62.00)[1] (45.58)[2]	14(16.00)[1] (38.09)[2]	57	
3	Above 10	8(27.02)[1] (32.25)[2]	28(59.45)[1] (32.35)[2]	6(13.51)[1] (23.80)[2]	42	
	Total	30	65	25	120	

1 = Percentage of row
2 = Percentage of column
NS = Non significant

7. Association between Reasons forced to explore knowledge and knowledge of respondents about global warming.

An observation of data in Table 7 shows that out of total 33 from below 5, 8 (24.24%) had viewed in category of high level of knowledge, while 15(45.45 %) and 10(30.30 %) respondents were found in the group of medium and low level of knowledge about global warming, respectively. In the middle 5-10 group 31, 11 and 8 respondents possessed medium, high and low level of knowledge, respectively. In case of above 10, out of 37 respondents, 27.02 per cent, 59.45 per cent and 13.51 per cent respondents had low, medium and high level of knowledge.

Further analysis of Table 7 clearly indicates that the calculated chi-square value (8.98) was less than tabulated value. Therefore, the null hypothesis was accepted. This reveals that there existed no association between reasons forced to explore knowledge and knowledge about global warming of respondents.

CONCLUSION

The motive of the study was to examining the association between personal variables and level of knowledge about global warming,it was observed that age and internet use had significant association

with knowledge of respondents about global warming. Whereas, independent variables like extracurricular activities, source of information, reason force to explore knowledge had no association with the level of knowledge about global warming.

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ASPIRATION OF EDUCATED YOUTHS TOWARDS AGRICULTURE ENTERPRISES OF GUJARAT STATE

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ABSTRACT

The present research was undertaken to assess aspiration of educated youths towards agriculture enterprises of Gujarat state. The study was conducted in 33 districts of Gujarat state. For the study 2 agriculture enterprise educated youths were identified from the lists. Simple random sampling methods was use to obtain 2 respondents from each district. So the total 66 respondents from all over district of Gujarat state were selected. It can be concluded that 87.88 per cent of the educated youths possessed more favourable aspiration, followed by 12.12 per cent of the respondents had favourable aspiration and no any educated youths had less favourable aspiration in the study. It can also be concluded that majority (100.00 per cent) of the respondents had favourable to more favourable aspiration towards agricultural enterprises. The probable reason for this result might be due to higher level of educational level, decision making ability, innovativeness, cosmopoliteness, management efficiency, risk and scientific orientation and achievement motivation towards agricultural enterprises.

INTRODUCTION

Generally, youth are willing to adopt new ideas and technologies and therefore they can easily transform the present status of farming. The youth could be the ideal catalyst to change the poor image of persons involved in farming moreover, with rise in their aspirations, their exposure to new age media like internet, smart phones, television. The educated youth are now looking for a better life and job. The only way to stop them from leaving the villages is by ensuring better economic prospect for them in farming and improving the quality of life in the rural belt. The study took a broad view of aspirations, asking educated youth's in Gujarat state what they want to do in the future. Some plans were immediate and realistic (for example, farming now to get money to learn a trade).To know the aspiration of educated youths towards agriculture enterprises is prime importance. Present study was undertaken to assess an aspiration of educated youths towards agriculture enterprises of Gujarat state.

RESEARCH METHODOLOGY

A scale that can scientifically measure the aspiration of educated youths towards agricultural enterprises was developed. Among the techniques available for the construction of the scales, the Likert's Summated Rating Scale (1932) was found appropriate. The final set of aspiration scale was content 16 statements in which 15 were positive and 1 negative. The study was conducted in 33 districts of Gujarat state. For the study, 2 agriculture enterprise educated youths were identified from the lists. Simple random sampling method was use to obtain 2 respondents from each district. So the total 66 respondents from all over district of Gujarat state were selected. The appropriate measuring techniques/scales of independent and dependent variables were also assorted from the available resources however, the structured schedules were developed with the assistance of experts for such variables for those the appropriate measuring techniques were not available. The response obtained for each item in the interview schedule were scored and tabulated into a master sheet. The statistical parameters like Frequency, Percentage, Rank, Mean, Standard deviation, and arbitrary method were used for analysis and developing the inference.

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RESULTS AND DISCUSSION

A. Profile of the respondents

1. Age

Table 1: Distribution of respondents according to age

n=66

Sr.	Categories	Frequency	Per cent
1.	15 to 21 year	4	6.06
2.	22 to 27 year	21	31.82
3.	28 to 35 year	41	62.12
	Total	**66**	**100.00**

It is evident from the data presented in Table 1 that majority (62.12 per cent) of the respondents of agricultural enterprise youths were belonged to 28 to 35 year age group, followed by 31.82 and 6.06 per cent were in 22 to 27 year and 15 to 21 year groups, respectively.

2. Education

Table 2: Distribution of respondents according to education

n=66

Sr.	Categories	Frequency	Per cent
1.	Bachelor education	37	56.06
2.	Master degree	23	34.85
3.	Ph.D. degree	6	9.09
	Total	**66**	**100.00**

The data presented in Table 2 indicates that majority (56.06 per cent) of the agricultural enterprise educated youths possessed bachelor education, followed by 34.85 per cent and 9.09 per cent having master degree and Ph.D. degree level of education, respectively.

3. Family Size

Table 3: Distribution of respondents according to family size

n=66

Sr.	Categories	Frequency	Per cent
1.	Small family (up to 4 members)	17	25.76
2.	Medium family (5 to 8 members)	44	66.66
3.	Big family (more than 8 members)	5	7.58
	Total	**66**	**100.00**

It is apparent from the data given in Table 3 that majority (66.66 per cent) of the agricultural enterprise youth had medium size of family, followed by 25.76 per cent had small size and 7.58 per cent had big size of family, respectively.

4. Land Holding

Table 4: Distribution of respondents according to land holding

n=66

Sr.	Categories	Frequency	Per cent
1.	Marginal land holding (up to 1.00 ha)	0	00.00
2.	Small land holding (1.01 to 2.00 ha)	6	09.10
3.	Medium land holding (2.01 to 4.00 ha)	19	28.78
4.	Big land holding (above 4.00 ha)	41	62.12
	Total	**66**	**100.00**

The data presented in Table 4 indicates that 62.12 per cent of the agricultural enterprise youth had big land holding, followed by 28.78 and 9.10.00 per cent had medium and small land holding respectively. No any agricultural enterprise youth had marginal land holding.

5. Animal Possession

Table 5: Distribution of respondents according to animal possession

n=66

Sr.	Categories	Frequency	Per cent
1.	Low level of animal possession (up to 3 score)	45	68.18
2.	Medium level of animal possession (4 to 15 score)	21	31.82
3.	High level of animal possession (above 15 score)	0	0.00
	Total	**66**	**100.00**

(Mean= 6.09), (SD= 9.084)

The data presented in Table 5 shows that majority (68.18 per cent) of the agricultural enterprise respondents had low level of animal possession, followed by 31.82 per cent of them had medium level of animal possession and No any respondent had high level of animal, respectively.

6. Family Income

Table 6: Distribution of respondents according to family income

n=66

Sr.	Categories	Frequency	Per cent
1.	Low family income (Up to Rs 1,00,000)	13	19.70
2.	Medium family income (Rs.1,00,001 to 2,00,000)	17	25.76
3.	High family income (above Rs 2,00,000)	36	54.54
	Total	**66**	**100.00**

From the Table 6 is revealed that majority (54.54 per cent) of the agricultural enterprise respondents had high family income and 25.76 and 19.70 per cent of respondent had medium and low level of family income, respectively.

7. Social Participation

Table 7: Distribution of respondents according to social participation

n=66

Sr.	Categories	Frequency	Per cent
1.	No membership (0 score)	3	4.54
2.	Membership in one organization (1 score)	41	62.12
3.	Membership in more than one organization (2 score)	11	16.67
4.	Membership with position in organization (3 score)	11	16.67
	Total	**66**	**100.00**

The data given in Table 7 concerned to social participation revealed that majority (62.12 per cent) of the agricultural enterprise respondents had membership in one organization, followed by same proportion that is 16.67 per cent had membership in more than one organization and Membership with position in organization. Only 4.54 per cent respondents had no membership in any organization.

8. Material Possession

Table 8: Distribution of respondents according to material possession

n=66

Sr.	Categories	Frequency	Per cent
1.	Low level of material possession (up to 11 score)	10	15.15
2.	Medium level of material possession (12 to 19 score)	42	63.63
3.	High level of material possession (above 19 score)	14	21.22
	Total	**66**	**100.00**

A look in to Table 8 point out that majority (63.63 per cent) of the agricultural enterprise respondents had medium level of material possession, followed by 21.22 and 15.15 per cent had high and low level of material possession, respectively.

9. Information Seeking Behaviour

Table 9: Distribution of respondents according to information seeking behavior

n=66

Sr.	Categories	Frequency	Per cent
1.	Low Information seeking behaviour (up to 30 score)	14	21.21
2.	Medium Information seeking behaviour (31 to 42 score)	39	59.10
3.	High Information seeking behaviour (43 to 54 score)	13	19.69
	Total	**66**	**100.00**

The data reported in Table 9 indicate that 59.10 per cent of the agricultural enterprise respondents

had medium level of information seeking behaviour, followed by 21.21 and 19.69 per cent had low and high level of information seeking behaviour, respectively.

10. Credit Seeking Behaviour

Table 10: Distribution of respondents according to credit seeking behavior

n=66

Sr.	Categories	Frequency	Per cent
1.	Low Credit seeking behaviour (up to 5 score)	15	22.73
2.	Medium Credit seeking behaviour (6 to 9 score)	38	57.57
3.	High Credit seeking behaviour (above 9 score)	13	19.70
	Total	**66**	**100.00**

From the Table 10 it is observed that majority (57.57 per cent) of the agricultural enterprise respondents had medium credit seeking behavior. 22.73 per cent and 19.70 per cent respondents had low and high credit seeking behavior, respectively.

11. Self Confidence

Table 11: Distribution of respondents according to self-confidence

n=66

Sr.	Categories	Frequency	Per cent
1.	Low self confidence (up to 3 score)	2	3.03
2.	Medium self confidence (4 to 6 score)	42	63.64
3.	High self confidence (above 7 to 9 score)	22	33.33
	Total	**66**	**100.00**

The data reported in Table 11 indicates that majority (63.64 per cent) of the agricultural enterprise respondents had medium level of self-confidence and 33.33 and 3.03 per cent had high and low level of self-confidence, respectively.

12. Exposure to training

Table 12: Distribution of respondents according to Exposure to training

n=66

Sr.	Categories	Frequency	%
1.	No training (1 score)	25	37.88
2.	1 to 2 training (2 score)	21	31.81
3.	3 to 4 training (3 score)	5	7.58
4.	Above 4 training (4 score)	15	22.73
	Total	**66**	**100.00**

The data presented in Table 12 indicates that in case of agricultural enterprises 37.88 and 31.81 per cent of the researchers had received 1 to 2 training and no trainings, respectively, whereas 22.73 per cent of them received above 4 trainings and 7.58 per cent of them had received 3 to 4 training.

13. Decision making ability

Table 13: Distribution of respondents according to their decision making ability

n=66

Sr.	Categories	Frequency	%
1.	Poor decision making ability (up to 7 score)	2	3.03
2.	Good decision making ability (8 to 13 score)	13	19.69
3.	Best decision making ability (14 to 20 score)	51	77.28
	Total	**66**	**100.00**

The Table 13 depicts that majority (77.28%) of the youth of agricultural enterprise had best decision making ability, while 19.69 and 3.03 per cent had good decision making ability and poor decision making ability, respectively.

14. Innovativeness

Table 14: Distribution of respondents according to innovativeness

n=66

Sr.	Categories	Frequency	%
1.	Low level of Innovativeness (1.67 score)	9	13.63
2.	Medium level of Innovativeness (1.68 to 2.34 score)	22	33.33
3.	High level of Innovativeness (2.35 to 3.0 score)	35	53.04
	Total	**66**	**100.00**

It is evident from Table 14 that majority (53.04 per cent) of the agricultural enterprise respondents had high level of innovativeness, followed by 33.33 and 13.63 per cent had medium and low level of innovativeness, respectively.

15. Cosmopoliteness

The variable was measured using the scale developed by Desai (1975). Two dimensions of the variable were considered in this case.

Table 15: Distribution of respondents according to Cosmopoliteness

n=66

Sr.	Categories	Frequency	%
1.	Low level of Cosmopoliteness	5	07.58
2.	Medium level of Cosmopoliteness	26	39.39
3.	High level of Cosmopoliteness	35	53.03
	Total	**66**	**100.00**

The data reported in Table 15 indicates that majority (53.03 per cent) of the agricultural enterprise respondents had high level of cosmopoliteness and 39.39 and 7.58 per cent had medium and low level of cosmopoliteness, respectively.

16. Scientific Orientation

Table 16: Distribution of respondents according to scientific orientation

n=66

Sr.	Categories	Frequency	%
1.	Low level of scientific orientation (up to 10 score)	0	0.00
2.	Medium level of scientific orientation (11 to 14 score)	15	22.73
3.	High level of scientific orientation (15 to 18 score)	51	77.27
	Total	**66**	**100.00**

The data presented in Table 16 disclose that majority (77.27 per cent) of the agricultural enterprise respondents had higher level of scientific orientation, followed by 22.73 per cent had medium level of scientific orientation. No any respondent had low level of scientific orientation.

17. Risk Orientation

Table 17: Distribution of respondents according to risk orientation

n=66

Sr.	Categories	Frequency	%
1.	Low level of risk orientation (up to 10 score)	1	1.51
2.	Medium level of risk orientation (11 to 14 score)	24	36.36
3.	High level of risk orientation (above 15 score)	41	62.13
	Total	**66**	**100.00**

It is evident from the Table 17 that majority (62.13.00 per cent) of the agricultural enterprise respondents had high level of risk orientation followed by 36.36 and 1.51 per cent had medium and low level of risk orientation, respectively.

18. Economic Orientation

Table 18: Distribution of respondents according to economic orientation

n=66

Sr.	Categories	Frequency	%
1.	Lower level of economic orientation (up to 10 score)	3	4.55
2.	Moderate level of economic orientation (11 to 14 score)	42	63.63
3.	Higher level of economic orientation (Above 16 score)	21	31.82
	Total	**66**	**100.00**

The data depicted in Table 18 clearly indicates that majority (63.63 per cent) of the agricultural enterprise youths had medium level of economic orientation, followed by 31.82 and 4.55 per cent had high and low level of economic orientation, respectively.

19. Management Efficiency

Table 19: Distribution of respondents according to management efficiency

n=66

Sr.	Categories	Frequency	%
1.	Low management efficiency (Up to 12.33)	1	1.52
2.	Medium management efficiency (12.34 to 24.67)	9	13.64
3.	High management efficiency (24.68 to 37.00)	56	84.84
	Total	**66**	**100.00**

The data presented in Table 19 shows that majority (84.84 per cent) of the agricultural enterprise respondents had high level of management efficiency, followed by 13.64 and 1.52 per cent had medium and lower level of management efficiency, respectively.

20. Achievement motivation

Table 20: Distribution of respondents according to achievement motivation

n=66

Sr.	Categories	Frequency	%
1.	Low achievement motivation (up to 10 score)	1	1.52
2.	Medium achievement motivation (11 to 14 score)	30	45.45
3.	High achievement motivation (15 to 18 score)	35	53.03
	Total	**66**	**100.00**

The data reported in Table 20 indicates that majority (53.03 per cent) of the agricultural enterprise respondents had high level of achievement motivation and 45.45 and 1.52 per cent had medium and low level of achievement motivation, respectively.

B. Aspiration of Educated Youths Towards Agricultural Enterprises

For this dependent variable, the maximum score was 80 and minimum was 16. An arbitrary method was used for categorization to each section. For that the higher score is subtracted from the lower score and divided by the number of categories. The obtained score is added into the lower score until it get the highest score.

Table 21: Aspiration of educated youths towards agriculture enterprises

n=66

Sr.	Categories	Frequency	%
1.	Less favourable aspiration (up to 37.33 score)	0	0.00
2.	Favourable aspiration (37.34 to 58.67 score)	8	12.12
3.	More favourable aspiration (58.68 to 80.00 score)	58	87.88
	Total	**66**	**100.00**

It is apparent from the data reported in Table 21 that majority (87.88 per cent) of the agricultural enterprise respondents possessed more favourable

aspiration, followed by 12.12 per cent respondent possessed favourable aspiration and No any educated youths had less favourable aspiration

CONCLUSION

It can be concluded that (87.88 per cent) of the educated youths possessed more favourable aspiration, followed by 12.12 per cent of the respondent had favourable aspiration and no any educated youths had less favourable aspiration in the study. From the above data it can be concluded that majority (100.00 per cent) of the respondents had favorable to more favorable aspiration towards agricultural enterprises. The probable reason for this result might be due to higher level of educational level, decision making ability, innovativeness, cosmopoliteness, management efficiency, risk and scientific orientation and achievement motivation towards agricultural enterprises.

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CONSTRAINTS FACED BY THE FARMERS IN UTILIZATION OF IMPROVED FARM IMPLEMENTS IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was undertaken in Udaipur District of Rajasthan state in order to identify constraints faced by farmers in utilization of improved farm implements. A sample of 120 respondents from two tehsils (Mavli & Salumber) and eight villages (Samchott, Banoda, Joyra, Mahadevkhera, Goverdhanpura, Rahami, Budgaon & Intali) were taken on the basis of proportionate random sampling. The study revealed that most of the farmers faced medium level of constraints. From the study, it was found that, "Low level of education" was the major personal constraint followed by" Lack of training". In case of technical constraints "Lack of demonstration on improved farm implements" is major constraint. Similarly "Poor extension service on improved farm implements" was major communicational constraints. In case of institutional constraints "Poor banking system in rural area" is major constraint and "High initial cost of improved farm implements" is major economical constraint. "Degraded soil structure" is major geographical constraint which was faced by the farmers in utilization of improved farm implements. The study shows that respondents were facing "Personal constraints" to maximum severity than other categories of constraints.

INTRODUCTION

Farm implement is machinery used in farming or other agricultural operation. There are many types of such equipment, from hand tools and power tools to tractors and the countless kinds of farm implements using in farming. Diverse arrays of equipments are used in both organic and inorganic farming. Especially since the advent of mechanized agriculture, agricultural machinery is an indispensable part of farming.

Mechanization of agriculture is an essential input in modern agriculture. It enhances productivity, besides reducing human drudgery and cost of cultivation. Mechanization also helps in improving utilization efficiency of other inputs, safety and comfort of the agricultural worker, improvements in the quality and value addition of the produce. Efficient machinery helps in increasing production and productivity.

The overall mechanization level in India is only 40-45 per cent even though 90.00 per cent of the total farm power is contributed by mechanical and electrical power sources. However, all the operations are not uniformly mechanized. Operation-wise level of mechanization varies from 42.00 per cent for soil working and seed bed preparation, 29.00 per cent for seeding and planting, 34.00 per cent for plant protection and 37.00 per cent for irrigation. In case of harvesting and threshing, the level of mechanization is 60-70 per cent for wheat and rice and less than five per cent for others crops.

RESEARCH METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan state during the year 2020-2021 with a total of 120 respondents selected from two tehsils and eight villages. 15 respondents were selected from each village. In present study, Constraints means hurdle one faces in utilization of improved farm implements. A list of possible constraints was prepared with the help of subject matter specialist of agricultural engineering, review of literature and discussion with the farmers. Data were collected with the help of interview schedule. Face to face

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interview was used for collection of information from respondents. For identifying constraints, mean per cent score was calculated and accordingly ranks were assigned on the basis of severity of constraints.

RESULTS AND DISCUSSION

This part of the dissertation deals with the constraints faced by the farmers in utilization of improved farm implements. An effort was made to find out the priority wise constraints faced by the farmers.

Table 1: Extent of personal constraints faced by the respondents

S. No.	Constraints	Mavli (n_1=60)		Salumbar (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Poor economical condition	75.00	III	73.33	III	74.16	III
2.	Small land holding	86.66	II	80.33	II	83.49	II
3.	Fragmented land holding	61.66	V	58.33	V	59.99	V
4.	Low education level	88.33	I	86.66	I	84.99	I
5.	Type of cropping pattern	65.00	IV	61.66	IV	63.33	IV

MPS = Mean Per Cent Score

Table 2: Extent of technical constraints faced by the respondents

S. No.	Constraints	Mavli (n_1=60)		Salumber (n_2=60)		Total (n=60)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Implements not suitable for agri ecological condition	28.33	V	25.00	V	26.66	V
2.	Lack of technical knowhow on farm implements	50.00	III	53.33	III	51.66	III
3.	Lack of training for farmers	75.00	II	73.33	II	74.16	II
4.	Lack of demonstration on improved farm implements	76.66	I	75.00	I	75.83	I
5.	No mechanic available in nearby area for repair of farm implements	41.66	IV	45.00	IV	43.33	IV

MPS = Mean Per Cent Score

Table 3: Extent of communicational constraints faced by the respondents

S. No.	Constraints	Mavli (n_1=60)		Salumber (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Poor extension service on improved farm implements	75.00	I	76.66	I	75.83	I
2.	Poor access to information resources	65.00	III	61.66	III	63.33	III
3.	Lack of mass media accessibility	68.33	II	66.66	II	67.49	II
4.	Poor listening skill	38.33	IV	41.66	IV	39.99	IV
5.	Information overload	30.00	V	28.33	V	29.16	V

MPS = Mean Per Cent Score

Table 1 presents the MPS & ranking of personal constraints in which most important constraint was "Low education level" which ranked I with 84.99 MPS followed by" Small land holding" ranked II with 83.49 MPS. Rank III, IV & V assigned to "Poor economical condition", "Type of cropping pattern" & "Fragmented land holding".

Table 2 reveals that most important technical constraint was "Lack of demonstration on improved farm implements" which ranked first with 75.83 MPS followed by "Lack of training", " Lack of technical knowhow on farm implements", "No mechanic available in nearby area for repairing of farm implements", "Implements not suitable for agri-ecological condition" with II,, III, IV, and V rank, respectively

Table 3 shows that "Poor extension service on improved farm implements" is ranked I in communicational constraints with 75.83 MPS, followed by "Lack of mass media accessibility" which ranked II with 67.49 MPS , "Poor access to information" ranked III with 63.33 MPS. Rank IV and V assigned to 39.99 & 29.16 MPS respectively.

Table 4 presents the MPS & ranking of institutional constraints in which most important institutional constraints is "Poor banking system in rural area" which ranked I with 84.16 MPS, followed by "Non-availability of loan" ranked II with 78.99 MPS & "Complex process of loan approval" ranked III with 76.66 MPS. Rank IV, V & VI assigned to "No repair workshop for improved farm implements in the nearby area", "High interest rate on agriculture loans" & "Lack of availability of improved implements in nearby area", respectively.

Table 5 presents the MPS & ranking of economical constraints in which most important institutional constraints was " High initial cost of improved farm implements" which ranked one with 76.66 MPS , followed by "High operational cost" ranked second with 63.33 MPS & "Less subsidy on improved farm implements" ranked third with 60.00 MPS.

Table 4: Extent of institutional constraints faced by the respondents

S. No	Constraints	Mavli (n_1=60)		Salumber (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Non availability of loan	78.33	II	79.16	II	78.99	II
2.	High interest rate on agriculture loans	45.00	V	41.66	V	43.33	V
3.	Complex process of loan approval	75.00	III	76.66	III	75.83	III
4.	Poor banking system in rural area	83.33	I	85.00	I	84.16	I
5.	Lack of availability of improved implements in nearby area	33.33	VI	28.33	VI	31.24	VI
6.	No repair workshop for improved farm implements in the nearby area	48.33	IV	50.00	IV	49.16	IV

MPS = Mean Per cent Score

Table 5: Extent of economical constraints faced by the farmers

S. No	Economical constraints	Mavli (n_1=60)		Salumber (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	High initial cost of improved farm implements	78.33	I	75.00	I	76.66	I
2.	High operational cost	63.33	II	66.66	II	64.99	II
3.	Low input efficiency	50.00	IV	45.83	IV	47.91	IV
4.	Less subsidy on improved farm implements	60.00	III	53.33	III	56.66	III

MPS = Mean Per cent Score

Table 6 presents the MPS & ranking of geographical constraints in which most important geographical constraint was "Degraded soil structure" ranked one with 42.49 MPS and least important geographical constraint is "Sloppy land" which ranked third with 15.83 MPS.

Table 7 presents the MPS & ranking of aspect wise constraints in which "Personal Constraints" ranked first with 73.16 MPS, followed by "Economical constraints" which ranked second with 66.66 MPS. Rank III, IV, V & VI assigned to "Institutional constraints", "Communicational constraints", "Technical constraints" & "Geographical constraints" with 61.66, 54.16, 51.66, 29.99 MPS respectively.

Table 8 reveals the result of aspect wise constraints which related to implements. The farmers mostly faced constraints in "Utilization of post harvest equipments", which ranked first with 78.33 MPS, followed by "Drip irrigation" which ranked second with 59.16 MPS. Rank III, IV, V, & VI assigned to "Plant protection equipment", "Sprinkler system", "Power weeder" & "Seed cum fertilizer drill", respectively.

CONCLUSION

To increase crop production and productivity needs to improve farm mechanization level by utilizing of improved farm implements. Based on the above constraints it can be concluded that government need to increase the subsidy on costly improved farm equipments, awareness should be spread among farmers by mass media & needs to give proper training to proper maintenance and operation of improved farm implements.

Custom hiring centre should be established nearby area & needs to improve banking system and increase no. of branches of RRBs in rural area. Constraints are hurdle that one faces while using improved farm implements which prevent them from effective utilization. From the results it is cleared that respondents face more personal constraints than other constraints followed by economical constraints. However long term research is required to know about its effect over long time. This study create a way to conduct the related research in other tehsils of Udaipur district as well as in other districts of Rajasthan. This may help in knowing more valid and general constraints faced by the respondents in utilization of improved farm implements.

Table 6: Extent of geographical constraints faced by the respondents

S.No.	Geographical constraints	Mavli (n_1=60)		Salumber (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Sloppy land	15.00	III	16.66	III	15.83	III
2.	Soil type	30.00	II	33.33	II	31.65	II
3.	Degraded soil structure	43.33	I	41.66	I	42.49	I

MPS = Mean per cent Score

Table 7: Extent of aspect wise constraints faced by the farmers

S. No.	Aspects wise constraints	Mavli (n_1=60)		Salumbar (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Personal Constraints	75.00	I	73.33	I	74.16	I
2.	Technical constraints	53.33	V	50.00	V	51.66	V
3.	Communicational constraints	56.66	IV	51.66	IV	54.16	IV
4.	Institutional constraints	60.00	III	63.33	III	61.66	III
5.	Economical constraints	65.00	II	68.33	II	66.66	II
6.	Geographical constraints	33.33	VI	26.66	VI	29.99	VI

MPS = Mean per cent Score

Table 8: Aspect wise constraints related to implements realized by the respondents

S. No.	Aspects wise implements related constraints	Mavli (n_1=60)		Salumbar (n_2=60)		Total (n=120)	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Seed cum fertilizer drill	25.00	VI	31.66	VI	28.33	VI
2.	Power weeder	38.33	V	40.00	V	39.16	V
3.	Drip irrigation	56.66	III	61.66	II	59.16	II
4.	Sprinkler system	45.00	IV	41.66	IV	43.33	IV
5.	Plant protection equipment	58.33	II	51.56	III	54.94	III
6.	Post harvesting equipments	75.00	I	81.66	I	78.33	I

MPS = Mean per cent Score

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EXTENSION METHODS USED BY NGO PERSONNEL IN TRANSFER OF AGRICULTURE TECHNOLOGY IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was undertaken during 2020-21 in Udaipur district of Rajasthan state in order to identify methods used by NGO personnel in transfer of agriculture technology. A sample of 120 NGO personnel from six NGOs (BAIF, Arpan Sansthan, Gayatri Seva Sansthan, Seva Mandir, Alert Sansthan and Gandhi Manav Kalyan Society) was taken on the basis of proportionate random sampling. The mostly used information source by NGO personnel was internet which is an easy means of getting information with MPS 72.5. Majority of NGO personnel have medium level of information source use. i.e. about half of the sample (59.16). Along with internet, NGO personnel also used some important information sources like agriculture department officers, Gram Panchayat officials, SMS of KVK and newspaper with MPS of 63.75, 62.9, 62.5 and 61.6, respectively. The study depicts that group meeting was the main method used by NGOs of Udaipur district for transfer of agricultural technology with MPS 89.16. The other methods used by NGOs for transfer of agricultural technology were Farm and Home visit, Phone calls and Demonstrations.

INTRODUCTION

In a country like India with huge population, increase in production and productivity of crops is must to meet food requirements of people. Green revolution tried to increase production in India but there is still gap between the resources and need. To increase production and productivity of crops, transfer of latest agricultural technology to farmers is very much required. Transfer of agricultural technology is a complex process and it requires many organizations like government, non-governmental organizations, private organizations etc. NGOs plays important role in transfer of agricultural technology along with government. NGO means non-governmental organizations. They are legal institutes working voluntarily for the benefit of society by providing services to people without expecting profit from them.

Extension methods are the communication techniques used by NGO worker for transfer of agricultural technology to farmers. For transfer of agricultural technology, NGO personnel use many methods to reach farmers. For effective transfer of agricultural technology, one should use correct method according to the situation. Generally, combination of methods is recommended for effective transfer of agricultural technology than individual method. In the present study an attempt has been made to know about the methods used by NGO personnel for transfer of agricultural technology.

RESEARCH METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan state with a total of 120 NGO personnel selected from six NGOs i.e. Seva Mandir, Gayatri Seva Sansthan, Alert Sansthan, Arpan Sansthan, Gandhi Manav Kalyan Society and BAIF on the basis of proportionate random sampling. In the present study, method means procedure of doing things and information source means place or person from which person gets information. A list of methods and information sources was prepared with the help of Job Chart of NGO workers, review of literature and discussion with NGO workers. Data were collected with the help of interview schedule. Face to face interview was used for collection of

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information from respondents. For identifying methods, mean percentage score was calculated and accordingly ranks were assigned on the basis of methods used.

RESULTS AND DISCUSSION

Extent of use of source of information for transfer of agricultural technology

Results presented in Table 1 indicates that Internet/Mobile was the main source of information among all 11 sources of information utilized by NGOs personnel with MPS 72.5, followed by Agriculture department officers, KVK SMS, Gram Panchayat officers, newspapers, friends, relatives and neighbours, magazines, T.V, University scientists, radio and other sources with MPS 63.75, 62.9, 62.5, 61.6, 55, 54.5, 54.16, 53.3, 47.9 and 36.25, respectively. The ranks were assigned to these sources of information as per descending order of their extent of use.

Internet was the main source of information to NGOs personnel because it provides access to information at any place and time. It is easy to get information from any corner and at any time. Along with that, vast amount of information is available on internet on all topics in a detailed manner. Other reason for use of internet as main source of information was that mobile is very handy to use and it is kept all the time. Agriculture department officers stood second from where the NGOs personnel sought latest information about topics and frequent training, usage of latest technique. So, the position of Agriculture department officials can't be ignored, while KVKs SMS stood at the third position. Radio and all other sources were used to less extent by NGOs personnel. Reasons for their lesser use may be that radio has been replaced by T.V. and mobile/Internet to some extent. The findings are similar to the results of Singh *et al.* (2020) where majority of NGOs staff use electronic and oral information sources as source of information.

Table 2 shows that majority of NGOs Personnel fall under medium level use of source utilization (59.16 %) followed by NGOs personnel under low level use of source utilization category (20.83 %) and 20.00 per cent respondents under high level of source utilization category. Most of the respondents fall under low to medium level of source utilization, that means respondents mainly depend on local sources of information than cosmopolite sources of

Table 1: Allocation of NGO personnel according to their information sources

S.No.	Category	Always	Some time	Never	MPS	Rank
1	KVK SMS	55	41	24	62.90	III
2	University scientists	30	68	22	53.30	IX
3	Agriculture department officers	56	42	22	63.75	II
4	Friends, relatives and Neighbors	43	46	31	55.00	VI
5	Gram Panchayat officials	48	54	18	62.50	IV
6	Internet/Mobile	70	34	16	72.50	I
7	T. V	45	41	34	54.16	VIII
8	Radio	26	62	32	47.90	X
9	News paper	54	40	26	61.60	V
10	Farm Magazines	45	41	34	54.50	VII
11	Any other	23	41	56	36.25	XI

Table 2: Extent of source utilization of NGOs personnel for getting farm information

S. No	Level of source utilization	Frequency	Percentage
1	Low (Up to 8)	25	20.83 %
2	Medium (8 to 16)	71	59.16 %
3	High (more than 17)	24	20.00 %
Mean=12.5		**SD=4.3**	

Mean=12.5, SD=4.3

information. But respondents should also consult cosmopolite sources along with locality sources for better information.

Extent of methods used by NGOs in transfer of technology

Table 3 shows that Group meeting was the method used by most of the respondents with MPS 89.16 followed by Farm and Home Visit with MPS 86.6 and were ranked as 1st and 2nd, respectively. Group meetings were used mostly because it enables transfer of technology to large number of people within short time. It helps in saving time and money to NGOs by avoiding individual contact with each person. This may be the main reason for its more usage. Farm and Home Visit was effective method used by NGOs for many years which helps in getting direct interaction with farmers and understand their needs and problems. This may be the cause for more usage of Farm and Home Visit method by NGOs.

While Campaign and E-mail were least used methods by NGOs personnel with MPS of 62.5 and 61.6, respectively and were assigned 19th and 20th rank, respectively. There is large number of illiterates among farmers to use e-mail and it is difficult for them to read and understand. Campaigns were rarely conducted by NGOs because it is conducted suddenly on a particular cause. These may be the probable reasons for NGOs for less usage of Campaign and e-mail methods for transfer of technology to farmers.

Table 4 shows that majority of NGOs personnel

Table 3: Distribution of NGO personnel according to methods used in transfer of technology

S. No	Methods	Frequently	Often	Occasionally	MPS	Rank
1	Farm and home visit	75	42	3	86.60	II
2	Group meetings	84	34	2	89.16	I
3	Training	65	38	17	80.50	VII
4	Demonstrations	75	38	7	85.00	IV
5	Publications	33	49	38	65.27	XVI
6	Phone calls	77	35	8	85.83	III
7	Whats App Group	69	41	10	83.05	V
8	Visit to progressive farmers	63	52	5	82.70	VI
9	Office Visit	41	63	16	73.60	IX
10	Lectures	47	43	30	71.38	XI
11	Farmers' field school	35	45	40	65.00	XVII
12	Audio-Visual aids	24	58	38	62.70	XVIII
13	Workshop	37	48	35	67.50	XIII
14	Seminars	36	46	38	66.10	XV
15	Field trips	48	39	33	70.80	XII
16	Exhibitions	31	57	32	66.38	XIV
17	Kisan Mela	50	43	27	73.05	X
18	Exposure Visit	60	46	14	79.00	VIII
19	E-mail	35	31	54	61.60	XX
20	Campaign	30	45	45	62.50	XIX

Table 4: Overall distribution of respondents according their extent of utilization of methods for transfer of technology

S. No	Level of utilization of methods	Frequency	Percentage
1	Low (Up to 37)	25	20.83 **%**
2	Medium (38 to 51)	72	60.00 %
3	High (more than 52)	23	19.16 %
Mean=44.35		**SD=7.4**	

Mean=44.35, SD=7.4

fall under medium level of utilization category (60.00 %) followed by low level of utilization category (20.83 %) and 19.16 per cent respondents under high level of utilization category, respectively. Most of the respondents fall under medium level of utilization of methods for transfer of agricultural technology. It indicates that most of the NGOs personnel were using routine methods of technology transfer.

CONCLUSION

The study shows that Internet/Mobile was the main source of information among all 11 sources of information utilized by NGOs personnel. Most of the respondents fall under low to medium level of source utilization. Group meeting was the method used by most of the respondents. Most of the respondents fall under medium level of utilization of methods for transfer of agricultural technology. This indicates that NGO personnel used more routine methods for transfer of agricultural technology. NGO personnel should try more innovative methods for transfer of agricultural technology to farmers. This study creates a way to conduct the related research in other NGOs of Udaipur and other districts of Rajasthan. This may help in knowing more methods followed by NGOs in transfer of agricultural technology.

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SOCIO-ECONOMIC TRANSFORMATION OF THE FARMERS THROUGH BELOW POVERY LINE SCHEMES IN SOUTHERN RAJASTHAN

Hemant Kumar Jhingoniya*, K.L. Dangi, S.S. Sisodia*** and S.S. Burark******

ABSTRACT

The present study was conducted in Udaipur district of southern Rajasthan to identify the socio-economic transformation of BPL holder through BPL schemes. Udaipur District consists of eleven Tehsils from which Girwa Tehsil had selected based on the highest population. Ten villages were selected from Girwa tehsil based on highest numbers of BPL card holders. It was selected 150 BPL card holders from 10 selected villages. For this purpose, a list of BPL card holders prepared separately for every village. Thereafter, sample of the respondents drawn from every village through proportionate random sampling technique. The statistical measures used were percentage, mean per cent score, mean and Rank. The study revealed that of total 68 (45.33 per cent) of the BPL holders fell under the moderately change of the socio-economic level under BPL schemes. The study seeks for means and provided the Udaipur district community with the opportunity to re-evaluate their own situation with the aim to improve their living conditions. In this way, the study assisted the Udaipur district community to alleviate poverty in their community and strengthen their socio-economic well-being.

INTRODUCTION

The extreme poverty threshold of $1.90 per person per day is a benchmark accepted by the World Bank and international organizations to represent the minimum level of consumption and income required to meet the basic needs of a person. This means that people who fall below the poverty line, which is 1/6 of the population of the world, lack the resources to meet basic needs, whether it means eating just one bowl of rice a day or abandoning health care when needed.

The World Bank forecasts that 702.1 million people were living in extreme poverty in 2015, down from 1.75 billion in 1990. of these, about 347.1 million people lived in Sub-Saharan Africa (35.2 per cent of the population) and 231.3 million lived in South Asia (13.5 per cent of the population). Between 1990 and 2015, the percentage of the world's population living in extreme poverty fell from 37.1 per cent to 9.6 per cent, falling below 10 per cent for the first time. Nevertheless, given the current economic model, built on GDP, it would take 100 years to bring the world's poorest up to the previous poverty line of $1.25 a day.

Under the Schemes households having BPL ration cards are issued 35 kg of rice monthly at the rate of Rs.6.5 per kg. The Schemes targets the really poor and weaker sections of the society such as landless labours, marginal farmers and wage earners of the informal sections of the economy. The identification of BPL families is the preview of the state government and identification is made as per the estimates adopted by the central Government and distinctive ration cards issued. The village councils/ local councils finalize the list drawn up by the designated authorities.

The objectives of the BPL Card Schemes are as: (i)To enable least interaction with the Government System (ii) Provide Identification of the BPL population (iii) Control mis-utilization of benefits (iv)

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Easily Operable System (v) Mobility (Access to the system across the state)

RESEARCH METHODOLOGY

The state of Rajasthan comprised 33 Districts, of which district Udaipur is appropriate as it has been selected purposively for theinvestigation.

Udaipur district consists of eleven Tehsils *viz*; Vallabhnagar, Sarada, Salumber, Kherwara, Rishabhdeo, Girwa, Gogunda, Badgaon, Mavli, Lasadiya, Jhadol, out of which Tehsil *viz*; Girwa had been selected based on the highest population. Ten villages were proposed to be selected from so selected tehsil (Girwa) based on highest numbers of BPL card holders. On the basis of highest BPL card holder 10 villages were selected from Girwa Tehsil. 150 BPL card holders were selected from 10 so selected villages. For this purpose, a list of BPL card holders had been prepared separately for every village. Thereafter, sample of the respondents had been drawn from every village through proportionate random sampling technique.

RESULTS AND DISCUSSION

1 To determine the socio-economic transformation of Below Poverty Line Schemes (BPL) card holders.

Data presented in Table 1 apparent that majority 68 (45.33 per cent) of the BPL holders fell under the moderately change of the socio-economic level under BPL schemes. Altogether 123 (82.00 per cent) respondents were of the view that they were change in socio-economic level with low and moderate level

Table 1: Socio-economic level of the farmers about BPL schemes.

n=150

Sr.	Socio-economical level	f	%
1	Low (<39.24)	55	36.67
2	Moderate (39.25-54.35)	68	45.33
3	High (> 54.35)	27	18.00
	Total	**150**	**100**

n= Total number of respondents, f = Frequency, %= Percentage

1.1 Aspects wise social transformation of the farmers based on BPL schemes.

Analysis of data given in Table 2 reveal that first priority among the farmers goes to social transformation of Children have joined non-formal (e.g. Anganwadi) or formal institute (e.g. school, College etc.) (ranked first with MPS 69.46) followed by Membership in formal and informal organization raised, Illegal activities restricted, Interest and aptitude increased towards poverty alleviation programmes, Health hygienic and living environment improved, with their respective ranks 2,3,4,5 and MPS 58.40, 52.26, 50.66, and 46.40,

Table: 2 Aspects hierarchy of social transformation of BPL holders

n=150

S.No	Aspect	MPS	Ranks
1	Social prestige increased	35.33	8
2	Confidence increased	45.73	6
3	Children have joined non-formal (e.g. Anganwadi) or formal institute (e.g. school, College etc.)	69.46	1
4	Interest and aptitude increased towards poverty alleviation programmes	50.66	4
5	Leadership quality increased	25.73	10
6	Participation in social cultural activities increased	26.66	9
7	Health hygienic and living environment improved	46.40	5
8	Membership in formal and informal organization raised	58.40	2
9	Illegal activities restricted	52.26	3
10	Attitude and awareness about welfare programmes augmented	45.46	7

MPS = Mean per cent score

respectively.

Least social level was recorded for the "Leadership quality increased, Participation in social cultural activities increased and Social prestige increased, which were ranked 10, 9 and 8 with their respective MPS 25.73, 26.66 and 35.33.

In view of data (Table 2), it is concluded that the social level of farmers about BPL schemes particularly of Children have joined non-formal (e.g. Anganwadi) or formal institute (e.g. school, College etc.) (ranked first with MPS 69.46) followed by Membership in formal and informal organization raised, Illegal activities restricted, Interest and aptitude increased towards poverty alleviation programmes were socially transformed highelly priorities in the hierarchy of 10 . These 5 interventions are directly related to the fastest improvements in the social transformation. Therefore, the farmers expressed substantial and satisfactory social transformation about these first 5 interventions.

Table 3. Aspects hierarchy of economical transformation of BPL holders

Sr.	Aspect	MPS	Ranks
1	Overall family income increased	45.20	4
2	Upgradation of children's education	66.53	1
3	Saving of money	59.33	2
4	Overall standards of living	42.26	5
5	Material possessions including households increased	33.60	6
6	Residential facilities improved	51.20	3
7	Loan repaying capacity raised	24.13	8
8	Purchasing power increased	25.33	7

MPS = Mean per cent score

1.2 Aspects wise economical transformation of the farmers based on BPL schemes.

Detailed view of status of BPL holders among the people was had through calculating the MPS acquired about each of the 8 interventions defined therein and ranking them.

Analysis of data given in Table 3 reveal that first priority among the farmers goes to economical transformation of Upgradation of children's education (ranked first with MPS 66.53) followed by Saving of money, Residential facilities improved, Overall family income increased with their respective ranks 2,3,4 and MPS 59.33, 51.20, and 45.20 respectively.

Least economical level was recorded for the "Loan repaying capacity raised and Purchasing power increased which were ranked 8 and 7 with their respective MPS 24.13 and 25.33 .

CONCLUSION

Through the study it is recommended that leadership quality and social prestige of people should be increased by providing appropriate knowledge about social issues that will work in social transformation of people.

Through the study it is recommended that economic transformation of people is possible by increase their loan repaying capacity through less interest rate of loan and convenient repayment schedule and by increase their purchasing power through making available inputs of lower cost.

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CONSTRAINTS IN EFFECTIVE IMPLEMENTATION OF SOIL AND WATER CONSERVATION TECHNOLOGIES

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ABSTRACT

Present study was undertaken to find out constraints faced by farmers in effective implementation of soil and water conservation technologies in rainfed areas of Ahmednagar and Solapur districts of Maharashtra State (India). Total of 288 respondents from Karjat, Pathardi, Karmala and Mohol tehsils were purposively selected as it stands first in total area under rainfed. The study has brought out the constraints faced by the farmers which were coming in way of effective implementation of soil and water conservation technologies. Maximum constraints related to soil and water conservation technologies, most severe constraints were smaller sized bunds particularly on arable land, treatments and design were not suitable for the local area, difficult to sow and cultivate crops exactly on contour across the slope, non-availability of sufficient mulching material, unorganized market for organically grown produce, preparation of ridges and furrows, is expensive and labour intensive in heavy soil and erratic nature of rainfall in the rainy season.

INTRODUCTION

India has about 108 million. of rainfed area which constitute nearly 75.00 per cent of the total 143 million of arable land. In such areas crop production become relatively difficult as it mainly depends upon intensity and frequency of rainfall. The crop production depending upon this rain is technically called dryland farming and areas known as dryland.

In Maharashtra, 84.00 per cent area is under dryland agriculture. Only 16.00 per cent area has irrigation facility in Maharashtra which cannot be increased to more than 25.00 per cent of total cropped area. Nearly 40.00 per cent of total cropped area of the state is affected by chronic scarcity conditions. The rainfall in this area ranges from 500 to 700 mm accompanied with dry spell of longer or shorter duration. The rainfall is erratic, inadequate and uncertain where the crops are grown within the available rainfall. The drought prone area distributed the state in 114 tehsils of 15 districts comprising 11,801 villages, drought affected (reliefweb.net). About 70.00 to 75.00 per cent of dryland area is cropped during rabi season (Economic Survey of Maharashtra 2012-13). In Maharashtra, the fortune of agriculture on a large chunk of area depends on temporal and spatial distribution of South-West monsoon rains.

Out of 22.61 million hectares gross cropped area in Maharashtra only 4.05 million hectares (17.90%) have irrigated and remaining 82.10 per cent area comes under dryland agriculture (Economic Survey of Maharashtra 2012-13).

The study will help the planner and policy makers of soil and water conservation technologies about dryland to identify the constraint in effective implementation of the technologies. Keeping in view the importance of soil and water technologies the following objectives were undertaken;

1. To identify the constraints in effective implementation of the soil and water conservation technologies.
2. To obtain the suggestions of the respondents for overcoming the constraints in effective implementation of the soil and water conservation technologies.

RESEARCH METHODOLOGY

The study was undertaken in Scarcity Zones of Maharashtra having the largest geographical area

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and population lives in Ahmednagar and Solapur districts, thus these districts have been selected purposively. The study has further been confined to randomly selected four Panchayat Samities, two from each selected district. The list of villages of each tehsil was obtained from their respective Panchayat Samiti Office. Out of these villages, four villages from each tahsil were selected by simple random sampling method. Thus, total sixteen villages were selected from these four tahsils. Thereafter a list of farmers from the selected villages was obtained from the 'Talathi' (Revenue Department) of respective villages. In order to get representation of all farmers, 18 respondents from each village were selected by using random sampling procedure. Thus, total 288 representative respondents were selected from all sixteen selected villages of Ahmednagar and Solapur districts.

In order to measure constraints faced by the farmers in effective implementation of soil and water conservation technologies. All possible impediments were included in questionnaire. Thus, total 39 statements on constraints were finalized and grouped in to six categories *viz.* constraints towards contour bunding, graded bunding and compartment bunding, contour cultivation, mulching techniques, organic recycling and addition of organic manures, ridges and furrows and farm pond. To measure the degree of severity of constraints, the responses were recorded on a three point continuum *viz.*, most severe, severe and least severe which were assigned 3, 2 and 1 scores, respectively. The data were collected with interview schedule and were analyzed accordingly.

RESULTS AND DISCUSSION

A. Constraints being faced by respondents in effective implementation soil and water conseration technologies

I. Constraints towards contour bunding, graded bunding and compartment bunding: Table 1 show that the most severe constraints were smaller sized bunds particularly on arable land, treatments and design were not suitable for the local area were considered as most severe constraints by the respondents. It was given rank 1st with 2.14 mean score. Easy breakage of bunds every year obtained rank IInd with 2.11 mean score by the respondents. Lack of maintenance of bunding structures was ranked IIIrd with 2.01 mean score by the respondents. The constraints like lack of sufficient funds from Govt. for the construction of farm pond, non-availability of recommended planting material of grasses and shrubs for protection of bunds and it requires to construction of farm pond for harvesting of runoff water viewed as less severe by the respondents. These

Table 1. Constraints faced by respondents about contour bunding, graded bunding and compartment bunding

Constraints	MS	S	LS	TS	MS	R
Lack of sufficient funds from Govt. for the construction of farm pond	90	100	98	568	1.97	IV
Smaller sized bunds particularly on arable land	120	88	80	616	2.14	I
Treatments and design were not suitable for the local area	127	73	88	615	2.14	I
Easy breakage of bunds in heavy rainfall and other causes, it required maintenance every year	112	95	81	607	2.11	II
Lack of maintenance of bunding structures	108	75	105	579	2.01	III
Non-availability of recommended planting material of grasses and shrubs for protection of bunds	92	83	113	555	1.93	V
It requires construction of farm pond for harvesting of runoff water.	80	120	88	488	1.69	VI

MS=Most Severe, S=Severe, LS=Least Severe, TS=Total Score, MS=Mean Score, R=Rank

constraints were perceived by the respondents because smaller size of land holding and treatments and designs were not suitable for smaller size of land holdings.

II. Constraints towards contour cultivation: The data presented in Table 2 show that the constraint difficult to sow and cultivate crops exactly on contour across the slope was perceived on the top priority by respondents and ranked Ist with mean score 2.26 in problem herachy. The second emphasis by the respondents was given on every time drawing of contours on field is tedious and time consuming with the mean score 2.22. Requires more labour and more cost for field preparation was given the third ranked by the respondents. Data further revealed in Table 2 that difficult to draw contour lines and it requires levelling of land were perceived as least severe on the basis of mean score.

III. Constraints towards mulching techniques: Table 3 reveals that non-availability of sufficient mulching material was considered as most severe constraints by the farmers. It was given rank Ist with mean score 2.15. The second rank was given to mulching requires large quantity of crop residue material by respondents with 2.01 mean score. The IIIrd and IVth rank was given to mulching technique is expensive and frequent inter culturing operations are not possible for soil mulching by respondents with 1.89 and 1.88 mean score, respectively.

IV. Constraints towards organic recycling and addition of organic manures: Data in Table 4 depicted the most severe constraints like unorganized market for organically grown produce followed by severe constraint viz., low premium price for organic produce, lack of technical knowledge about organic farming and certification were having the mean score of 2.58, 2.12 and 2.11, respectively. The last rank was assigned to the organic pesticides are not easily available (1.75).

V. Constraints towards ridges and furrows: The data presented in Table 5 show that the most severe constraints were preparation of ridges and furrows, is expensive and labour intensive in heavy soil, lateral movement of water is restricted and water logging during

Table 2. Constraints faced by respondents about contour cultivation

Constraints	MS	S	LS	TS	MS	R
Difficult to draw contour lines	87	120	87	570	1.98	IV
Difficult to sow and cultivate crops exactly on contour across the slope	130	102	56	650	2.26	I
Every time drawing of contours on field is tedious and time consuming	122	108	58	640	2.22	II
It requires levelling of land	79	110	99	556	1.93	V
Requires more labour and more cost for field preparation	64	168	56	584	2.03	III

***MS**=Most Severe, **S**=Severe, **LS**=Least Severe, **TS**=Total Score, **MS**=Mean Score, **R**=Rank*

Table 3. Constraints faced by respondents about mulching techniques

Constraints	MS	S	LS	TS	MS	R
Mulching requires large quantity of crop residue material	67	158	63	580	2.01	II
Frequent inter culturing operations are not possible for soil mulching	62	128	98	540	1.88	IV
Mulching technique is expensive	106	44	138	544	1.89	III
Non-availability of sufficient mulching material	118	95	75	619	2.15	I

***MS**=Most Severe, **S**=Severe, **LS**=Least Severe, **TS**=Total Score, **MS**=Mean Score, **R**=Rank*

excess rainfall was perceived on the top priority by respondents and ranked first, second and third rank with mean score of 2.58, 2.22 and 2.00, respectively. The realization of this problem might be because majority of the respondents in dryland area were economically backward having low socio-economic status.

VI. Constraints towards farm pond: The data in Table 6 show that erratic nature of rainfall in the rainy season was considered as most severe constraint by the respondents. It was ranked first with 2.58 mean score. Smaller land holdings and land lost in farm pond reduces income and yield was ranked second with 2.47 mean score by the respondents.

Difficulties in getting agricultural credits and meager subsidy as compared to investment were ranked third with 2.45 mean score by the respondents. More initial investment was considered as a sever constraint by the respondents. It was given rank fourth with 2.06 mean score. The constraint like more evaporation loss of water due to high temperature were not appropriate and viewed as less important by the respondents.

B. Suggestions of respondents for overcoming the constraints

Suggestions made by respondents for effective implementation of soil and water conservation technologies: From Table 7, it was revealed that the respondents (95.49%) suggested that

Table 4. Constraints faced by respondents about organic recycling and addition of organic manures

Constraints	MS	S	LS	TS	MS	R
Unorganized market for organically grown produce	192	72	24	744	2.58	I
Low premium price for organic produce	78	166	44	610	2.12	II
Lack of technical knowledge about organic farming and certification	72	176	40	608	2.11	III
No experimental evidence or the cost benefit ratio of organic farming	88	128	72	592	2.06	IV
No subsidies for organic farming	85	120	83	578	2.00	V
Large quantities of organic inputs are required	64	160	64	576	2.00	V
Economic loss due to transition (from conventional to organic)	75	136	77	574	1.99	VI
Difficult to get organic fertilizers	80	120	88	568	1.97	VII
Time consuming	78	110	100	554	1.92	VIII
Organic pesticides are not easily available	40	136	112	504	1.75	IX

MS=Most Severe, S=Severe, LS=Least Severe, TS=Total Score, MS=Mean Score, R=Rank

Table 5. Constraints faced by respondents' about ridges and furrows

Constraints	MS	S	LS	TS	MS	R
Require specially designed agricultural equipments and implements	104	72	112	568	1.97	IV
Non- availability and high cost at village level	80	72	136	420	1.46	VIII
Water logging during excess rainfall	64	160	64	576	2.00	III
In heavy soil lateral movement of water is restricted	146	60	82	640	2.22	II
Create difficulty in inter cultivation	40	136	112	504	1.75	V
Wastage of precious land	37	78	173	440	1.53	VII
Preparation of ridges and furrows, is expensive and labour intensive in heavy soil	192	72	24	744	2.58	I
Non-availability of labour at proper time	80	40	168	488	1.69	VI

MS=Most Severe, S=Severe, LS=Least Severe, TS=Total Score, MS=Mean Score, R=Rank

creation of irrigation facilities through construction of dam, well, watershed structures *viz*., nala bund, percolation tanks, KT wears and farm ponds through Govt. schemes, make provision of different types of irrigation facilities for attaining better results by the farmers (93.75%). The third suggestion was to develop suitable location specific treatments and designs for construction of contour bund and graded bunds in the local area (92.01%).

About one third respondents suggested to develop effective low cost technology for soil moisture conservation technique. In depth training should be given to farmers on soil and water conservation technology, large scale demonstrations on agronomic measures of soil and water conservation be organized on respondents field during crop season, sanction procedure for construction of farm ponds under Govt. scheme should be made easy, provision of sufficient and timely credit facility with low interest

Table 6. Constraints faced by respondents about farm pond

Constraints	MS	S	LS	TS	MS	R
Smaller land holdings and land lost in farm pond reduces income and yield	176	72	40	712	2.47	II
Erratic nature of rainfall in the rainy season	192	72	24	744	2.58	I
More evaporation loss of water due to high temperature	98	48	142	532	1.85	V
More initial investment	88	128	72	592	2.06	IV
Difficulties in getting agril. credits and meager subsidy as compared to investment	171	76	41	706	2.45	III

MS=Most Severe, S=Severe, LS=Least Severe, TS=Total Score, MS=Mean Score, R=Rank

Table 7. Suggestions made by respondents for effective implementation of soil and water conservation technologies

Sr. No.	Suggestions	F	Per-cent	Rank
1.	Availability of sufficient funds in time from Govt. for development work	170	59.03	XII
2.	Creation of irrigation facilities through construction of dam, well, watershed structures *viz*., nala bund, percolation tanks, KT wears and farm ponds through Govt. schemes	275	95.49	I
3.	Develop effective low cost technology for soil moisture conservation technique	255	88.54	IV
4.	Availability of recommended planting material	190	65.97	XI
5.	Develop suitable location specific treatments and designs for construction of contour bund and graded bunds in the local area	265	92.01	III
6.	In depth training should be given to farmers on soil and water conservation technology	252	87.50	V
7.	Large scale demonstrations on agronomic measures of soil and water conservation be organized on respondents field during crop season	249	86.46	VI
8.	Make provision of different types of irrigation facilities for attaining better results by the farmers'	270	93.75	II
9.	Fertilizers and organic manures should be provided on subsidy rate	208	72.22	X
10.	Develop low cost technology for construction of farm pond	215	74.56	IX
11.	Sanction procedure for construction of farm ponds under Govt. scheme should be made easy	237	82.29	VII
12.	Provision of sufficient and timely credit facility with low interest rate by financing institute	221	76.74	VIII

F = Frequency

rate by financing institute and develop low cost technology for construction of farm pond. The results confirm with the results of Arya and Singh (2006) and Singh and Sinha (2006).

CONCLUSIONS

The study has brought out the constraints faced by the farmers which were coming in way of effective implementation of soil and water conservation technologies, smaller sized bunds particularly on arable land, treatments and design were not suitable for the local area were expressed as most severe constraint about contour bunding, graded bunding and compartment bunding. Maximum constraints related to contour cultivation were difficult to sow and cultivate crops exactly on contour across the slope, every time drawing of contours on field is tedious and time consuming, it requires leveling of land and requires more labour and more cost for field preparation. Non-availability of sufficient mulching material was considered as most severe constraints in mulching techniques by the farmers. Similarly unorganized market for organically grown produce followed by severe constraint viz., low premium price for organic produce, lack of technical knowledge about organic farming and certification constraints of organic recycling and addition of organic manures aspect. Preparation of ridges and furrows is expensive and labour intensive in heavy soil, lateral movement of water is restricted and water logging during excess rainfall was considered as most severe constraints in ridges and furrows by the farmers. Erratic nature of rainfall in the rainy season, land holdings and land lost in farm pond reduces income and yield and difficulties in getting agricultural credits and meager subsidy as compared to investment was considered as most severe constraints in farm pond by the farmers. Further, it was found that this existed on significant difference, in constraint perceived by the various categories of farmers towards different technologies. Ranking of different aspects of constraints perceived by the farmers was found that maximum in contour bunding, graded bunding and compartment bunding technology followed by contour cultivation, mulching techniques, organic recycling and addition of organic manures aspect, ridges and furrows and farm pond aspects were least severe. The important suggestions made by the farmers were related to proper and fair selection of soil and water conservation Secretary and Volunteers, publicity of constitution of various groups at soil and water conservation level, Proper representation exploration of additional irrigation facilities, plantation, pasture development, fairness in use of budget, involvement of rural institution and need based demonstrations.

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PROBLEMS FACED BY THE FARMERS' SONS IN DEVELOPING FARMING WORKABILITY

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ABSTRACT

The study was conducted on farmers' sons from Anand and Kheda districts. Five random talukas from each district were selected. Two random villages where numbers of practicing farmers were higher were selected randomly. A random sample of total 200 farmers' sons was selected for the study to know their problems in developing farming workability. The data were collected by personal contact. Major problems faced by the farmers' sons in developing farming workability in descending order of rank were non-availability of technical guidance in time for different agricultural technologies, followed by lack of updated knowledge regarding different agricultural technologies to extension personnel to motivate youth towards farming, poor encouragement from family members, non-availability of adequate and timely supply of electricity and non-availability of workable farming system models for different areas and types of farmers.

INTRODUCTION

From last many years, agriculture is dying, not as in the production of food but as a desirable profession. The farming profession has been considering as thankless, risky and even back-breaking job. On an average, about 2,035 farmers have been losing their status as main cultivator every single day for the last 25 years. During recent years, the young generation of practicing farmers avoids accepting family farming as their career. There might be many problems on the pathway of farmers' sons in accepting farming as livelihood by developing basic farming workability. If such problems are identified, corrective measures can be taken up. With this in view, the farmers' sons were requested to express their problems in developing farming workability.

Objective

1) To identify problems faced by the farmers' sons in developing farming workability

RESEARCH METHODOLOGY

The study was conducted on farmers' sons from Anand and Kheda districts. Five random talukas from each district were selected. Two random villages where numbers of practicing farmers were higher were selected randomly. A random sample of total 200 farmers' sons was selected for the study to know their problems faced by the farmers' sons in developing farming workability. The data were collected by personal contact. Ex-post-facto research design was used. The problems faced by each respondent were measured in terms of mean value. To know their degree of importance, respondents were asked to give their responses in three point continuum viz. very important, important and not important. The scores assigned were two, one and zero for very important, important and not important responses, respectively. Finally, the mean score for each constraint was calculated for ranking them in terms of importance.

RESULTS AND DISCUSSION

During the course of present investigation, the farmers' sons expressed many problems. The responses of the farmers' sons with regard to the problems with rank are presented in Table 1.

The result indicated that major problems faced by the farmers' sons in developing farming workability in descending order of rank were non-availability of technical guidance in time for different agricultural technologies, followed by lack of updated knowledge regarding different agricultural technologies to extension personnel to motivate

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Table 1: Problems faced by the farmers' sons in developing farming workability

n=200

S.No.	Problems	Mean	Rank
1	Non availability of technical guidance in time for different agricultural technologies	1.905	1st
2	Lack of updated knowledge regarding different agricultural technologies to extension personnel to motivate youth towards farming	1.880	2nd
3	Poor encouragement from family members	1.795	3rd
4	Non availability of adequate and timely supply of electricity	1.755	4th
5	Non availability of workable farming system models for different types of areas and farmers	1.730	5th
6	Lack of confidence to do good work in agriculture	1.720	6th
7	Unavailability of farmers' friendly Credit facilities	1.700	7th
8	Poor marketing facilities for the agricultural products	1.700	7th
9	No pension to the well experienced farmers' sons during their old age by Government	1.690	8th
10	Poor knowledge about crop insurance system	1.690	8th
11	No special policy for small and marginal young farmers	1.675	9th
12	Non availability of agricultural inputs timely	1.635	10th
13	Working in rural area restricts family development	1.575	11th
14	Poor interest to do agricultural work	1.555	12th

youth towards farming, poor encouragement from family members, non-availability of adequate and timely supply of electricity, non-availability of workable farming system models for different areas and types of farmers, lack of confidence to do good work in agriculture, unavailability of farmers' friendly credit facilities, poor marketing facilities for the agricultural products, no pension to the well experienced farmers' sons during their old age by Government, poor knowledge about crop insurance system, unavailability of special policy to work and sustain for small and marginal young farmers, unavailability of agricultural inputs timely, working in rural area restricts family development and poor interest to do agricultural work.

The result clearly indicates that issues like non-availability of technical guidance in time for different agricultural technologies and lack of updated knowledge oriented extension personnel with great ability to convince, guide and motivate farmers due to lack of wisdom in farming need to be managed by policy makers if India really wants to encourage youngsters in farming. In addition to this, there is need to do counseling amongst the practicing farmers to encourage and allow their sons to accept family farming occupation. The availability of electricity is also a big issue that needs to be resolved. There is need to develop workable farmers' friendly farming system models for different types of areas and farmers. Recently government has declared pension scheme and crop insurance scheme for the farmers. If these schemes are implemented with more attractive features, certainly sons of farmers can be attracted and their interest to gain farming workability to be a part of farming can be increased with good confidence.

This finding is more or less in line with Elvis (2020), Gattupalli (2020), Onima (2017) and Vegad (2020).

CONCLUSION

Major problems faced by the farmers' sons in

developing farming workability in descending order of rank were non-availability of technical guidance in time for different agricultural technologies, followed by lack of updated knowledge regarding different agricultural technologies to extension personnel to motivate youth towards farming, poor encouragement from family members, non-availability of adequate and timely supply of electricity and non-availability of workable farming system models for different areas and types of farmers.

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IMPACT OF KVK TRAINING PROGRAMME ON KNOWLEDGE AND ADOPTION OF CUMIN CROP PRODUCTION TECHNOLOGIES IN BARMER DISTRICT OF RAJASTHAN

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ABSTRACT

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. The present study was under taken with objective to review the level of knowledge and adoption of improved Cumin crop production as advocated by Krishi Vigyan Kendra, Barmer-II. The cumin is one of the leading Spice crops of district. After assessing the training needs, complete package of training programme on Cumin crop were conducted for selected cumin growers in two villages by the Krishi Vigyan Kendra, Barmer-II. Majority of trainees were aware of recent technological advancement about cumin crop like varieties, irrigation management Fertilizers doses but not known about, seed treatment, soil treatment, storage, 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 cumin crop production technologies.

INTRODUCTION

India is the world's largest producer, consumer and export of seed spices which are being cultivated widely in the country over different agro-climate zones The Indian system of medicine has identified 1,500 medicinal plants out of which 500 species are mostly in preparation of drugs another use of seed spices are flavouring seasoning and imparting aroma in variety of food items and beverages. There are about 20 seed spices grow in India there for known as land of spices.

Botanical name of Cumin is *Cuminum cyminum*. In India, it is known as 'Jeera' or 'Zeera' in Hindi. It is an important spice used in Indian kitchens for flavoring various food preparation. The flavor of cumin seeds is due to the presence of a volatile oil. In indigenous varieties of cumin, this volatile oil is present up to 2.5-3.5%. Cumin seeds are extensively used in various ayurvedic medicines also especially for the conditions like obesity, stomach pain and dyspepsia. Nutritional value of cumin seeds is as follows: 17.7% protein, 23.8% fat, 35.5% carbohydrate and 7.7% minerals. Cumin are dried seeds, is used to enhance the flavour of foods. Like any other agricultural product, Cumin may be contaminated by pathogens, naturally occurring toxins such as mycotoxins, agrochemicals such as fertilizers and pesticides, heavy metals and accidental contaminants. Food safety is of considerable significance in this globalized era and the safety of Cumin depends on maintaining good agricultural and hygienic practices along the food chain during primary production, post-harvest, packing, processing, retail and at the point of consumption.

Knowledge may be defined as those behaviour 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 farmers and youth. Activities of KVK also include skill

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training of farmers by providing work experience, through the principle 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 and lake of correct adequate knowledge lead to under or over adoption of innovation, which prove harmful to the farming communities. Therefore, in attentive 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 cumin crop production technology. The present study was undertaken to study the Impact Assessment of Training programme on knowledge level of respondents about the cumin crop production technology in Barmer district of Rajasthan.

RESEARCH METHODOLOGY

The study was conducted in Barmer district. Cumin is one of the most important spices crop of Rajasthan. The Barmer district is very potential for cumin production. A training programme was organized by Krishi Vigyan Kendra, Gudamalani Barmer-II regarding cumin crop production technology. After that an enquiry was conducted with 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 schedule. The level of knowledge was categorized as low, medium and high on the basis of scores obtained by interview schedule. 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 cumin growers adopting recommended package of practices. Scoring was done on the basis of correct of the responses and scoring was given for full adopt 2, Partial adopt 1 and non adopt 0, and the total adoption score was calculated accordingly. Adoption behaviour was further categorized on the basis of total scores obtained by the individual respondent for all the recommended practices.

RESULTS AND DISCUSSION

The Result presented in Table 1 reveals that most of the trainees respondents had high (68 per cent) level of knowledge, followed by medium level of knowledge (32 per cent), whereas in the case of non-trainees, 64 per cent respondents had medium level of knowledge and 20 per cent had high level of knowledge. It is therefore, concluded that cumin crop growers trainees (Farmer) had high level of knowledge than the non-trainees. It is cleared from data depicts in the Table 2 that most of the trainees (farmers) had fully adopted the use of improved varieties (92 per cent), the Plant protection measure (88 per cent), seed treatment and water management (84 per cent) followed by soil treatment and marketing (80%) and Fertilizer doses and Method of sowing (76%), Timely sowing (72 Per cent), Grading and storage (68 Per cent), seed treatment and proper Disease management is very important feature in success of Cumin crop and adoption of both the technologies increased to a great extent after training Programme.

CONCLUSION

It was found that most of the trainees (Farmers) respondents had high level of knowledge (68%), followed by medium level of knowledge (32%), whereas in the case of non trainees the medium level respondents were maximum (64%). There was observed difference between trainees and non-trainees regarding their knowledge about improved production technology of Cumin crop. It is therefore, concluded that trainees had greater knowledge than the non trainees (farmers) about improved

Table 1: Distribution of respondents according to level of knowledge about cumin crop Production technology

Level Knowledge	Trainees		Non –trainees	
	No. of Farmers	Per cent	No. of Farmers	Per cent
Low (Up to 5)	00	00	04	16
Medium (Above 5 up to10)	08	32	16	64
High (Above 10)	17	68	05	20
Total	25	100	25	100

Table 2: Distribution of respondents of cumin crop production technology according to the extent of adoption

S. No.	Practices	Extent of adoption (%)					
		Trainees			Non -Trainees		
		Fully Adopted	Partially Adopted	Non Adopted	Fully Adopted	Partially Adopted	Non Adopted
1.	Improved varieties.	23 (92)	1(4)	1 (4)	17(68)	6(24)	2 (8)
2.	Seed treatment.	21(84)	3(12)	1(4)	14 (56)	-	11 (44)
3.	Soil treatment.	20(80)	3(12)	2(8)	16(64)	7(28)	2(8)
4.	Time of sowing.	18(72)	7(28)	-	11(44)	-	14(56)
5.	Method of sowing.	19(76)	4(16)	2(8)	16(64)	5(20)	4(16)
6.	Seed rate.	17(68)	8(32)	-	16(64)	4(16)	5(20)
7.	Fertilizers doses.	19(76)	3(12)	3(12)	15(60)	7(28)	3(12)
8.	Weed management.	17(68)	5(20)	3(12)	13(52)	10(40)	2(8)
9.	Plant protection measure.	22(88)	1(4)	2(8)	12(48)	7(28)	6(24)
10.	Water management.	21(84)	2(8)	2(8)	19(76)	4(16)	2(8)
11.	Proper Harvesting.	19(76)	4(16)	2(8)	13(52)	8(32)	4(16)
12.	Grading and storage of cumin.	17(68)	5(20)	3(12)	15(60)	6(24)	4(16)
13.	Marketing of cumin.	20(80)	4(16)	1(4)	15(60)	9(36)	1(4)

production technology of Cumin crop and KVK Training Programmes had influenced in enhancing the level of knowledge and adoption level of technologies of cumin crop growers.

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IMPACT OF ENTREPRENEURIAL DEVELOPMENT TRAININGS ON THE ATTITUDE AND SKILL OF DAIRY FARMERS

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ABSTRACT

Presently, animal husbandry sector has been identified as an important area for employment generation. Recent advances in animal husbandry technologies have demonstrated potential for maximization of milk productivity and all these requires adoption of improved technologies. The present study was conducted to assess the extent of adoption of improved animal husbandry practices by dairyfarmers of four Blocks in Jalore district of Rajasthan. The study revealed that training played a significant role in the attitude of farmers towards scientific dairy management practices. It also suggested that vocational training programme was effective in changing the attitude of respondents in a favorable direction towards the scientific dairy management practices. There was also a significant impact of training on their attitude for scientific dairy enterprise.

INTRODUCTION

Livestock is an integral component of economic and social fabric of the rural masses in Rajasthan since crop farming is constrained by erratic rains and limited irrigation facilities. Livestock is an adjacent farm enterprise in most part of the state especially in arid areas, which covers nearly 60% of the total geographical area of the state (34.23m ha). This region is characterized by scanty and erratic annual precipitation (100-400mm), high evaporation rate (1500-2000 mm), high temperature and poor fertility of the soil. In addition to this frequent draught, extreme events triggered by climatic change may pose serious threat to survival of living being in arid region (Patidar *et al.* 2014). Animal husbandry plays an important role in livelihood security and economic sustenance of rural people by providing regular employment and income generation throughout the year and also provides security against risk in agriculture. The less educated entrepreneurs of lower socio-economic status with less knowledge about scientific management practices can be well equipped through effective training programmes. The present investigation was undertaken to study the impact of Entrepreneurial Development training on the attitude and skill of dairy farmers for scientific dairy husbandry practices in the Jalore district of western Rajasthan.

RESEARCH METHODOLOGY

The present study was conducted by randomly selecting in four blocks of the district and from each block two villages. From each village 10 ex trainees' dairy farmers of Krishi Vigyan Kendra, Jalore were selected by random sampling technique. A sample of 40 trained dairy Entrepreneur were selected from four adopted villages and 40 untrained dairy farmers were selected from other four villages as control group for field investigation. To measure the levels of attitude of entrepreneur towards dairy husbandry training, the score were assigned as 5,4,3,2, and 1 for strong agree, agree, neutral, Disagree and strongly disagree response choices, respectively. In order to arrive at the composite attitude score, the scores obtained by each respondent for every items were summed up on the basis of their attitude scores and the respondents were classified into three groups namely, least favourable, favourable and most favourable, respectively. For measurement of skill, both the trained and untrained respondents, schedule was given for collection of data against each question. Final score was measured at three levels namely, competent, partially competent and not

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competent for which score of 2,1and 0 was given. An individual respondent, total score was calculated by summing up the score, obtained against each item in the scale.

RESULTS AND DISCUSSION

As evident from the Table 1, the 't'-value (46.39) in respect of the difference in the attitude of trained and untrained entrepreneurs towards improved scientific dairy husbandry practices was highly significant. The study reveal that training played a significant role in the attitude of farmers towards scientific dairy management practices. It also suggested that vocational training programme was effective in changing the attitude of respondents in a favourable direction towards the scientific dairy management practices. The possible reason for higher attitude mean score indicated that the farmers possessed more knowledge about dairy farm practices by training programme apart from motivation and training strategies in the area of investigation. There was significant difference in the level of attitude of trained and untrained respondents in all five components of bovine farming. The computed t-value was highly significant in the five components of dairy farming *viz*., Nutrition practices, Heading, Breeding, Health prophylactic measurement practices and value addition & marketing practices. This finding was an agreement with the findings of Singh and Chauhan (2010), Kumar and Rajak (2018).

As evident From Table 2, the computed t-value was found to be statistically significantat 0.01 level of significance, which indicated that there was significant difference in the mean skill score of the trained and untrained respondents. It could be concluded that trained farmers had more skill about package and practices of scientific dairy farming than untrained farmers. There were significant differences in the mean levels of skill of trained and

Table 1: Level of attitude of scientific dairy husbandry practices between trained and untrained farmers.

(N=80)

Components of dairy Husbandry	Attitude of farmers		
	Trained	Untrained	't'-value
Levels of attitude of dairy husbandry	70.8	23.8	46.39*
Nutrition Practices	12.5	4.2	43.42*
Heading Practices	13.6	4.1	44.41*
Breeding Practices	7.6	3.2	23.91*
Health prophylactic	18.5	6.1	56.81*
Value addition	18.6	6.2	57.19*

(Significant at 0.01 level)

Table 2: Level of attitude of scientific dairy husbandry practices between trained and untrained farmers.

(N=80)

Components of dairy enterprises	Attitude of farmers		
	Trained	Untrained	't'-value
Skill related to scientific dairy production	31.2	9.9	25.00*
Nutrition Practices	5.5	2.2	19.57*
Heading Practices	10.5	3.4	37.00*
Breeding Practices	4.6	1.8	15.69*
Health prophylactic	4.0	0.8	19.00*
Value addition	6.6	1.7	26.60*

(Significant at 0.01 level)

untrained dairy farmers in all five components of dairy husbandry. The findings revealed that in comparison to untrained farmers, trained farmers had more competence in doing animal husbandry practices. These findings were in conformity with the findings of Singh and Gill (1980) and Kumar and Rajak (2018) and Kumar *et al*. (2019).

CONCLUSION

The present study was undertaken to study impact of Entrepreneurial Development training on the attitude, and skill of dairy farmers in Jalore district of western Rajasthan. The study revealed that vocational trainings had significant effect on the skill of farmers related to Nutritional, Heading, Breeding, Health and value addition practices. There was also a significant impact of training on their attitude for scientific dairy enterprise.The study suggests utilizing these parameter in order to accelerate the milk production and there by enhance the socio-economic status of rural people.

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COMPARISON OF ATRAZINE AS PRE & POST EMERGENCE FOR WEEDS MANAGEMENT IN PEARL MILLET

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ABSTRACT

The present study was conducted at the farmers' fields of Dausa district of Rajasthan during the Kharif season of 2018.On farm trial consisted two treatment i.e. T_1- Farmers practice (Atrazine as post emergence@ 2.0 kg a.i./ha at 30-35 DAS) and T_2- Recommended practice (Atrazine @ 0.5 kg a.i. /ha as pre emergence) with ten replications. At 20 DAS registered lower weed count (5.3) with treatment T_2- Recommended practice (Atrazine @ 0.5 kg a.i./ha as pre emergence) which is 70.22 per cent lower as compared to treatment T_1- Farmers practice (Atrazine as post emergence at 30-35 DAS). In contrary to this at 40 DAS lower weeds count were recorded with treatment T_1 which were 97.5 per cent lower as compared to treatment T_2. Treatment T_2 recorded the grain yield of pearl millet by the tune of 19.15 q/ha which was 26.82 per cent higher over treatment T_1. Similarly stover yield also recorded 40.20 q/ha in treatment T_2 which are 24.84 per cent higher over treatment T_1. Gross returns and net returns are also registered higher with treatment T_2 by the tune of 42890 and 26538Rs/ha, respectively which were 26.07 and 34.93 per cent higher over treatment T_1, respectively.

INTRODUCTION

District Dausa falls in Agro climatic zone IIIa, namely "Semi-Arid Eastern Plains" covering Dausa, Ajmer,Tonk and Jaipur districts. Headquarter of the zone is situated at Rajasthan Agricultural Research Institute, Durgapura, Jaipur. The technologies generated by scientist of, Rajasthan Agricultural Research Institute,Durgapura were tested and disseminated through front line demonstrations to farmers of Dausa district. Pearl millet is the most important cereal crop grown in Kharif season in Dausa district of Rajasthan. Pearl millet crop occupy the first rank in cereal crops grown in Dausa district. It account for 153930 hectare area and 277074 metric ton production with 1800 kg/ha productivity (Anon, 2017-18). The hike in production in recent years has been possible due to improvement in productivity and strategies adopted by the government by launching various schemes. Pearl millet can be cultivated in dry and hot areas in rainy season. Weed of different kinds in rainy season pearl millet limits the crop production. Weed management is an important factor for improving the productivity of pearl millet as weeds compete for nutrient, water, light and space resulting in reduces crop yield and quality. Pearl millet grow slowly in early stage is a poor competitor with weeds. Critical period defines the maximum period weeds can be endured without affecting final crop yields (Zimdahl, 1988). Critical period for weed management in pearl millet is 28-42 DAS (Singh *et al.* 1986). Major weeds are *Ageratum congoides, Amaranthus virids, Commelena benghalensis, Digera arvensis, Euphorbia hirta, Lucas aspera, Tridexpercumbens, Saccharum spontaneum, Sorghum helpense, Cyperus rotundus* infesting the pearl millet. Hand weeding is an excellent way for reasonable weed control. In this area pearl millet is grown in rainy season in which there are not many rain free days resulting in delay in weed control. Rising labour wages and non-availability of adequate labour are becoming serious problem now days.

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Chemical weed control is also one of the options to control the weeds timely and efficiently. Farmers are using the chemical weed control methods which are faulty and not recommended like application of atrazine @ 2.0-2.5 kg a.i./ha at 30-35 DAS to control the weeds in standing crop of pearl millet which is harmful to soil health as well as germination of next crop like wheat, gram etc.Keeping in view the importance of chemical weed management one on farm trial was framed during kharif 2018 to demonstrate the chemical weed management in pearl millet for better production.

RESEARCH METHODOLOGY

The present study was conducted at the farmers' fields of Dausa district of Rajasthan during the Kharif 2018. A total of 10 trials in 2.5 ha area having similar number of traditional practices or local check was carried out in sandy loam soil under rain fed conditions. The pearl millet crop was sown in around mid July and harvested in last week of September. The variety RHB 121 was used in on farm trial in all the villages i.e. Ralawas, Dholawas, Patalwas villages of Lalsot block and Sindoli of Dausa block & district. On farm trial consisted two treatment i.e.T_1- Farmers practice (Atrazine as post emergence @ 2.0 kg a.i./ha at 30-35 DAS) and T_2- Recommended practice (Atrazine @ 0.5 kg a.i./ha as pre emergence) with ten replications. In on farm trial especial emphasis was given to proper weed management, seed rate (4 kg/ha), balance use of fertilizers (60 kg/ha N and 30 kg/ha P_2O_5), seed treatment with pesticides, and proper & need based plant protection measures. For proper weed management pre emergence application of atrazine @ 0.5 kg a.i./ha was applied. Total population of weeds was counted twice at 20 & 40 DAS. The sale price of pearl millet was Rs. 1400/q and the fodder was Rs. 400/q. The cross section data on output of pearl millet crop and input used per hectare have been collected from the on farm trials. In addition to this in farmers practice plot followed by farmers have also been collected and used for further calculation like cost of cultivation, gross returns, net returns, additional cost, additional returns, B:C ratio. The benefit cost ratio (B: C) was calculated dividing the net monetary return by the total cost of cultivation.

RESULTS AND DISCUSSION

Total population of weeds/m^2:- At 20 DAS registered lower weed count (5.3) with treatment T_2- Recommended practice (Atrazine @ 0.5 kg a.i./ha as pre emergence) which is 70.22 per cent lower as compared to treatment T_1- Farmers practice (Atrazine as post emergence at 30-35 DAS). In contrary to this at 40 DAS lower weeds count were recorded with treatment T_1 which were 97.5 per cent lower as compared to treatment T_2. It is self explanatory that treatment T_2 being pre emergence recorded lower weeds count at 20 DAS and when it is used as post emergence in treatment T_1 recorded lower weeds count at 40 DAS.

Grain and stover yield: Treatment T_2 recorded the grain yield of pearl millet by the tune of 19.15 q/ha which was 26.82 per cent higher over treatment T_1. Similarly stover yield also recorded 40.20 q/ha in treatment T_2 which are 24.84 per cent higher over treatment T_1. The grain yield of pearl millet was higher with treatment T_2 because the weeds counts were lower in this treatment resulting in higher yields. The results are also supported by Das *et al.*, 2013.

Economics: Treatment T_2 recorded higher cost of cultivation (16352) which was 13.94 per cent higher over treatment T_1. Farmers are generally used to broadcasting of atrazine that why the cost of cultivation was lower as compared to treatment T_2. Similarly gross returns and net returns are also registered higher with treatment T_2 by the tune of 42890 and 26538Rs/ha, respectively which were 26.07 and 34.93 per cent higher over treatment T_1, respectively. Treatment T_2 recorded Rs. 2000/ha additional cost resulting in Rs 8870/ha additional returns. The B:C ratio was higher (2.62) with treatment T_2 which was 10.55 per cent higher over treatment T_1.

CONCLUSION

In conclusion on the basis of one year trial it is suggested that farmers should not apply

Table 1: Comparison of atrazine as pre & post emergence for weeds management in pearl millet in different villages of Dausa district of Rajasthan

S. No.	Treatments	Total population of weeds/m^2		Grain yield (q/ha)	Stover yield (q/ha)	Cost of cultivation (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	Additional cost (Rs/ha)	Additional returns (Rs/ha)	B:C Ratio
		20 DAS	40 DAS								
1	T_1- Farmers practice (Atrazine as post emergence @ 2.0 kg a.i./ha at 30-35 DAS)	17.8	4.0	15.10	32.20	14352	34020	19668	-	-	2.37
2	T_2- Recommended practice (Atrazine @ 0.5 kg *a.i.*/ha as pre emergence)	5.3	7.9	19.15	40.20	16352	42890	26538	2000	8870	2.62
3	Per cent increase/ decrease over T_1	- 70.22	97.50	26.82	24.84	13.94	26.07	34.93	-	-	10.55

indiscriminate use of atrazine as broadcasting with urea at 30-35 DAS which is not economical and pollute the soil also resulting in create hindrance in germination of next crop which is observed by farmers now a days. So the application of atrazine in recommended dose and time (pre emergence application of atrazine @ 0.5 kg a.i./ha) is beneficial and economical for pearl millet production.

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EMPLOYMENT & EMPOWERMENT OPPORTUNITIES FOR WOMEN IN SECONDARY AGRICULTURE

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ABSTRACT

Women are backbone of rural development and national economies. Women not only support their households by doing domestic jobs but they contribute in other supporting jobs of the house inmates. They work in fields, for crop growth and development, maintenance of crops in the fields, harvesting, primary and secondary processing, marketing and ultimate consumption as well. However, the contribution of women (especially belonging to the particular household) to most of these works goes unnoticed and unpaid. Agriculture is the major player in supporting livelihoods and socio-economic development of the nation and almost 70 per cent of the population depends on it directly or indirectly. After tapping almost the full potential of agriculture and its primary activities viz; growing and harvesting the crop; we must focus on secondary agriculture. Secondary agriculture supports primary agriculture by adding value to the basic produce, creating facilities for primary processing and stress management in agriculture, adding value to basic agro commodities to allow farmers to get better returns from their harvest. Women being the major participants in these activities at one step or other can avail an opportunity to get paid for the work they perform, thus generating an income for their households. They can be empowered through trainings and exposure learning in these secondary agriculture techniques and hence can be a major work force for such ventures which could show a new way to the country's economy and socio-economic upliftment of its population.

INTRODUCTION

Women have always been the major role player in almost all jobs of households, farms and socio-economic activities of the society. However being the silent worker of the society and considered as 'weaker', most of the activities of women go unnoticed or is considered as part of their day to day activities which are obvious to be done by them. However, women have proven themselves as better learners, workers and performers in every field. Various government initiatives, developmental programmes; societies and NGO's are working day and night for better livelihood and socio-economic status of women.

Agriculture is one such occupation which absorbs most of these silent workers. It is evident that women are involved in almost all sort of agricultural activities both at farm viz., preparation of land, sowing, irrigation, weeding, harvesting and almost all operations in-between and off-farm activities like cleaning, drying, storage and now even transport and marketing also involves women. In addition to all these agricultural based activities all sort of allied activities i.e., animal rearing, gardening (kitchen or backyard), processing and preservation of harvest and sometimes the region specific activities like bee-keeping, mushroom growing, silk worm rearing, poultry, goatry, rabbitary etc. are also supported by women in the household. However, condition of women in all regions of the country is not pitiful. In some parts of the country they are 'head' of the household and are respected for what they do. They are both socially and economically independent and strong enough to run a household on their own.

Secondary Agriculture

Today India holds 7th position in global export of agri-products and is considered as self-sufficient in respect of its food demand. The report of the Committee constituted to access the possibilities of Doubling Farmers' Income (2018) justifies the involvement of farmers in increasing the 'vertical elasticity' of resources *viz*., land and labour. The

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activities that could add to their income in the limited sources of land and other inputs. Any activity that gainfully utilizes agricultural waste, makes the produce saleable (cleaning, grading, sorting) and all kinds of on or off-farm activities like bee-keeping, mushroom cultivation, silk worm rearing, backyard poultry and other bird farming, sheep and goat rearing, piggery and many more which adds to their income, utilizes their land and free time when the season of crops i.e., Rabi, Kharif, Zaid are over are considered as activities of 'secondary agriculture' (Business Standard, 2018).

However, the US perspective of 'secondary agriculture' is a little different from ours and it connects both primary and secondary agriculture activities in continuation. Here, sowing, tilling, growing and harvesting are considered as 'Primary agriculture' operations and in continuation the activities that could be on-farm or off-farm viz., assembling, ripening, sorting, grading, drying, storing and preservation operations are considered as 'secondary agriculture'. But changing the basic form of the produce using processing techniques is totally excluded from 'secondary agriculture'.

Today, agriculture as a whole is being taken as an enterprise, which is the source of income and encompasses two major segments in it;

1. Production segment: It includes all sort of on-farm activities cultivation and maintenance of produce and all related practices
2. Post production segment: It begins as soon as the produce is harvested or with the output from the on-farm activities and includes the transformation of produce/ output for the benefit of farmers. The activities like cleaning, sorting, grading, packaging etc., that attracts the consumers to pay feasible prices for their produce.

Agriculture being the major 'Economic sector', especially in a country like India which holds very strong roots in land and land resources, the major production activities that are 'income generating'.

Indian perspective

Various committees and technical advisors have elaborated 'Secondary Agriculture' in their own terms and views. Secondary Agriculture is not new to Indian sub-continent and Technical Advisory Committee on Secondary Agriculture (TACSA, 2007) stated the term (Secondary Agriculture) as 'very broad' as they referred it to include 'all food and non-food bio-resources based products for human and industrial use'. It intended to include using edible part of crops as well as non-edible parts like husk, straws, roots *etc.*, Lately, committee on 'Doubling Farmers Income' suggested Secondary Agriculture as an 'Enterprise' 'that involves the agricultural community directly and provides equal growth opportunities to the primary sector. Agriculture linked Secondary level activities can include various economic activities from both the secondary and tertiary sectors'. Various productive activities at enterprise level, as included in Secondary Agriculture are:

1. Utilization of raw materials, the primary product and by-product of agriculture and other bio-resources available locally in its rural agrarian neighborhood.
2. Deploys locally available skills or a high level of rural manpower, to operate/ manage/ maintain the production of goods and services
3. Can easily be categorized under Micro, Small or Medium Enterprise Development Act, 2006

Involvement of women in these activities is quite appreciable. Approximately 86 per cent of rural females are involved in agriculture (Indoria and Balai, 2018). However, the nature and extent of their involvement in these agricultural based activities differs with various agro-production systems (Nagaraja, 2013). These can be social, economic, cultural or even the need based activities. It is also evident from many studies that women are blessed to have basic indigenous knowledge and they have basic skill and potential to utilize resources in a better way (Indoria and Balai, 2018). Being socially mobile

they can be best instruments for entrepreneurial activities that could be helpful in economic development of the society through employment generation activities. This could be uplifting for them as well as the society especially the fellow women of the area and around.

Women in Secondary Agriculture

The changing scenario of agriculture is demanding a change in the role of women as well. Today the paradigm of agriculture is shifting from traditional farming to adopting 'secondary agriculture' activities.

With the government's initiative of 'Doubling farmers' Income' there is dire need to connect all the three sectors; primary, secondary and tertiary sectors together (Kushankur Dey, 2019). According to Ashok Dalwal committee's report submitted in February, 2018; secondary agriculture is an activity conducted at farm/ enterprise level in four folds:

1. Sustainability of production
2. Monetisation of farmers' produce
3. Strengthening of extension services
4. Recognising agriculture as an enterprise

Yadav *et al.,* (2020) endorses secondary agriculture as a venture that will help uplift the primary agriculture activities. Accordingly, some of the avenues of secondary agriculture viz., development of plant nurseries, bio-fertilizers and compost, bio-pesticides and organic alternatives of plant protection, agro-tourism, plant based dyes, colours, flavours, weaving crafting etc., have great potential in generating income and utilizing the primary agriculture produce as well as waste. These products are in demand and promise better returns. Also these products are environment friendly and most of them have a better end use rather using them as feed, fodder or for burning.

1. Waste from fruits & vegetables: Rich in bioactive compounds; source of polyphenols, fibre, food grade ethanol, citric acid, gums and pectin, colour, flavour etc.
2. Traditional agricultural crop waste: Bran, oil, gluten, husk and fibre, de-oiled meals, germs, protein.
3. Floriculture waste: biofuels, bio-ethanol, compost, organic acids, pigments, dyes, aromas and perfumes, handmade paper, fibre, gums etc.
4. Weeds and non-agri/ forest plants: secondary metabolites as ethano-botanical sources, pharmaceutical extracts, high value metabolites and chemicals.

Women's Empowerment

Role of women in different sectors of life cannot be denied. Be it rural or urban, women in each household performs multiple tasks for the betterment of livelihood of household and society as well. Some of these are unpaid (mostly considered as their household chores), some be paid (service or job roles) and sometimes they are underpaid as well with respect to their male counterparts. Economic survey of the year 2017-18 clearly indicates that with growing rural to urban migration by men, there is 'Feminization' of agri- sector with increasing number of women in multiple roles as;

- Cultivators
- Entrepreneurers
- Labourers

Education, social equity, economic status or financial stability, political participation alongwith improved and/ or good health status are major attributes that contribute towards the empowerment of women (Patel, 2012). World forum now considers that addressing gender issues in agriculture and related activities is the way out to achieve desirable sustainable growth. It is the right time to empower women with new knowledge and skills in the field of secondary agriculture so that they may participate in mainstream without any gender disparity and lack of knowledge.

With these changing roles of women and becoming economically independent and decision makers, world is now progressing at a faster pace. Globally there are empirical evidence that women have a decisive role in ensuring food security and

preserving local agro-biodiversity. Many efforts on the part of Government departments, Educational institutions, NGO's have contributed in changing the socio-economic status of these women and the society as well. With the setting up of National Resource Centre for Women in Agriculture (NRCWA) at Bhubhaneshwar (1996) and other ICAR institutes and Krishi Vigyan Kendra's working towards the upliftment of women, now 'Role of women' in agricultural operations is being noticed and heard.

They are moving from

- 'Unpaid' to 'Skilled' workforce
- 'Beneficiaries' to 'Active participants' in shaping empowerment.
- 'Unrecognised' to 'Enlighted'

Empowerment Strategies

The literary meaning of 'Empowerment' is 'the act of bestowing or granting power or authority on someone'. As women in our society is considered as weaker or deprived, hence providing her with power to do something or take decisions for family or society is termed as 'Women Empowerment'. Being a central part of the society, this 'Empowerment' has the ability to bring about social, economic and civil freedom for women. Women are empowering and women are being empowered. Empowerment is a gradual process which is achieved through education, transfer of feasible knowledge and technologies, conducting trials at suitable places in verified conditions and through several out-reach programmes targeting especially the women. Various Government and Non-Government agencies are working towards empowering women in the areas of knowledge, skill, decision making etc., so that they become socially and economically independent. Strategic planning and enforcement are bringing gainful results in the overall development of women. Some of the strategies include:

- Awareness programmes

  Creating awareness amongst the target group or population is the first step towards the success of any initiative. Various awareness programme on health and hygiene, sanitation, education will make women more aware and vigilant towards themselves and their own interests. They will consider themselves as 'beneficiary' and not a 'deprived' one.

- Educational interventions

  Education and knowledge go hand in hand. In a country like India, education for girls is sometimes obstructed due to geographical conditions, economic status, social bindings and many more. Therefore, short term education programmes, technical education and knowledge dissemination will prove to be beneficial for women.

- Transfer of technologies

  Women are well versed in adapting to the new technologies as is evident from some visible examples of solving household chores to working and managing at the farms and backyards. Training women on new technologies will add to its adaptation more quickly.

- Feasibility trials

  Introducing technology kits, having responses on a particular technology; women are more true to it. Conducting feasibility trials involving women would have wider impact as compared to others.

- Out-reach programmes

  Approaching women through various outreach programmes may somewhat ensure its wider adaptation.

CONCLUSION

- Women are engaged in a number of agro-oriented activities ranging from seed-bed preparation, weeding and horticulture and fruit cultivation to a series of post harvest activities, to their domestic use and marketing as well.
- These 'Secondary Agricultural' operations which are performed by women as a 'Responsibility' and now when 'Secondary Agriculture' itself has become an essential contributor towards 'national

economy' we should encourage the ones (Women) who are already skilled and knowledgeable in this task.

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ECONOMICS OF COST OF CULTIVATION OF GINGER CROP IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

India is the world's largest producer, consumer, and exporter of ginger. Ginger, the underground stem or rhizome is used as spice and medicine. During overall period, the ginger area and production showed a negative and significant growth of -4.36 per cent and -4.93 per cent at 5 per cent level of significance in Udaipur district. Total cost of cultivation of ginger was computed to Rs. 374311.22 per hectare out of which total variable cost was Rs. 349764.51 and total fixed cost was Rs. 24546.70. Human labour (35.61 per cent) accounted for the highest percentage of the overall cost. Seed (32.49 per cent) ranked second in terms of percentage of overall cost. The overall cost A1 and cost A2 accounted for 79.24 per cent: cost B1 and B2 were 79.40 and 84.21 per cent: and cost C1 accounted for 95.19 per cent of the C2 cost (Rs. 374311.22).The overall gross income from ginger cultivation during 2020-21 was estimated as Rs. 453831.29 per hectare. The net return over cost C2 was Rs. 79520.07 per hectare. The cost of production was Rs. 3180.87, Rs. 3098.75 and Rs. 2946.82 per quintal on small, medium and large farms, respectively. Total production was found highest on large farms i.e. 128.49 quintal per hectare. Average net income over cost C2 and average family labour income were Rs. 79520.07 and Rs. 138612.13 per hectare, respectively. The average return per rupee was 1.21 from ginger cultivation. The average cost of production per quintal was Rs. 3085.77.

INTRODUCTION

Ginger, the underground stem or rhizome is used as spice and medicine to improve digestion and treat disturbed stomach, diarrhea, and nausea. Ginger can also be used to cure conditions such as arthritis, colic, and heart. Ginger is an aromatic spicy rhizome often dried and ground to powder and used in biscuits, cake, cookies or syrup as a flavour. It is rich in starch, volatile oil, and protein. It contains 2-3 per cent protein, 0.9 per cent fat, 2.4 per cent fibre and 12.3 per cent carbohydrates. It is a good source of vitamins, minerals and trace elements (Kumar *et al.*, 2017).

India is the world's largest producer, consumer, and exporter of ginger (Mathew et al., 2018). India earned a total of Rs. 31025 lacs in 2018 from the export of 20722 tons of ginger. Top five major exporter of ginger were China, Netherlands, Thailand, Peru and Nigeria (Source - faostat). In India ginger production and area were 1846 thousand metric tons and 174 thousand hectares in the year 2018-19 (Agricultural at a Glance, 2019).

The area, production and productivity of ginger in Rajasthan were 138 hectares, 461 tons and 3341 kg per hectare during 2018-19, respectively (Source - Agricultural Statistics, 2019).In Udaipur area, production and productivity of ginger were 82 hectares, 166 tons and 2024 kg per hectare during 2018-19. Udaipur ranks second after Dungarpur among the ginger producing districts of Rajasthan. The top three ginger producing districts were Dungarpur, Udaipur and Pratapgarh during 2018-19 (Source - Agricultural statistics, Government of Rajasthan, 2018-19).

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RESEARCH METHODOLOGY

Primary data related to cost of cultivation were collected from selected growers of ginger in Jhadol and Gogunda tehsils of Udaipur district. The ginger growers further categorized into three categories, namely, small, medium and large based on their acreage by using the cumulative square root frequency method. A random sample of 60 farmers was taken from two selected tehsils. Primary data on the cost of cultivation were collected from 30 farmers from each tehsil and 15 farmers from each selected village of each tehsil. Twelve years (2007-08 to 2018-19) of data were considered for the analysis of compound annual growth rates of area, production and productivity of ginger crop in Udaipur district as well as in Rajasthan state, i.e.,. The period was further divided into two components to see variations in growth during every six years. The period was divided as: Period-I from the year 2007-08 to 2012-13, Period-II from the year 2013-14 to 2018-19 and overall period from the year 2007-08 to 2018-19. To study the cost of cultivation of ginger crop, the primary data were collected for the year 2020-21.

Measurement of Compound Annual Growth Rate (CAGR) - The compound annual growth rate was calculated by fitting the exponential function of the following form - Growth rate i.e. $Y_t = AB^t$.

The growth rate was estimated after logarithmic transformation of the above equation as follow:- Log Yt = log A + t log B. Then, the compound growth rate (per cent per year)G = [(Antilog B) - 1] × 100.

The cost of cultivation was calculated by using simple tabular analysis and standard method of cost of cultivation was adopted. This included cost A1 cost A2, cost B1 cost B2, cost C1 and cost C2.

Cost A1: Consist of the following 14 items of costs:-

1. Value of hired human labour
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Value of owned machine labour
5. Value of hired machine labour
6. Value of fertilizers
7. Value of seed (owned and purchased)
8. Value of manure (owned and purchased)
9. Value of plant protection chemical
10. Irrigation charges
11. Land revenue
12. Depreciation charges on farm implements
13. Interest on working capital
14. Miscellaneous expenses

Cost A2 = Cost A1+ Rent paid for Leased in Land

Cost B1 = Cost A1 + Interest on fixed capital

Cost B2 = Cost B1 + rental value of owned land + rent paid for leased in land

Cost C1 = Cost B1 + Imputed value of family labour

Cost C2 = Cost B2 + Imputed value of family labour

Cost C3 = Cost C2 + 10% of Cost C2 (as management cost)

Income measure - For the purpose of working out returns the following concepts were used.

1. Gross income = $Q_m \times P_m + Q_b \times P_b$
   Where, Q_m = quantity of main product
   P_m = price of main product
   Q_b = quantity of by product
   P_b = price of by product
2. Farm business income = Gross income - Cost A1 (Cost A2 in case of tenant operated land)
3. Family labour income = Gross income - Cost B2
4. Net income = Gross income - Cost C2
5. Farm investment income = Farm Business Income - Imputed Value of Family Labour

Identification of constraints in production of ginger crop by farmers

Estimation of constraints faced by the farmer was calculated by Garrett ranking formula-

$$P = \frac{100(Rij - 0.5)}{Nj}$$

Rij = Rank given for the ith variable by jth respondents

Nj = Number of variables ranked by jth respondents

RESULTS AND DISCUSSION

Growth Rates:

The growth of ginger in terms of area, production and productivity in Udaipur district are depicted in Table 1.During overall period, the ginger area and production showed a negative and significant growth of -4.36 per cent and -4.93 per cent at 5 per cent level of significance in Udaipur district. The ginger productivity also showed a negative growth rate of -0.63 per cent in Udaipur district. Thus, it can be concluded that the crop is not getting the technical support and there was a declining trend in area as well as production of ginger crop in Udaipur district of Rajasthan.

The result revealed that during overall period, ginger area showed a negative growth of -3.42 per cent per annum in Rajasthan. Whereas, ginger showed a positive growth rate of 0.35 per cent per annum in production and similarity productivity of ginger also showed a positive growth rate of 3.90 per cent in the state but all the growth rates during overall period were non-significant.

Cost of cultivation of ginger crop in Udaipur district:

Cost of cultivation of ginger crop has been estimated from 60 selected farmers from Jhadol and Gogunda tehsils of Udaipur district. Further, farmers were divided into three categories on the basis of their land holding by using cumulative square root frequency method as small (<1.2 ha), medium (1.2-2.4 ha) and large size (>2.4 ha) farms. The average size of land holding and average ginger area are presented in Table 2. On an average, the area under ginger cultivation was 0.036 hectare, 0.128 hectare and 0.30 hectare on small, medium and large farms, respectively.

In order to understand economics of ginger cultivation it is essential to measure the costs incurred and return received during cultivation. Generally farmers can increase ginger production in two ways, (1) by effective utilization of various inputs and by reducing cost of ginger cultivation (2) by judicious use of various factors of production.

The total cost of cultivation of ginger on small, medium and large size farms was Rs. 361017.56, Rs. 378777.09 and Rs. 378647.13, respectively as depicted in Table 3. On sample farms, the total

Table 1: Compound Annual Growth Rates of Area, Production and Productivity of Ginger in Udaipur district and Rajasthan

Particulars	Period	Area	Production	Productivity
Udaipur District	I (2007-12)	6.04	-11.70	-16.73
	II (2013-18)	0.65	10.60	9.88*
	Overall (2007-18)	-3.42	0.35	3.90
Rajasthan	I (2007-12)	8.88*	5.19	-3.51
	II (2013-18)	-5.32*	0.78	6.44*
	Overall (2007-18)	-4.36*	-4.93*	-0.63

*Significant tat 5 per cent

Table 2: Classification of farmers on the basis of land holding and average ginger area

(Area in Ha)

Particulars	Small (<1.2Ha)	Medium (1.2-2.4Ha)	Large (>2.4Ha)
Average size of land holding	0.65	1.57	3.09
On an average ginger area	0.036	0.128	0.31

Table 3: Cost of cultivation of ginger crop in Udaipur district of Rajasthan

(Rs./ha)

Input	Small	Medium	Large	Overall
Seed	106580.15 **(29.52)**	124411.76 **(32.84)**	132833.33 **(35.08)**	121638.17 **(32.49)**
FYM	45105.34 **(12.49)**	42811.76 **(11.28)**	40973.33 **(10.82)**	43017.47 **(11.48)**
Fertilizer	1099.23 **(0.30)**	2131.52 **(0.56)**	9343.99 **(2.46)**	3315.94 **(0.88)**
Urea	0.00	231.52	970.66	321.47
DAP	1099.23	1900.00	8373.33	2994.47
Plant protection chemical	87.93 **(0.02)**	0.00 **(00.00)**	0.00 **(00.00)**	21.98 **(0.005)**
Human labour	143110.99 **(39.64)**	135508.23 **(35.77)**	114362 **(35.84)**	133179.67 **(35.57)**
a) Family labour	78572.06	58881.17	35322.00	59092.06
b) Hired labour	64538.93	76627.06	79040.00	74087.61
Animal labour	9453.42 **(2.61)**	7938.82 **(2.09)**	0.00 **(00.00)**	6729.70 **(1.79)**
Owned	9233.58	7938.82	0.00	6674.74
Hired	219.84	0.00	0.00	54.96
Machine labour	10259.54 **(2.84)**	16250 **(4.28)**	24120 **(6.37)**	16326.38 **(4.35)**
a) Owned	0.00	0.00	0.00	0.00
b) Hired	10259.54	16250.00	24120.00	16326.38
Miscellaneous cost	6815.26 **(1.88)**	6864.70 **(1.81)**	7014.66 **(1.85)**	6882.33 **(1.83)**
Interest on working capital (10%)	8093.02 **(2.24)**	8407.86 **(2.21)**	8268.38 **(2.18)**	8301.26 **(2.21)**
Total Variable cost	338849.20 **(93.85)**	355735.27 **(93.91)**	346989.05 **(91.63)**	349764.51 **(93.45)**
Rental value of owned land	18000.00 **(4.98)**	18000.00 **(4.74)**	18000.00 **(4.75)**	18000.00 **(4.80)**
Depreciation charges	3627.66 **(1.00)**	4479.82 **(1.18)**	12885.93 **(3.40)**	5948.00 **(1.58)**
Land revenue	0.00 **(00.00)**	0.00 **(00.00)**	0.00 **(00.00)**	0.00 **(00.00)**
Interest on fixed capital (10%)	540.69 **(0.14)**	561.99 **(0.14)**	772.14 **(0.20)**	598.70 **(0.16)**
Total fixed cost	22168.35 **(6.14)**	23041.81 **(6.08)**	31658.08 **(8.36)**	24546.70 **(6.55)**
Total cost	361017.56 **(100)**	378777.09 **(100)**	378647.13 **(100)**	374311.22 **(100)**

cost of hired human labour was Rs. 74087.61 per hectare. Large farms, with a cost of Rs. 79040, had the highest cost of hired human labour.The overall cost of machine labour on sample farmers was Rs. 16326.38 per hectare. The cost of machine labour on small size farm was lowest (Rs. 10259.54) because farmers of this group used more family labour in comparison to others. The overall cost of animal labour on sample farmers was Rs. 6729.70 per hectare. The cost of animal labour was maximum on small farms (Rs. 9453.42) and no animal labour was used in large size farms because of high usage of machine labour.

The cost of seed in the case of small size group was Rs. 106580.15, which was lower than overall cost (Rs. 121638.17) per hectare, which was probably due to fact that the small size group more home produced seed than local seed. The cost of seed on large size group was Rs. 132833.33 per hectare. The main reason for high cost of seed on large size farms was that these farmers used improved quality of ginger seeds.

The cost of fertilizer was more on large farms (Rs. 9343.99 per hectare) than overall cost of Rs. 3315.94 per hectare. 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 FYM on sample farms was Rs. 43017.47 per hectare. In the case of small size groups, the cost of FYM was Rs. 45105.34 per hectare which was more than other size groups. The cost of FYM was less in a large size group due to use of lesser quantity of FYM.

The irrigation charges on sample farms were Rs. 10351.55. In the case of small size group irrigation charges (Rs. 8244.27) was lower than other size of group.

The depreciation charges were more on large farms i.e. Rs. 12885.93 than other sizes of group of sample farms. It was low in the case of small size group i.e. Rs. 3627.66. Thus, could be seen that the depreciation charges increased with an increase in size of farms.

Table 4: Overall cost of cultivation of ginger according to cost concepts in Udaipur district

(Rs./ha)

SI. No.	Particulars	Small	Medium	Large	Overall
1.	O.C.	338849.20 **(93.86)**	355735.27 **(93.92)**	346989.05 **(91.64)**	349764.51 **(93.44)**
2.	O.H.C.	22168.35 **(6.14)**	23041.81 **(6.08)**	31658.08 **(8.36)**	24546.70 **(6.56)**
3.	Cost A1	263904.81 **(73.10)**	301333.92 **(79.55)**	324552.98 **(85.71)**	296620.45 **(79.24)**
4.	Cost A2	263904.81 **(73.10)**	301333.92 **(79.55)**	324552.98 **(85.71)**	296620.45 **(79.24)**
5.	Cost B1	264445.50 **(73.25)**	301895.92 **(79.70)**	325325.13 (85.91)	297219.15 **(79.40)**
6.	Cost B2	282445.50 **(78.23)**	319895.92 **(84.45)**	343325.13 **(90.67)**	315219.15 **(84.21)**
7.	Cost C1	343017.56 **(95.01)**	360777.09 **(95.24)**	360647.13 **(95.24)**	356311.22 **(95.19)**
8.	Cost C2	361017.56 **(100)**	378777.09 **(100)**	378647.13 **(100)**	374311.22 **(100)**
9.	Cost C3	397119.32 **(110)**	416654.80 **(110)**	416511.84 **(110)**	411742.34 **(110)**

The rental value of owned land was same for all categories of farm size i.e. Rs. 18000 per hectare. The interest on fixed capital was observed highest in large size farms (Rs. 772.14 per hectare) than medium size farms (Rs. 561.48 per hectare) and small size farms (Rs. 540.69 per hectare).

The total cost of cultivation of ginger crop was Rs. 361017.56 per hectare on small size group. In the case of large size group, the cost of cultivation was Rs. 378647.13 per hectare. It was highest in the case of medium size farms (Rs. 378777.09 per hectare), which was higher than overall cost (Rs. 374311.22 per hectare).

In Table 4, the overall cost A1 and cost A2 accounted 79.24 per cent of total cost as there was no leased in tendency in Udaipur district. The cost B1 and B2 costs were 79.40 and 84.21 per cent cost of total cost, respectively. The cost C1 accounted for 95.19 per cent of total cost.

Economics of Ginger Cultivation in Udaipur District:

The overall gross income from ginger cultivation during 2020-21 was estimated as Rs. 453831.29 per hectare (Table 5). The net return over cost C2 was Rs. 79520.07 per hectare. The cost of production was Rs. 3180.87, Rs. 3098.75 and Rs. 2946.82 per quintal on small, medium and large farms, respectively. Total production was found highest on large farms i.e. 128.49 quintal per hectare.

Income measures in Udaipur district:

Comparison of cost, income and return per rupee of ginger cultivation in Udaipur district are shown in Table 6. Overall gross income from ginger during 2020-21 was estimated as Rs. 453831.29. Average net income over cost C2 and average family labour income were Rs. 79520.07 and Rs. 138612.13 per hectare, respectively. The average return per rupee invested was worked out to Rs. 1.21.

Gross income from ginger during 2020-21 for large size group was estimated as Rs. 492136.36 per hectare which was more than overall (Rs. 460502.82 per hectare). This was due to higher yield than overall yield.

Net income on large size farms was Rs. 105819.53 per hectare. It was more than overall estimate of net income. Family labour income on large farms was Rs. 141141.53 per hectare. The net return per rupee of large size farms was 1.27, which was more than overall net return per rupee (1.21). Farm investment income was more in large size group Rs. 124591.68 per hectare than small (Rs. 80133.81 per hectare) and medium size groups (Rs. 96667.25 per hectare).Gross income from ginger during 2020-21 for medium size groups was estimated as Rs. 456882.35 per hectare. In this group, the cost of cultivation was Rs. 378777.09 per hectare, which was more than medium and large size group of farmers. It was due to less use of improved seed, less machine labour, less hired human labour, less use of fertilizer than large size group. Net income was Rs. 78105.25. Return per rupee was 1.20.Gross income from ginger for small size groups was estimated as Rs. 422610.68 per hectare, which was lower than other sizes of groups. It was due to low production of ginger per hectare. In this group cost of cultivation was Rs. 361017.56 per hectare. Return per rupee (1.17) was lower than other sizes of groups due to high cost of

Table 5: Overall cost and return from ginger production in Udaipur district

S.No.	Particulars	Small (N=15)	Medium (N=33)	Large (N=12)	All (N=60)
1.	Cost of cultivation (?/ha)	361017.56	378777.09	378647.13	374311.22
2.	Gross return (?/ha)	422610.68	456882.35	484466.66	453831.29
3.	Net return (?/ha)	61593.12	78105.25	105819.53	79520.07
4.	Total production (quintal per ha)	113.49	122.23	128.49	121.30
5.	Cost of production (?/quintal)	3180.87	3098.75	2946.82	3085.77

Table 6: Overall economics of ginger cultivation in Udaipur district

(Rs./ha)

S.No.	Particulars	Small	Medium	Large	Overall
1.	Cost of cultivation	361017.56	378777.09	378647.13	374311.22
2.	Gross income	422610.687	456882.35	484466.66	453831.29
3.	Farm business income	158705.87	155548.42	159913.68	157210.83
4.	Family labour income	140165.18	136986.43	141141.53	138612.13
5.	Net income	61593.12	78105.25	105819.53	79520.07
6.	Farm investment income	80133.81	96667.25	124591.68	98118.77
7.	Return per rupee	1.17	1.20	1.27	1.21

Table 7: Problems faced by producer in production and marketing of ginger

SI. No.	Particulars	Garett mean score	Rank
1.	Pest and disease attack	81.60	I
2.	High cost of inputs specially seed	66.78	II
3.	Fluctuation of ginger prices	63.38	III
4.	Exploitation by middlemen	59.93	IV
5.	Lack of knowledge about disease and pest treatment	51.78	V
6.	Non availability of HYV seeds	48.76	VI
7.	Water scarcity	37.90	VII
8.	Shortage of labour	36.76	VIII
9.	Lack of storage facilities	28.18	IX
10.	Lack of processing units	22.75	X

production per quintal in this group than medium and large size group.

An overview of results presented above depicted that the per hectare cost of cultivation of ginger crop varied from Rs. 361017.56 to Rs. 378647.13 with an average of Rs. 374311.22.

Constraints in Ginger Production:

In Table 7, the analysis showed that pest and disease attack with mean per cent score mean per cent score of 81.60 was the major problem perceived by the ginger growers in Udaipur district. The second most important problem perceived by the ginger growers was high cost of input (66.78) followed by fluctuation of ginger prices (63.38), exploitation by middlemen (59.93), lack of knowledge about disease and pest treatment (51.78), non availability of HYV seeds (48.76), water scarcity (37.90), shortage of labour (36.76), lack of storage facilities (28.18) and lack of processing units (22.75) in the study area.

CONCLUSION

The following conclusions were drawn from the study.

The compound growth rate of area and production showed a negative but significant growth of -4.36 per cent and -4.93 per cent at 5 per cent level of significance, while productivity also showed a negative growth rate of -0.63 per cent but non-significant in Udaipur district during 2007-08 to 2018-19.

The results revealed that during overall period, ginger area showed a negative growth of -3.42 per cent per annum in Rajasthan. Whereas, ginger showed a positive growth rate of 0.35 per cent per annum in production and similarity productivity of ginger also showed a positive growth rate of 3.90 per cent in the state but all the growth rates during overall period were non-significant.

The total cost of growing ginger was calculated

as Rs. 374311.22 per hectare, with total variable costs of Rs. 349764.51 and total fixed costs of Rs. 24546.70. Human labour (35.61 per cent) accounted for the highest percentage of the overall cost. Seed (32.49 per cent) ranked second in terms of percentage of overall cost. Among other items the important one was FYM, followed by rental value of owned land, machine labour, irrigation charges, depreciation charges, interest on working capital, miscellaneous expenses, animal labour, fertilizer, interest on fixed capital, plant protection chemicals, and land revenue, which accounted for 11.48, 4.80, 4.35, 2.76, 2.29, 2.21, 1.83, 1.78, 0.88 and 0.15 per cent of total cost, respectively. On small, medium and large farms, the total cost of ginger cultivation was Rs. 361017.56, Rs. 378777.09, and Rs. 378647.13, respectively.

The overall cost A1 and cost A2 accounted for 79.24 per cent: cost B1 and B2 were 79.40 and 84.21 per cent: and cost C1 accounted for 95.19 per cent of the c2 cost (Rs. 374311.22)

The overall gross income from ginger cultivation during 2020-21 was estimated as Rs. 453831.29 per hectare. The net return over cost C2 was Rs. 79520.07 per hectare. The cost of production was Rs. 3180.87, Rs. 3098.75 and Rs. 2946.82 per quintal on small, medium and large farms, respectively. Total production was found highest on large farms i.e. 128.49 quintal per hectare.

Average net income over cost C2 and average family labour income were Rs. 79520.07 and Rs. 138612.13 per hectare, respectively. The average return per rupee invested was worked out to Rs. 1.21.

A large number of constraints were faced by producers in ginger production and marketing. It was observed that pest and disease attack with MPS of 81.60 was the major problem perceived by the ginger growers in Udaipur district. The second most important problem perceived by the ginger growers was high cost of input specially seed (66.78).

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ADAPTATION STRATEGIES FOLLOWED BY THE FARMERS DUE TO CLIMATE CHANGE IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was undertaken in Udaipur district of Rajasthan in order to identify the adaptation strategies of climate change related to agriculture and allied activities. A sample of 120 respondents from two tehsils (Girwa & Kotra) and eight villages (Alsigarh, Karget, Pai, Panduna, Mamer, Asawara, Samoli and Ghata) were selected on the basis of random sampling technique. The result reveled that wallowing in animals in summer season for control heat stress, use of improved varieties, use of short duration varieties, crop-livestock diversification, conserving soil moisture through appropriate tillage practices, follow contour practices in hilly areas are most suitable strategies followed by the farmers due to climate change of Udaipur district.

INTRODUCTION

Climate change is one of the biggest challenges facing in the world today. The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programmed (UNEP) to assess climate change based on the latest science. Recent climate changes and climate variations are beginning to have effects on many natural and human systems. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and green house gases fluxes in terrestrial ecosystems.

Climate is one of the inputs for agricultural growth and survival of related population. Total annual crop losses in the world agriculture are mainly due to direct weather impacts. Increase in atmospheric carbon dioxide (CO_2) and other greenhouse gases viz. methane (CH_2), nitrous oxide (N_2O) and chloro fluoro Carbons (CFC) due to fossil fuel burning, rapid industrialization and deforestation create a layer in the atmosphere and prevent the long wave radiation emitted by earth which otherwise would have escaped to space.

As a result, the average global temperatures are increasing. Increase in global temperature results in changes in the general circulation and there by climate change. Agriculture sector reveals high sensitivity and resilience to climate change. Looking to the effect of climate change in agriculture and allied fields the present study aimed to identify the adaptation strategies followed by the farmers due to Climate Change in Udaipur District of Rajasthan was undertaken.

RESEARCH METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan state with a total of 120 respondents selected from two tehsils and eight villages. 15 respondents were selected from each village. To identify the adaptation strategies, a schedule was prepared with the help of agriculture and meteorological experts. Data were collected with the help of interview schedule. Face to face interview technique was used for collection of information from the respondents. For identifying most adaptation strategies frequency, percentage and Z test used for finding significant or non- significant deference between the respondents of both tehsils.

RESULTS AND DISCUSSION

To know the adaptation strategies followed by the farmers due to climate change, total 15 statements

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Table 1: Adaptation strategies followed by the farmers

n = 120

S.No.	Strategies	Girwa tehsil		Kotra tehsil		Total		Z Value
		f	%	f	%	f	%	
1.	Crop-livestock diversification	9	15	20	33.33	29	24.16	1.88^{NS}
2.	Use of improved varieties	48	80	33	55	81	67.50	
3.	Use of short duration varieties	43	71.66	30	50	73	60.83	
4.	Agroforestry and perennial plantation	23	38.33	3	5	26	21.66	
5.	Changes in cropping pattern	10	16.66	6	10	16	13.33	
6.	Use of drip & sprinkler irrigation system	5	8.33	4	6.66	9	7.50	
7.	Conserving soil moisture through appropriate tillage practices	9	15	5	8.33	14	11.66	
8.	Changes in cultivation practices	12	20	6	10	18	15.00	
9.	Suitable breeds of animals	21	35	19	31.66	40	33.33	
10.	Conservation of rain water through ponds	7	11.66	7	11.66	14	11.66	
11.	Farming of perennial and cover crops for reducing the soil and water erosion	10	16.66	8	13.33	18	15.00	
12.	Follow contour practices in hilly areas	21	35	24	40	45	37.50	
13.	Vaccination in animals /poultry	20	33.33	11	18.33	31	25.83	
14.	Wallowing in animals in summer season for control heat stress	54	90	60	100	114	95.33	
15.	Grooming in animals for maintain blood circulation and reduce parasite attack	22	36.66	24	40	46	38.33	

MPS = Mean Per Cent Score

(strategies) were identified and responses were obtained from the farmers. The frequencies and percentage for each aspect were calculated and results were given in Table 1.

Data presented in Table 1 show that majority of farmers (95.33%) adapted the wallowing in animals in summer season for control heat stress and ranked first. This was followed by use of improved varieties, use of short duration varieties and grooming in animals for maintain blood circulation and reduce parasite attack aspects which were used by 67.50, 60.83 and 38.33 per cent farmers. Table also shows that 37.50 per cent farmers following contour practices in hilly areas, 33.33 per cent farmers rearing suitable breeds of animals, 25.83 per cent farmers vaccinated in animals/poultry, 24.16 per cent farmers used crop-livestock diversification, 21.66 per cent farmers used Agroforestry and perennial plantation, 15 per cent farmers growing of perennial and cover crops for reducing the soil and water erosion and changes in cultivation practices, 13.33 per cent farmers changed in cropping pattern and 11.66 per cent farmers conserving soil moisture through appropriate tillage practices and conservation of rain water through ponds.

Analysis of table reveals that 7.50 per cent

farmers were using drip & sprinkler irrigation system for efficient and effective use of water for irrigation of various crops. This aspect was priotized last in the order of various strategies followed by the farmers due to climate change in the study area.

Further analysis of Table 1 reveals that calculated Z value (1.88) was found to be less than its tabulated value at 5 per cent level of significance. Therefore, there is no significant difference between the respondents of Girwa and Kotra tehsils with regard to adaptation of strategies in agriculture and allied areas due to climate change.

These findings are supported by the findings of Singh et al. (2012) who reported that majority of the respondents perceived that climate change has negative impact on productive and reproductive performance of livestock, increased incidence of livestock diseases and parasitic infestation, decreasing trend of feed and fodder resources. Majority of the respondents perceived an increased environmental temperature, decreased precipitation, increased frequency of extreme weather conditions and summer season length. Most of the farmers preserved fodder crop in farm of hay for adverse climatic condition, followed mixed livestock farming, diversifying farming practices and changed planting date, provided bedding and warmth to their animals to protect them from extreme cold, similarly during hot days farmers provided cold water and shed to protect their animals as adaptation strategies for sustaining livestock production and agriculture.

CONCLUSION

From the above discussion it can be concluded that wallowing in animals in summer season for control heat stress, use of improved varieties, use of short duration varieties and grooming in animals for maintain blood circulation and reduce parasite attack were the important adaptation strategies followed by the farmers due to climate change in the study area.

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STUDY ON FARMING SYSTEM BEING FOLLOWED BY THE FARMERS IN GIRWA PANCHYAT SAMITI OF UDAIPUR DISTRICT (RAJASTHAN)

Mukesh Choudhary*, K.L. Dangi and S.S. Sisodia*****

ABSTRACT

Land is important natural resource, which supports evolution and development of all types of lives on land. Land plays the key important role in the determination of man's economic and cultural progress. The present study was conducted in Udaipur district of Rajasthan. Udaipur district consists of total seventeen panchayat samities, out of which Girwa was selected purposively, ten revenue villages were selected on basis of highest population and total 150 respondents were selected from every village through proportionate random sampling. It was observed that FS-II: Crop + Dairy with 76.22 MPS was adopted and assigned first rank by the respondents. The farming system FS-IV: Crop + Poultry with 51.33 MPS was as the least adopted by the respondents.

INTRODUCTION

Agriculture, the backbone of Indian economy, contributes to the overall economic growth of the country and determines the standard of life for more than 70 per cent of the Indian population. Agriculture contributes only about 14 per cent to the overall GDP but its impact is felt in the manufacturing sector as well as the service sector as the rural population has become a significant consumer of goods and services in the last couple of decades. Farming systems represent integration of farm enterprises such as cropping systems, animal husbandry, fisheries, forestry, etc. for optimal utilization of resources bringing prosperity to the farmers. The need for Farming Systems Approach in the present scenario is mainly due to high cost of farm inputs, fluctuation in the market price of farm produce, risk in crop harvest due to climatic vagaries and biotic factors, environmental degradation, depletion in soil fertility & productivity, unstable income of the farmer, fragmentation of holdings and low standard of living add to the intensity of the problems. The researcher traced out very few past studies conducted on the theme of farming systems followed by farmers in the state of Rajasthan or elsewhere. Based on this background, the present investigation was conducted with the specific objective to "Study the level of adoption of defined farming systems and to see the priorities of farming systems among the farmers."

RESEARCH METHODOLOGY

The present study was conducted in Udaipur district of Rajasthan. Udaipur district consists of total seventeen panchayat samities, out of which Girwa was selected purposively, ten revenue villages were selected on basis of highest population and total 150 respondents were selected from every village through proportionate random sampling. In this part research, study of the farming system adopted by the farmers in the investigation area was analyzed; a suitable interview schedule was developed. There were five farming systems prevalent in the study area. The responses obtained from respondents were recorded on three point continuum scale in relation to adoption viz., fully, partially and not all adopted farming systems, these points were assigned scores 3, 2 and 1, respectively. Total score obtained by each of the respondents as well as for each of components was calculated. The respondents were divided into three categories (low level, moderate level and high level of adoption) on the basis of arbitrary method.

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RESULTS AND DISCUSSION

To get an overview the farming systems adopted , the farmers were grouped into (7.0-8.67) low, (8.68-10.33) medium and (10.34-12.00) high category of adoption on the basis of the obtained scores by the respondents.

The data in Table 1 revealed that 61 (40.67 per cent) respondents were found in medium adoption of farming system group, whereas, 62 (41.33 per cent) were in low adoption of farming system group and remaining 27 (18.00 per cent) were observed in high adoption of farming system group.

There were five farming systems defined for the study in the Girwa panchayat samiti of Udaipur districts (Rajasthan) as shown in Table 2 namely Crops + Vegetables (FS-I), Crops + Dairy (FS-II), Crops + Dairy + Goats constituted (FS-III), Crops supported by Poultry (FS-IV) Crop + Goat + Poultry + Orchard (FS-V).

The data presented in Table 2 indicate the different farming systems adopted by the farmers. The results show that Crop + Dairy (76.22 MPS) adopted by the majority of respondents and assigned first rank by the respondents. Whereas the FS-III: Crop + Dairy +Goat (71.11 MPS), FS-I: Crop+ Vegetables (69.78 MPS), FS-V: Crop + Goat +Poultry + Orchard (66.67 MPS) with II, III, and IV ranks assigned in order to adopted farming systems by the respondents, respectively. The farming system Crop + Poultry (51.33 MPS) was adopted at last by the respondents.

CONCLUSION

It is concluded that the most common feature of Integrated Farming Systems are agronomical crops and dairy animals, due to the small land holdings the farmers growing the cereals crops for family feeding and animals for milk purpose. The wastes of crops are used as feeding materials and the dung of animals is used as fertilizer (FYM) for crops. Therefore, there is an urgent need of the farmer's awareness about the horticulture crops, Mushroom farming, Bee keeping and poultry farming for additional income generation. The present results are somewhat similar with that of Dadadhau (2014).

Table 1. Categorization of respondents based on level of farming system adopted

n=150

Level of adoption	Range of score	*f*	Per cent
Low	7.0-8.67	62	41.33
Medium	8.68-10.33	61	40.67
High	10.34-12	27	18.00
	Total	150	100

f=Frequency, n=Total number of respondents

Table 2. Farming systems adopted and prioritized by the farmers

n=150

S.N.	Farming system	MPS	Rank
1	FS-I: Crop+ Vegetables	69.78	III
2	FS-II: Crop + Dairy	76.22	I
3	FS-III: Crop + Dairy +Goat	71.11	II
4	FS-IV: Crop + Poultry	51.33	V
5	FS-V: Crop + Goat +Poultry + Orchard	66.67	IV

MPS=Mean per cent score n= Total number of respondent

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CONSTRAINTS FACED BY AGRICULTURE PEDAGOGUES OF SKNAU JOBNER IN ACHIEVING HIGH LEVEL OF WORK MOTIVATION

Kulkarni Srinivas*

ABSTRACT

In the present study the researcher investigated constraints faced by agriculture pedagogues in achieving high level of work motivation. For the purpose of investigation, descriptive survey method in form of complete enumeration was applied. The sample comprised of 92 agriculture teachers/ pedagogues of nine constituent colleges of SKNAU, Jobner, Rajasthan. A complete list of all possible constraints were enlisted. The initial list of constraints were discussed with the experts for their comments. Finally, 20 constraints were included in this section. The data were recorded on three-point continuum viz. most important constraint, important constraint and least important constraint which were given 3, 2 and 1 score respectively. Finally, the Mean Per cent Score (MPS) for each constraint was calculated for ranking them in terms of its importance. The study concluded that 'inadequate ministerial and supporting staff' was the most severe constraint perceived by agriculture pedagogues in achieving high level of work motivation, whereas 'lack of autonomy in teaching' was perceived as the least constraint faced by the agriculture pedagogues in attaining high level of work motivation.

INTRODUCTION

Motivation is generally perceived as basic psychological process, according to the recent data-based on comprehensive analysis elucidated that competitive problems appear to be largely motivational in nature (Miner et al. 1995). Rainey (2001) defines work motivation as the level of excitement, persistence of work and direction in work that a person tries to execute hard and well.

Robbins and Judge (2008) defined, motivation as the "processes that account for an individual's intensity, direction, and persistence of effort toward achieving goal". The advantages of high work motivation of pedagogues in a particular organization are as follows:- 1) High work motivation level among the pedagogues helps in attaining the higher productivity level in an organization or institution. 2) Motivated pedagogues are likely to become more focused on the job they are performing which directly drives the working environment healthier. 3) Pedagogues work motivation will induce learning enthusiasm among the students.

While achieving job satisfaction and high level of work motivation pedagogues face few constraints that lag them to achieve the work motivational goals. The lacunae may include lack of proper pay, delay in promotions, no job security, less incentives and many more. Hence, keeping in view of all the above-mentioned ideas and facts the study on "constraints faced by agriculture pedagogues of SKNAU Jobner in achieving high level of work motivation" with an objective to'identify the constraints faced by agriculture pedagogues in achieving work motivation' was undertaken.

RESEARCH METHODOLOGY

From all nine constituent colleges of SKNAU, Jobner, Rajasthan, a separate list of pedagogues posted in accredited and non-accredited colleges was prepared and all those pedagogues who are directly involved into teaching as their profession were selected as the sample respondents for the present research study. In this way, all the 92 agriculture pedagogues were selected for the study purpose (complete enumeration). To determine if the data are appropriate for factor analysis the Kaiser-Meyer-Olkin Measure of Sampling Adequacy must be calculated (Kaiser, 1974). Small

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values of the KMO MSA indicate problem with sampling. KMO values less than 0.6 indicates that sampling is not adequate, and that remedial action should be taken. Kaiser (1974) suggested KMO value above 0.60 is acceptable which indicates the sample is adequate.

The reliability analysis was done and KMO test was taken conducted. The reliability of the answers considering the questionnaire, given by the α-Cronbach measure was very satisfactory α=0.832 with KMO MSA=0.679. Constraints in the present study mean impediments or barriers restricting teachers from doing assigned duties more efficiently. A complete list of all possible constraints was prepared with the help of advisory committee, experts and subject matter specialists. The initial list of constraints were discussed with the experts for their comments. Finally, 20 constraints were included in this section. The data were recorded on three-point continuum viz. most important constraint, important constraint and least important constraint which were given 3, 2 and 1 score, respectively. Finally, the Mean Per cent Score (MPS) for each constraint was calculated for ranking them in terms of its importance.

RESULTS AND DISCUSSION

The study reveals the severity of the following enlisted twenty constraints which were perceived by the pedagogues in achieving high level of work motivation.

It was noted that that 'inadequate ministerial and supporting staff' (80.80 MPS) followed by "lack of exposure visit" (78.62 MPS) and "lack of budget allocation to the project undertaken" (77.17) were the most severe constraints perceived by the

Table 1. Constraints perceived by agriculture pedagogues in achieving high level of work motivation

n=92

S. No.	Constraints	(MPS)	Rank
		59.78	XV
2	More number of students in the class	53.99	XIX
3	Lack of autonomy in teaching	47.83	XX
4	In-adequate teaching aids	65.22	XII
5	Lack of coordination with departmental colleagues	57.97	XVII
6	Unpleasant working environment	59.06	XVI
7	Lack of scientific orientation of the institution in which you are working	66.67	XI
8	Lack of timely budget allocation to the project undertaken	77.17	III
9	Students' low performance in the examination even after your satisfied effort in teaching	64.13	XIII
10	Lack of training programmes	69.20	IX
11	Administrative complexities	75.72	IV
12	Lack of timely orientation programmes	68.12	X
13	Lack of exposure visit	78.62	II
14	Lack of coordination by the ministerial and supporting staff	72.10	VI
15	Long distance of permanent residence from current living place	56.52	XVIII
16	Inadequate facility for teaching, research and extension	71.01	VI
17	Long waiting dues TA/DA/arrears/ etc.	75.00	V
18	Lack of sanitation facility at workplace	61.59	XIV
19	Additional duties/ responsibilities apart from teaching	69.57	VIII
20	Inadequate ministerial and supporting staff	80.80	I

respondents and 'lack of autonomy in teaching' (47.83 MPS) was the least important constraint faced by the agriculture pedagogues in attaining high level of work motivation.

CONCLUSION

From the study it was concluded that pedagogues perceived inadequate ministerial and supporting staff as the major reason that cause hindrance to them in achieving high level of work motivation. Since Majority of the agriculture pedagogues perceived inadequate ministerial and supporting staff as the more severe constraints they faced in an organization where they are working, Hence it was recommended that University management and administrators must recruit more ministerial and supporting staffs to back up the lacunae which has caused.

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EFFECT OF SHATAVARI (*asparagus racemosus*) SUPPLEMENTATION ON REPRODUCTIVE PERFORMANCE OF CROSSBRED COWS

Rashmi Bhinda*, J.L. Choudhary, Jeewan Ram Jat*** and Hitesh Muwal******

ABSTRACT

Asparagus racemosus root powder supplementation during of lactation improved the reproductive performance and nutritional status of dairy cows. The productivity and profitability of crossbred cows depend largely on reproductive performance. Thus, this study was intended to evaluate the effect of shatavari (asparagus racemosus) supplementation on reproductive performance of crossbred cows. A total fifteen crossbred cows at early stage of lactation were selected and divided into three groups; T_1 (control), T_2 and T_3 (treatment) of five animals each on the basis of nearness in their body weight and milk yield in completely randomized design. In T_1 no Shatavari was supplemented, while in T_2 and T_3 Shatavari was supplemented @ 150 mg and 200 mg /kg body weight, respectively. The study was conducted for a period of 90 days. There was significant reduction in ($P<0.05$) first postpartum oestrus days, service period and service per conception in cows of shatavari supplemented groups. Results showed that conception rate was better in supplemented groups than control (T_1) group. Hence, shatavari supplementation in diet of crossbred dairy cows is beneficial and could serve as potential management tool to improve reproductive performance.

INTRODUCTION

Production and reproduction disorders and veterinary costs are more associated with postpartum period. Supplementation of anti-oxidant and immuno-modulator agent during transition period has been reported to be resulting early onset of postpartum estrus and improved pregnancy rate (Khan 2008). So, this period needs extra attention to alleviate the stress and augment future production and reproduction. However, large-scale studies have focused on the use of hormones and other veterinary medicines for augmenting reproduction performance, which are considered economically not affordable to Indian farmers. So, there arises the need for other substitutes (herbals), which are considered safe, cheap, locally available and at the same time improve production and reproduction performance of dairy animals.

There are many physiological, psychological, behavioral, and environmental factors that influence the intensity of estrus expression in cattle. Fertility of dairy cows is of growing concern. Reproductive indices that are used to assess reproductive management show a negative trend during the past decade despite increased knowledge and professional attention. Poor detection of estrus is the major contributor to low fertility (Reimers *et al.* 1985).

Asparagus racemosus root is the most commonly used traditional medicine in human beings and its supplementation is recommended during last trimester of pregnancy to first trimester after birth to the mother to boost milk quality, immunity of both mother and fetus and to tone the reproductive system and reproductive health. Besides, *Asparagus racemosus* have been scientifically validated as reproductive system tonic, immuno-modulator, antioxidant, and anti-stress (Kumar *et al.*, 2008). Keeping in view these benefits, supplementation of *Asparagus racemosus* herb was selected as

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supportive management intervention to improve the reproductive performance in crossbred lactating cows.

RESEARCH METHODOLOGY

This study was carried out to examine the effect of Asparagus racemosus (Shatavari) on reproductive performance of crossbred cows. A total of fifteen lactating crossbred cows at early stage of lactation were selected from the herd of livestock farm, Rajasthan College of agriculture, MPUAT, Udaipur (Rajasthan) for the study purpose. Thereafter, the animals were randomly divided into three groups of five animals each on the basis of nearness in their body weight and milk yield. All the animals were fed as per ICAR (2013) feeding standards to meet the requirement of nutrients. The experiment was conducted for a period of 90 days. The Shatavari root powder was supplemented daily by mixing in the concentrate. All experimental cows were maintained under well ventilated shed throughout the experiment period. The cows were placed on three dietary experimental feeds (Table 1).

After parturition all experimental animals were observed regularly for first symptom of heat during both morning and evening. Estrus detection was being carried out by teaser bull which was used twice a day (morning and evening) for identifying cows in estrus. Estrus was also detected by visualizing various estrus behavior signs like bellowing, mucus discharge, wagging of tail and stand to be mounted. Animals detected in heat during morning were inseminated in evening and animals detected in heat during evening were inseminated next morning. The following observations were recorded on individual crossbred cow to calculate the service period and conception rate.

(i) No. of animals coming in heat

(ii) No. of animals conceived

(iii) No. of service per conception

Statistical Analysis

Completely randomized design (CRD) was used to conduct the experiments and data were analyzed as per the procedure of Snedecor and Cochran (1980). Treatment means were tested by critical difference test.

RESULTS AND DISCUSSION

Reproduction performance

First postpartum oestrus

The average of first postpartum oestrus in T_1 (control) was 94.60±6.16 days and the corresponding values for supplemented groups T_2 and T_3 were 77.80±7.90 and 66.60±7.04 days, respectively (Table 2). The first postpartum oestrus days were significantly less in T_3 group than that of T_1 (control) group. The first postpartum oestrus days were also reduced in T_2 group than T_1 (control) group. However, statistical analysis show that there was no significant difference between T_1 (control) and T_2 group. Earlier first postpartum estrus in supplemented groups could be due to estrogenic property of Asparagus racemosus which might have stimulated the ovarian function and uterine tonicity properties of Asparagus racemosus that could have helped in early uterine involution and consequently early initiation of estrus cycle in supplemented groups. The findings are in accordance with the earlier reports of Pandey *et al.*, 2005.

The initiation of estrus cycle in supplemented T_3 group was earlier than other groups indicating the importance of stage of lactation and supplementation of Asparagus racemosus. It was found that initiation of estrus cycle in T_3 group was earlier by 28 and 11.20 days from control and T_2 group, respectively. The results are in accordance with the findings of Kumar *et al.* (2010) who observed that first postpartum estrus significantly (P= 0.020) reduced in treatment group than control group. Kumar *et al.* (2011) also reported that Asparagus racemosus supplementation during both prepartum continued to postpartum (PREPOS) resulted in significant reduction in first postpartum oestrus interval.

Service period

Mean of service period in T_1 (control), T_2 and T_3 was 164.20±6.00, 126.60±8.62 and 112.80 ±

Table 1. Experimental feeds offered to lactating crossbred cows

Groups	Experimental feed
T_1 (Control)	Wheat straw ad-lib. + 10 kg green fodder + Concentrate mixture
T_2	T_1 + Shatavari @ 150 mg/kg BW
T_3	T_1+ Shatavari @ 200 mg/kg BW

Table 2. Mean (±SE) of Reproductive performance in different treatment groups

Attributes	Treatments		
	T_1 (Control)	T_2	T_3
First postpartum estrus (days)	94.60^{a}±6.16	77.80^{ab}±7.90	66.60^{b}±7.04
Service period (days)	164.20^{a}±6.00	126.60^{ab}±8.62	112.80^{b}±18.91
Service per conception	3.40^{a}±0.245	2.20^{b}±0.200	2.00^{b}±0.316
Conception rate (%)	20	40	60

Mean values having different superscripts within a row differ significantly (P<0.05)

18.91 days, respectively. The service period was significantly less in T_3 group than that of T_1 (control) group. The service period was also reduced in T_2 group than T_1 (control) group. However, statistical analysis showed that there was no significant difference between T_1 (control) and T_2 group.

The service period (days) in supplemented T_3 group was significantly (P<0.05) reduced, which might be due to stage of lactation and initiation of supplementation of Shatavari. It was found that animals in T_3 group had earlier initiation of estrus and consequently the service period was reduced significantly (P<0.05) when compared to T_1 (control) group. Service period in T_3 group was reduced by 51.4 and 13.8 days over control and T_2 group, respectively. These findings are in agreement with those of Kumar *et al.* (2010) who observed that service period was significantly (P= 0.020) reduced in treatment group than control group. Kumar *et al.* (2014) evaluated the effect of Shatavari root powder @ 100 mg/kg live body weight once in the morning from 60 days till parturition, and found significant (P<0.05) reduction in service period. Kumawat *et al.* (2017) also observed that Asparagus racemosus supplementation stimulated oestrus induction in cows and reduced (P<0.01) the service period in Asparagus supplemented group.

Service per conception

Mean of service per conception in T_1 (control), T_2 and T_3 was 3.40±0.24, 2.20±0.20 and 2.00±0.31, respectively. The statistical analysis showed that number of services per conception were significantly (P<0.05) less in the supplemented groups T_2 and T_3 than the control group. The improvement in supplemented groups could be due to antioxytotic action of Asparagus racemosus compound present in Asparagus racemosus on uterus, which helps in conception (Gaitonde and Jetmalani 1969). Mitra *et al.* (1999) also reported that Asparagus racemosus based herbal formulation did not possess oxytocin like activity which might be useful in condition associated with hypermotility of uterus as in threatened abortion, hence Asparagus racemosus supplementation enhances conception.

These findings are in agreement with those of Kumar *et al.* (2010) who reported significant difference in service per conception among control and treatment groups. Kumar *et al.* (2014) evaluated the effect of Shatavari root powder @ 100 mg/kg live body weight once in the morning from 60 days till parturition, and found significant (P<0.05) reduction service per conception in experimental group than control group. Kuri *et al.* (2019) reported that poly herbal mixture supplementation in diet of Sahiwal cows significantly (P<0.05) reduced the number of service per conception.

Conception rate

Conception rate was highest (60%) in T_3

followed by T_2 (40%) and T_1 (20%). Results showed that conception rate was better in supplemented groups than control (T_1) group. The results are in close agreement with those reported by Dangi (2011) who reported higher conception rate (62.5%) in shatavari supplemented group. Similarly, Hedge *et al.* (2002) reported that 60 % animals were conceived in treatment group.

CONCLUSION

Based on the above results, it can be concluded that Asparagus racemosus root powder supplementation during lactation period improved in post partum reproductive performance in terms of first postpartum oestrus days, service period, service per conception and conception rate and nutritional status of crossbred cows. Therefore, it is beneficial and could serve as potential management tool to improve reproductive performance in crossbred dairy cows.

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CREDIT UTILIZATION PATTERN OF FARM WOMEN IN UDAIPUR DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was undertaken to find out the rural credit utilization pattern of rural women of Udaipur district. The study was conducted in four villages of randomly selected Mavli panchayat samiti of Udaipur district of Rajasthan. A sample of 100 rural women was selected randomly for the present study. Personal interview technique was used for collection of data. Frequency, percentage, mean and percent score were used for analysis of the data.It was found that women generally have no control over land and other productive assets which largely exclude them from access to institutional credit and left them dependent on high-cost informal sources of credit to secure capital for consumption and/or productive purposes. Rural women's access to financial services is a key factor of successful rural development strategies for inclusive growth. Regarding utilization of rural credit majority of the respondents 62 per cent had low utilization of rural credit followed by 37 percent of the respondents with medium utilization with overall MPS of 22.71. Majority of the respondents used loan amount for production purposes i.e. repayments of old debts, purchase of animal feed, social obligations and medical treatment.

INTRODUCTION

Rural women in India are economically dependent, vulnerable and socially discriminated .They have very limited access to income generating activities due to social , economic and religions barriers .It has been experienced that women's economic role by tradition have been largely unacknowledged , undervalued and they have often been exposed to informal finance .It is generally recognized that independent women could utilize the earning more sharply for family welfare .The effort of government could not prove much effective in bringing the rural women streamlined and capable of taking loans from formal credit institutions and utilize the earnings independently .Aneffective credit delivery and efficient utilization of credit by rural women is necessary, with this idea in mind a study on credit utilization pattern of rural women in Udaipur district was undertaken.

RESEARCH METHODOLOGY

The study was conducted in four villages viz. Gadoli, Bhopatkhedi, Martadi and Fatehpura of randomly selected Mavli Panchayat Samiti of Udaipur district .From each village, 25 rural women were selected randomly, thereby making a total sample of 100 respondents. Data were collected with the help of personal interview schedule. Frequency, percentage and mean percent score were used for analyzing the data statistically.

RESULTS AND DISCUSSION

Provision of credit for rural women is not fruitful without its proper utilization. In this section, information related to utilization of rural credit by the respondents viz. frequency of visiting bank, type of bank account ,sources of credit, bank loan i.e. type of loan duration, amount, frequency of taking loan ,purpose of utilization, credit utilization pattern and general practices followed by rural women in utilization of loan has been discussed .

Data in Table 1 clearly show that majority of the respondents (63%) reported that they go to the banks. Regarding frequency of visiting bank, half of the respondents (50%) visited monthly and 11 percent of the respondents visited bank quarterly.

Regarding type of loan, data in table depict that

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45 percent of the respondents had taken short term loan (1 to 2 years) followed by 30 percent respondents who availed medium term loan (more than 2 years). Long term loan from bank was taken by one fourth of the respondents (25%) in the study aera.

Table 1. Credit utilization pattern of respondents

n=100

S. No.	Item	%
1	Go to bank	63
2	Frequency of visiting banks	
	i. Weekly	3
	ii. Monthly	50
	iii. Quarterly	11
3	Hold bank account	80
4	Type of bank account	
	i. Joint account	55
	ii. Individual account	34
5	Hold account since	
	i. Before 2001	10
	ii. 2001 - 2014	30
	iii. 2014 -2015	40
6	Type of deposit schemes	
	i. Recurring deposit (R.D)	35
	ii. Current deposit(C.D)	28
	iii. Fixed deposit(F.D)	22
	iv. Short-term deposit (S.D)	14
7	Taken credit	80
8	Frequency of taking loan from banks	
	i. Once	68
	ii. Twice	12
9	Sources of credit	
	i. Banks	60
	ii. SHGs	2
	iii. PACS	9
	iv. LAMPS	9
10	Years of taking loan	
	i. 2005-2010	8
	ii. 2011-2013	32
	iii. 2014-2015	40
11	Type of loans	
	i. Short term loan	45
	ii. Medium term loan	30
	iii. Long term loan	25
12	Purpose of loan	
	i. Production purpose	12
	ii. Consumption purpose	68
13	Production purpose	
	i. Shop general goods	2
	ii. Beauty parlor	6
	iii. Stitching	4
14	Consumption purpose	
	i. Purchase of animal feed	20
	ii. Repayments of old debts	30
	iii. Medical treatment	8
	iv. Social obligation	10
15	Amount of loan	
	i. Rs.5,000	10
	i. Rs 10,000	20
	iii. Rs 20,000	30
	iv. Rs 30,000	40
16	Used loan for the purpose / sanctioned	80

It was encouraging to note that majority of respondents (80%) were holding bank account.More than half of the total respondents (55%) had joint account as they were dependent on family members whereas nearly one third of the respondents (34%) had individual bank accounts. Data in table about duration of holding bank account shows that 40 percent rural women had account since last 1 year i.e. 2014. This may be due to Prime Minister Jan Dhan Yojana run by Ministry of Finance, Government of India initiated for financial inclusion of rural people. It was further noted that 30 Percent respondents had bank account since last 14 years i.e. 2001-2014 and rest of them (10%) were holding bank account since the year 2000.

Perusal of data in table 1 further show that more than one third of the respondents (35%) had recurring deposits (R.D) followed by 28percent having current deposit (C.D) whereas 22 and 14 percent kept their money in fixed deposits (F.D) and short deposit(S.D)schemes respectively. Possible reason for more respondents having RDs may be the regular and small savingsearned by them which they preferred to deposit monthly.

The data reveals that majority of the respondents

(80%) had taken loan. Regarding sources of loan it was noted that majority of the respondents (60%) had availed loan from the bank, 9 percent took loan from Primary Agricultural Credit Society and Large and Multi Purpose Credit Society whereas only 2 percent of the respondents reported SHGs as source of credit availed by them. Such type of findings may be due to the reason that banks give loan for different durations while PACS and LAMPS give only short term loans.

Regarding frequency of availing loans majority of the respondents (68%) had taken loan once while 12 percent of rural women had availed loan twice from formal institutions like banks, cooperatives and SHGs

Data in table 1 highlights that 40 per cent respondents got their loan sanctioned in the year 2014-2015.This may be due to initiation of Prime Minister Jan DhanYojana that women became more aware of and familiar with the banks and credit schemes. Further 32 per cent reported that the loan was sanctioned to them during year 2010-2014 and only 8 percent rural women got the loan sanctioned during the year 2005-2010.

Regarding type of loan, data in table depict that 45 percent of the respondents had taken short term loan (1 to 2 years) followed by 30 percent respondents who availed medium term loan (more than 2 years). Long term loan from bank was taken by one fourth of the respondents (25%).

The data regarding type of loan show that majority of the respondents (68%) had availed loan for consumption purpose while 12 percent had taken loan for production purpose. The result further reveals that under consumption purpose, respondents availed loan for repayments of old debts (30%), purchase of animal feed (20%), social obligations (10%) and medical treatment (8%). This indicates that they took loan for more pressing problems. Under production purposes respondents had utilized loan for establishing beauty parlor (6%), Purchase of stitching machine (4%), and grocery shop (2%).

With regard to amount of loan sanctioned, it was noted that 40 percent of the respondents had taken loan of Rs.30,000/, followed by 30 percent respondents who took loan of Rs.20,000/, rest of them had taken loan of Rs. 10,000/, (20%) and Rs.5,000/ (10%).

Perusal of data in table 1 reveals that most of the respondents (70%) had utilized the loan for the purpose it was sanctioned and rest of them (10%) had utilized for some other purposes.

Data in table 1.2below presents the repayment pattern of loan by the respondents which depict that 40 percent respondents have repaid loan amount. Regarding duration of loan repayment it was noted that 5-12 percent respondents repaid the loan between 1-5 years as per the permitted duration of loan sanctioned to them.

Table 2. Distribution of respondents by their repayments pattern of loan

n=100

S. No.	Item	%
1	Repaid loan	40
2	Duration of loan repayment	
	i. 1 year	5
	ii. 2 year	12
	iii. 3 year	9
	iv. 4 year	6
	v. 5 year	8
3	Regular repayment of loan	80
4	Full repayment of loan	40
5	Sources of repayments of loan	
	i. Agriculture	60
	ii. Government jobs	5
	iii. Income generating activities	5
	iv. Labor work	10

Regarding repayments of loan, it was observed that majority of the respondents who took loan (80%) were repaying the loan as per the terms and conditions. Regarding full repayment of loan, 40 percent had returned full amount of loan and rest of them were in the process of repayments. Rao

Table 3. Distribution of respondents by bank transaction pattern

n=100

S.NO	Items	Pattern of transaction in %	
		Individually	With family members
1	Use check book and Demand draft	8	15
2	Deposit and withdraw of money	25	35
3	Hold ATM card	35	-
4	Use ATM card	10	15

(2006) also revealed that 34 percent of the respondents had fully repaid their recent loans.

Regarding sources of repayments, majority of respondents (60%) reported income from agriculture as most of the respondents had agriculture as their main occupation. Further salary from government jobs, earnings from income generating activities and labor work were reported by 5 - 10 percent of the respondents.

Data in Table 3 regardingbank transaction pattern indicate that 15 percent respondents were using checkbook and demand draft with the help of family members while 8 percent used them individually and independently . It can be seen from table that one fourth of the respondents (25%) were depositing and withdrawing money from bank individually while 35 percent were accompanied by family members for transaction which indicates their dependence.

The data in table highlights that 35 per cent respondents were holding ATM card whereas one fourth of them (25%) were found using it for drawing money only. As many as10 percent of the total respondents were operating ATM individually, while rest of them (15%) accompanied male members for of their family during transactions.

Conclusion

Majority of the respondents (62%) had low utilization of rural credit followed by 37 percent of the total respondents with medium utilization while only 1 percent rural women had high utilization with overall MPS 22.71. further majority of the respondents (68%) were utilizing the rural credit for consumption purpose or for meeting out their personal needs. Therefore it is recommended thatthe social discrimination including access to rural credit between their male and female counterparts should be minimized. The women should get an equal opportunity to become independent in action and decision making for family affairs.

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SOCIO-PROFILE CHARACTERISTICS OF THE ENTREPRENEURIAL DAIRY FARMERS IN ANDHRA PRADESH

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ABSTRACT

Dairy farmers play a major role in socio-economic development of the society which is directly related to their entrepreneurial development. In the present investigation conducted in Chittoor district of Andhra Pradesh, an effort is made to study the socio-profile characteristics of entrepreneurial dairy farmers as they are pre-requisite in determining their entrepreneurial behaviour. Out of the four animal husbandry divisions of Chittoor district, one mandal from each division, two villages from each mandal and twenty respondents from each village i.e., eight villages and 160 respondents were selected for the study. Majority of the farmers belonged to middle age group dominated by women, possessed high school education, medium experience in dairy farming, medium herd size and medium annual income, while the psychological variables ranged from medium to high level. A well-planned and systematically executed entrepreneurship development programme can help to convert the dairy enterprise into an economically viable and sound business unit.

INTRODUCTION

Dairy farming is one of the important subsidiary businesses to agriculture, of the rural India. It provides continuous income, ensures food security, creates tremendous employment at various levels like milk production, procurement, transport, processing and marketing. Dairy farming has significant socio economic importance and has given able leadership to villages.(Yadav P K and Grover). Therefore, dairy farmer plays a major role in socio-economic development of the society which is directly related to their entrepreneurial development. Dairy entrepreneur is a person who has an urge to do or create something new, organize production, undertake risks and handle the economic uncertainty involved in running the dairy enterprise. The entrepreneurial dairy farmers who are running the dairy enterprise with optimum profits were selected for the present investigation and an effort is made to study their socio-profile characteristics as they are pre-requisite in determining the entrepreneurial behaviour of the dairy farmers.

RESEARCH METHODOLOGY

Chittoor district was purposively selected for the study owing to its highest milk production in the state. Out of the four animal husbandry divisions of Chittoor district, one mandal from each division ie., G.D Nellore from Chittoor division, Peddatippasamudram (PTM) from Madanapalle division, Chinnagottigallu from Tirupati division and Srikalahasti from Puttur division were selected for the study. Two villages from each mandal and twenty entrepreneurial dairy farmers from each village i.e., 8 villages and 160 respondents constituted the sample for the study. The entrepreneurial dairy farmers were selected based on three criteria viz., each dairy farmer must possess at least 3 milch animals; each dairy farmer must sell at least 10 litres of milk per day and each dairy farmer should sell more than 60 per cent of produced milk per day to the market.

RESULTS AND DISCUSSIONS

The results are detailed in tabular form as presented in Table 1.

Results presented in Table 1 reveal that, nearly half (46.30%) of the respondents were in middle age category followed by 32.5 and 21.2 per cent respondents in young and old age categories respectively. This might be due to interest of the middle aged dairy entrepreneurs to choose dairying

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Table 1. Distribution of entrepreneurial dairy farmers according to their Socio-profile characteristics

1. AGE			
S.No.	**Category**	**Frequency**	**Percentage**
1	Young	52	32.50
2	Middle	74	46.30
3	Old	34	21.20
2. GENDER			
S.No.	**Gender**	**Frequency**	**Percentage**
1	Male	63	39.40
2	Female	97	60.60
3. EDUCATION			
S.No.	**Education**	**Frequency**	**Percentage**
1	Illiterate	9	5.60
2	Can read	3	1.90
3	Can read and write	15	9.40
4	Primary School	42	26.30
5	High School	70	43.80
6	Intermediate	9	5.50
7	Graduate and above	12	7.50
4. EXPERIENCE			
S.No.	**Experience in dairy farming**	**Frequency**	**Percentage**
1	Low	16	10.00
2	Medium	96	60.00
3	High	48	30.00
5. HERD SIZE			
S.No.	**Herd Size**	**Frequency**	**Percentage**
1	Small (upto 3 milch animals)	48	30.00
2	Medium (4 to 6 milch animals)	82	51.30
3	Large (Above 6 milch animals)	30	18.70
6. ANNUAL INCOME			
S.No.	**Annual income**	**Frequency**	**Percentage**
1.	Low	28	17.50
2.	Medium	113	70.62
3.	High	19	11.88

7. INFORMATION SEEKING BEHAVIOUR			
S.No.	**Category**	**Frequency**	**Percentage**
1	Low	41	25.60
2	Medium	64	40.00
3	High	55	34.40
8. ECONOMIC MOTIVATION			
S.No	**Category**	**Frequency**	**Percentage**
1	Low	46	28.80
2	Medium	88	55.00
3	High	26	16.20
9. MARKET ORIENTATION			
S.No	**Category**	**Frequency**	**Percentage**
1	Low	33	20.60
2	Medium	105	65.60
3	High	22	13.80
10. RISK ORIENTATION			
S.No	**Category**	**Frequency**	**Percentage**
1	Low	43	26.90
2	Medium	92	57.50
3	High	25	15.60
	Total	**160**	**100.00**

as main livelihood occupation, while young age group involved in educational activities and the older group were interested in traditional farm activities. These results are in conformity with findings of Tholkappian and Kumar (2014).

Majority (60.60%) of the respondents were women and only 39.4 per cent of respondents were men. The probable reason for this trend is due to the fact that, most of the activities such as cleaning of animal sheds, preparation of feed, offering water to animals, cleaning of utensils and preparation of cow dung cakes were entirely dominated by female respondents. Similarly, the male dominated activities were taking animals to hospital, purchase of concentrates and sale of milk. These results are in conformity with findings reported by Rathod *et al.*, (2011) and Ram *et al.*, (2016).

The probable reason for majority of farmers to possess high school education is due to lack of facilities for college education at village level. To acquire college education they had to travel to surrounding towns/cities resulting in increase of the economic burden on the family. Similar results were reported by Chauhan *et al.*, (2015).

Medium experience in dairy enterprise by majority of the respondents is due to option for dairying as an allied profession along with agriculture. The range of experience i.e., 11-20 years shows the importance of dairying in sustaining their livelihood activities and has become an integral part of their daily occupation. The findings of this study are in the line with the studies of Sharma *et al.*, (2014).

Possession of medium herd size by the dairy farmers indicated that milch animals are providing year round assured income, in view of unpredictable income from agriculture enterprise and inclination of farmers towards entrepreneurship in dairy sector.

These are in the line with the results of Yadav and Grover (2013). Medium annual income of the entrepreneurial dairy farmers is due to the possession of medium herd size by the dairy farmers which has generated moderate income from dairying in weekly and fortnightly intervals. These are in the line with the results of Singh *et al.*, (2016) and Lawrence *et al.*, (2012).

It is clear from the results that majority (74.40%) of the dairy farmers had medium to high level of information seeking behavior. It might be due to the fact that their knowledge levels in profits from dairy enterprise promoted keen interest and high exposure towards improved dairy technologies which had motivated them to seek information for managing their dairy enterprise. The findings contradicted with the findings of Raina *et al.*, (2016).The results indicated that majority respondents hold average level of economic motivation by virtue of which they might not be excelling a profit motive from their dairy farming. At the same time they are at threshold of converting dairy enterprise as an economically viable and sound business unit. These findings are in accordance with the findings of Patel (2013).

Medium level of market orientation could be attributed to possession of education up to secondary school level, medium cosmopoliteness, limited marketing channels and medium extent of knowledge on marketing of milk and milk products. These results are in conformity with the results of Ravindra kumar *et al.*, (2017). Medium risk orientation could be due to the fact that majority of the respondents possessed medium annual income, herd size, cosmopoliteness, knowledge levels and low self-confidence which hindered them from taking up the activities, that involved high risk. These results are in conformity with the results of Mane *et al.*, (2016).

CONCLUSION

Majority of the farmers in the study area belonged to middle age group dominated by women, possessed high school education, medium experience in dairy farming, medium herd size and medium annual income. The psychological variables like information seeking behaviour, economic orientation, market orientation and risk orientation ranged from medium to high level which indicated that the dairy farmers are at threshold of converting dairy enterprise as an economically viable and sound business unit. Therefore, skill and potentiality of entrepreneurship in the dairying can be exploited by well-planned and systematically executed entrepreneurship development programme among the dairy farmers.

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STUDY ON THE PERFORMANCE AND SUITABILITY OF KADAKNATH UNDER BACKYARD POULTRY FARMING IN BANSWARA DISTRICT OF RAJASTHAN

Heera Lal Bugalia*, Lekhu Kumar and Jeewan Ram Jat*****

ABSTRACT

The study present was conducted on Kadaknath birds under backyard poultry rearing in Banswara district of Rajasthan. During the study three blocks were selected from Banswara district randomly. 20 farmers from each block were randomly selected, who having Kadaknath poultry birds (beneficiaries under ARYA project) and rest 20 farmers having native poultry birds (non-beneficiaries) were selected. The impact of training on poultry farming was significantly high and average knowledge score of the trainees increased from 2.98 to 8.84. The performance of dual purpose breed Kadaknath was better than native birds under backyard poultry farming. The overall mean body weight, the mean eggs production were significantly (P?0.05) higher in Kadaknath poultry birds than native birds. The overall mortality rate of Kadaknath poultry birds were significant lower (P?0.05) than native birds. Kadaknath poultry bird is one of the promising dual purpose strains of poultry, which can be popularized in rural areas of Banswara district of Rajasthan.

INTRODUCTION

Backyard poultry farming play an important role in the economic upliftment of poor farmers. Stress free and harmful residue free poultry obtained from backyard poultry farming get a great scope in the availability of quality meat. Poultry sector contributes about 36 per cent of total meat production in India (Department of Animal Husbandry, Dairying and Fisheries, 2018-19). Eggs contribute 3.77 per cent as value output from total livestock rearing. India shares 3.17 per cent of total poultry in the world, (Anonymous, 2018-19). The population of poultry under courtyard system is 317 million (20th census). As per 20th livestock census, there were 80.24 lacs poultry in Rajasthan, from which 30.33 lacs poultry were at backyard and remaining 49.91 lacs were at farm poultry. Generally, in rural areas farmers have been maintaining backyard poultry for income generation, home consumption, gifts and sacrifice for guests. Backyard poultry is a great need to increase the availability of protein food source in rural areas to alleviate protein malnutrition. This can be achieved by adopting poultry farming in small scale in the back yard of rural households or rearing them under intensive farm conditions in small numbers by utilizing locally available, less expensive feed and housing inputs. Backyard poultry is identified as a significant livelihood activity for many poor and landless families and particularly for women who looks for additional income. In traditional backyard poultry farming, farmer rears 5 to 10 indigenous birds which produce only 50 to 60 eggs per year and low meat production. The contribution of backyard poultry is only 11 per cent of total eggs production of the country The present per-capita availability of eggs is 54, while chicken meat consumption is 2.2 kg whereas, the ICMR recommendation is the consumption of 180 eggs and 10.8 kg poultry meat per person per annum (Shekhar and Ranjan, 2020). To increase the income of such family a need was to introduce Kadaknath breed of backyard poultry for livelihood security of poor family. The demand of Kadaknath chicken is growing day by day and spread across most of the Indian states due to their excellent medicinal values.

Hence, the poultry farming has good potential in the state especially in the rural areas to improve the

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socio-economic condition and overcoming protein deficiency. So, that the present study has been undertaken on kadaknath poultry birds under backyard poultry rearing in Banswara district of Rajasthan.

RESEARCH METHODOLOGY

The present study was carried out by the Krishi Vigyan Kendra, Banswara district of Rajasthan. Before start Poultry farming training programmes was organized under ARYA project on different aspects of scientific poultry farming for knowledge upgradation and skill development especially in rural youth. For this purpose Abaapura, Bagidora and Kushalgarh block were selected for backyard poultry distribution under ARYA project during the year 2018-19. 20 farmers from each block were selected randomly making it a total of 60 respondents and 20 farmers of them having Kadaknath poultry (beneficiaries under ARYA project) and rest 20 having Native poultry birds (non-beneficiaries) were selected study. Data were collected with the help of a semi structured interview schedule and through observation. Data so collected, tabulated and analyzed as per standard statistical procedure of Snedecor and Cochran (1994).

RESULTS AND DISCUSSIONS

Knowledge level

The results shows that most of the farmers were unaware and very less number of farmer's was used scientific management practices for poultry rearing. The impact of training was significantly higher and average knowledge score of the trainees increased from 2.98 to 8.84 (out of 10) as given in Table 1. Importance of farmers training for successful poultry farming was also highlighted by earlier workers (Ram *et al.*, 2017, Chatterjee and Rajkumar, 2015, Shekhar *et al.*, 2019).

Growth Performances

Comparative data on body weight of different age groups (0 day to 20 weeks) are presented in Table 2. The average body weights at 0 day, 4 week, 12 week and 20 weeks were recorded as 26.45 ± 0.085, 301.25 ± 1.103, 750.25 ± 0.123 and 1485.15 ± 0.245 gram, respectively in Kadaknath birds and in case of native birds 25.80 ± 0.102, 172.26 ± 1.056, 650.45±0.845 and 1222.75 ± 1.852 gram, respectively. It clearly indicated that the body weights of Kadaknath birds were significantly (P?0.05) higher than the corresponding body weights of native birds. The present findings are in accordance with the report of earlier workers (Khadda *et al.*, 2017 and Singh *et al.*, 2018). The difference in body weights may be due to varied agro-climatic conditions, availability of feeding materials and management practices adopted by the farmers. More or less comparable body weight of native birds at 40 weeks of age is reported by Singh, 1997.

The mean values of day-old, 4th, 8th and 12th week body weight of Kadaknath were presented in Table 2. Day old body weight of Kadaknath was 26.03 ± 0.53 g observed in the present study. In contrary to this study Haunshi *et al.* (2011) reported that higher hatch weight (28.55 ± 0.12) in Kadaknath reared under deep litter system of management. Higher fourth week body weight (344.95 ± 1.22 g) was observed in this study, which is not in agreement with earlier report of Haunshi *et al.* (2011). In the present study, twelfth week body weight of Kadaknath was ranges from 797.54 ± 1.25 to 617.74 ± 1.42 g. Singh *et al.* (2007) reported average 40-week body weight of Kadaknath was 1,407 g. 21.04 26.39 g and 1,555.50 Average body weight Kadaknath at 21 and 52 week of age was 1,303 g, respectively (Mohan *et al.*, 2008).

Production Performances

The average age at sexual maturity in Kadaknath birds and native birds were recorded to be 185.25 ± 1.103 and 205.52 ± 1.965 days, respectively. Low age of sexual maturity 173 and 169 days recorded by Khadda *et al.*, 2017 and Singh *et al.*, 2018. The average egg production of Kadaknath birds and native birds were recorded to be 76.15 ± 0.462 and 52.00 ± 0.640, respectively (Table 3). The average egg production of Kadaknath birds was also significantly (P?0.05) higher than native

Table 1: Knowledge level of farmers regarding poultry farming practices

S.No.	Farm Management Practices	Average Score (Out of 10)	
		Before Training	After Training
1.	Backyard poultry breed, Brooding and Housing	3.65	9.51
2.	Disease Management and Schedule Vaccination and deworming	2.50	8.58
3.	Poultry Nutrition and Feed formulation	4.25	9.65
4.	Bio-securityand sanitation	2.15	8.10
5.	Marketing and waste management	2.35	8.35
	Overall Average Score	2.98	8.84

Table 2. Growth Performances of Kadaknath birds in comparison to native birds

Age of bird	Body Weight (In Gram)	
	Kadaknath Bird	Native Bird
Day old	26.45± 0.085	25.80±0.102
1 Week	85.23±0.182	49.65±1.035
2 Week	125.12±0.245	70.85±0.945
4 Week	301.25±1.103	172.26±1.056
6 Week	450.12±0.256	225.42±2.045
8 Week	575.14±0.202	380.25±1.521
10 Week	665.30±0.098	508.25±0.564
12 Week	750.25±0.123	650.45±0.845
20 Week	1485.15±0.245	1222.75±1.852

Table 3. Production Performances of Kadaknath birds in comparison to native bird

Quantitative traits	Kadaknath Bird	Native Bird
Age at Sexual Maturity (Days)	185.25 ± 1.103	205.52 ± 1.965
Egg Production	76.15 ± 0.462	52.00 ± 0.640
Average Egg Weight (g)	46.35 ± 1.853	42.50±0.965
Mortality 0 to 4 week (%)	9.75±0.751	17.15±1.090
Mortality 5 to 20 week (%)	7.5±2.065	14.24±1.325
Mortality 21 to –40 week (%)	2.45±0.150	5.56±2.590
Above 40 weeks	1.05±0.089	3.05±0.923

birds, which might be due to different genetic makeup of two groups. In contrast to present findings low egg production of 54.94 and 167.89 was recorded in 40 and 72 weeks, respectively as reported by Khadda *et al.*, 2017. The average egg weights of Kadaknath birds and native birds were 46.35 ± 1.853 and 42.50 ± 0.965 gram, respectively. The mortality rate during 0 to 4, 5 to 20, 21 to 40 and Above 40 weeks of age in Kadaknath birds and in native birds under backyard poultry farming system of rearing is presented in the Table 3. There was significant ($P \leq 0.05$) low mortality rate in Kadaknath birds as compared to native birds. The results of study indicate that survivability percentage of Kadaknath birds in prevailing agro-climatic conditions of Banswara was well within the standard range 90-95 per cent (Khan, 2008), which may be due to presence of good brooding, timely vaccination, good immune competence, disease resistance, ability to protect from predator and

proper management practices followed by farmers.

CONCLUSION

It is concluded that training was one of the most important tools for knowledge up gradation and skill development among the poultry farmers. The Kadaknath bird was dual purpose strain better performance than native bird. The phonotypical similarity particularly black coloured plumage, better adaptability and protected well from predator of Kadaknath bird, it is well adopted by the farmers of the Banswara district of Rajasthan.

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ROLE OF CSR INITIATIVES IN ENTREPRENEURSHIP AMONG RURAL WOMEN

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ABSTRACT

The Corporate Social Responsibility (CSR) initiatives for most of these companies has revolved around community-based development approach. Many have actively worked towards the economic and social empowerment of women. Some of them have promoted the formation of self help groups which were supported to take up income generating livelihood activities after sufficient training and capacity building. It has been proved that extra income in the hands of women leads to significant and positive changes in human development since it is largely spent on children's education, health and nutrition and is a catalyst for gendering development. The present paper thus aims to see what pivotal role does such initiatives, have been able to play in terms of entrepreneurship in rural women beneficiaries.

INTRODUCTION

The empowerment of women is to gain greater equality with men in other words it is the process to challenge social restrictions and social norms for women which are barriers in the way of their development so that their confidence level can increase and they can also contribute to nation's development and participate in political, social and economic life at the local, regional and national level. This objective can be achieved through CSR in a systematic manner. At present, a number of business houses/ NGOs as well are involved in the SHG formation. But despite the financial support received, studies have shown that many such enterprises have not sustained for long or provided sustainable or decent livelihoods. As studies show, this may be due to non-suitability of the enterprise activity to the area or incorrect choice, failure to market the product or service, lack of cohesion and co-operation among the members. Enterprises which received some type of formal support, particularly in marketing and credit requirements on an average performed better in comparison to stand alone enterprises. Various companies in Rajasthan as well are working towards empowering women since years. An attempt has been made in the present paper to study the sources of motivation, support given under CSR, reasons for taking up an entrepreneurial activity, income earned and contribution in family expenditure by such beneficiaries of selected business houses.

Research Methodology

The present study was conducted in Rajasthan state. Four companies comprising of Hindustan Zinc Limited (HZL), Chambal Fertilisers and Chemicals Limited (CFCL), JK Lakshmi Cement Limited (JKCL) and Shree Cement Limited (SCL) were purposively selected on the basis of their activities focusing on empowerment of rural women. From each company 60 rural women beneficiaries of CSR initiatives were randomly selected to make a total sample of 240. Out of the total sample 100 per cent (n1=60) of HZL, 20 per cent (n2=12) of CFCL, 35 per cent (n3=21) and 21.66 per cent (n4= 13) of SCL beneficiaries (Total sample n=106) started some sort of group or individual enterprise. The research tool was administered only on those 106 beneficiaries. Data were collected using interview schedule and frequency, percentage, mean weighted score and kendall's coefficient of concordance was used to analyze the data.

RESULTS AND DISCUSSION

It was observed during the collection of data that all the four selected companies worked for women empowerment under CSR by organizing the women

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into Self Help Groups. These SHGs were involved in thrift, savings and interloaning. Entrepreneurial trainings on stitching, embroidery, beauty parlour, food processing were given to these groups from time to time, so that they can take up these activities to generate income and become economically independent.

Sources of motivation for starting the enterprise

Motivation is necessary for mobilizing the rural women if any programme is to succeed. A motive is some inner drive, impulse or intention. Motivation is providing with a motive. It is a process of initiating a purposeful action. There are different sources which motivates a woman to start an enterprise. The response for different sources of motivation was measured on five point continuum of no, least, less, average and high. Data in the table illustrates that respondents from HZL and JKCL ranked CSR perssonnels, self and friends as the important sources of motivation in order of their preference, whereas the respondents from CFCL and SCL pointed self, family members and CSR perssonnel as their important sources of motivation. Beneficiaries of CFCL and JKCL were motivated least by relatives (Rank V) and neighbours (VI), while family members were least motivators of the respondents from HZL.

Kendall's coefficient of concordance computed among the different sources of motivation indicated non significant agreement among the response of the beneficiaries of the four companies, which indicate that the respondents differed in their sources of motivation for some it was family and friends and for others it was self or CSR personnel.

Reason of starting the enterprise

The response of the respondents was recorded on five point continuum as not important, least

Table: 1 Rank-wise distribution of sources of motivation of the beneficiaries

n = 106

S.No.	Sources of motivation	Ranks (Mean Weighted Scores)			
		HZL	CFCL	JKCL	SCL
1	Family member				
2	Relatives	VI (0.2)	V (0.16)	V (0.14)	VI (0)
3	Friends	III (2.53)	IV (1.16)	III (2.71)	IV (1.76)
4	Neighbours	IV (1.63)	VI (0.083)	VI (0.18)	V (0.15)
5	CSR perssonnel	I (3.88)	III (1.67)	I (3.90)	III (2.23)
6	Self	II (3.1)	I (3.83)	II (2.19)	I (3.61)

Kc= 0.76 NS

Table: 2 Rank-wise distribution of reason of starting an enterprise by the respondents

n = 106

S.No	Reasons	Mean Weighted Scores			
		HZL	CFCL	JKCL	SCL
1	To earn money for better living	I (3.92)	I (4)	I (4)	I (4)
2	To learn new skill	VII (2.18)	VII (1.75)	IX (1.62)	III (3.15)
3	To become economically independent	II (3.83)	VI (1.85)	II (3.19)	VI (2.53)
4	To improve status in the family	V (2.6)	II (3.92)	III (3.14)	II (3.23)
5	To earn respect from outsiders	IV (2.93)	V (1.92)	V (2.76)	VIII (2.30)
6	To have better household assets	VI (2.48)	III (3.5)	IV (2.95)	IV (2.77)
7	To come out of four walls of house	VIII (1.95)	VIII (1.25)	VII (2.19)	IX (2.23)
8	To save for future	III (3.05)	IV (3.17)	VI (2.57)	V (2.69)
9	Under persuasion	IX (0.43)	IX (0.92)	VIII (1.71)	VII (2.46)

Kc = 0.30* Significant at 5% level of significance

important, less important, important and most important. Perusal of the Table 2 indicates that to earn money for better living was the most preferred reason of starting an enterprise by the beneficiaries of all the four companies. To become economically independent was ranked II in order of preference by both respondents from HZL and JKCL, whereas to improve the status of the family was also a preferred reason by the beneficiaries of CFCL (Rank II), SCL (Rank II) and JKCL (Rank III). Some other important reasons were to have better household assets and to save for the future and to learn new skills. Reasons like to come out of the four walls of the house and starting the enterprise under persuasion were lesser preferred reasons by the respondents. It can be inferred that reasons related to economic benefit acted as an impetus to start an enterprise. The findings are in conformity with Shukla and Dayal (2013) who reported want of economic independence, and providing comfortable life to family members were the major sources of motivation by the respondents.

Kendall's coefficient of concordance was computed to know the significance of correlation among ranking of different reasons by the beneficiaries. It was found to be significant among the beneficiaries of the four companies which indicate similar reasons for starting the enterprise.

Support given under CSR activities of the selected private companies

Respondents were asked to specify the support given to them under CSR initiatives. The data in Table 3 reveals that out of the total respondents who started their enterprise after receiving trainings, majority of the respondents (95.28%) reported guidance and technical know how as the major support provided by the companies. In case of HZL, all the respondents reported establishment of market links, providing of raw material and upgrading and training of new skill as support received under CSR initiatives, whereas none of the respondents from CFCL and SCL reported the same. Input support in the form of sewing machine, cattle was reported by beneficiaries of CFCL (41.67%), JKCL (14.29%) and SCL (23.07%).

Monthly earnings of the respondents

The perusal of the Table 4 reveals that one third of the total beneficiaries (31.13%) earned 3001-5000 monthly, followed by 20.75 per cent earning ?5001-?7000, 16.68 per cent earning ?9001-?11000 and 15.09 per cent earning ?7001- ?9000 per month. Study by Sarmah and Das (2012) reported alike that women started some income generating activities after joining SHGs which helped in improving their incomes.

Table: 3 Distribution of the beneficiaries on the basis of support given by CSR

n = 106

S. No.	Support under CSR*	f (%)				
		HZL (n_1=60)	CFCL (n_2=12)	JKCL (n_3=21)	SCL (n_4=13)	Total (n=106)
1	Establishment of financial linkage with banks	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2	Provision of funding through company	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
3	Input support (Sewing machines, cattle)	0 (0)	5 (41.67)	3 (14.29)	3 (23.07)	6 (5.67)
3	Guidance in technical know how	60 (100)	7 (58.33)	21 (100)	13 (100)	101 (95.28)
5	Upgrading and training in new skills	60 (100)	0 (0)	0 (0)	0 (0)	60 (56.60)
6	Establishment of market links	60 (100)	0 (0)	10 (47.62)	0 (0)	70 (66.03)
7	Providing raw materials	60 (100)	0 (0)	10 (47.62)	0 (0)	70 (66.03)

*Multiple responses

Contribution in family expenditure

The different aspects of expenditure were rated on three point continuum as no, to some extent and to great extent. The rank-wise distribution of the MWS reveals that all the beneficiaries ranked Food (Rank I) and Education (Rank II) as the important aspect where they spent the income earned followed by clothing ranked as III (HZL,JKCL,SCL) and IV (CFCL). Kendall's coefficient of concordance calculated revealed non significant difference. Food and clothing are often considered as the basic essentiality of an individual, thus the respondents prioritize these aspects but it is also very encouraging to note that share of expenditure towards education is also increasing which shows the respondents zeal to provide a better future for their children. Similar results were reported by Yadava (2009) who reported that women utilized the money earned to fulfill their family requirement viz. food, clothing, health and maintenance of house.

Satisfaction from the enterprise selected

Data presented in Table 6 show that nearly half of the total respondents were satisfied with their income while the remaining half wanted to expand their enterprise. Close observation of the table shows that majority of HZL beneficiaries (75%) were satisfied compared to majority of beneficiaries of CFCL (58.33%), JKCL (85.71%) and SCL

Table 4: Distribution of the beneficiaries on the basis of monthly earnings from enterprise

n = 106

S. No.	Monthly earnings (In Rupees)	f (%)				
		HZL (n_1=60)	CFCL (n_2=12)	JKCL (n_3=21)	SCL (n_4=13)	Total (n=106)
1	1000-3000	0 (0)	0 (0)	6 (28.27)	3 (23.07)	9 (8.49)
2	3001-5000	11 (18.33)	5 (41.66)	12 (57.14)	5 (38.46)	33 (31.13)
3	5001-7000	13 (21.66)	2 (16.66)	3 (14.28)	4 (30.76)	22 (20.75)
4	7001-9000	13 (21.66)	2 (16.66)	0 (0)	1 (7.69)	16 (15.09)
5	9001-11000	17 (28.33)	1 (8.33)	0 (0)	0 (0)	18 (16.68)
6	11001-13000	4 (6.66)	2 (16.66)	0 (0)	0 (0)	6 (5.66)
7	13001-15000	2 (3.33)	0 (0)	0 (0)	0 (0)	2 (1.88)

Table: 5 Rankwise distribution of contribution in family expenditure by the beneficiaries

n = 106

S. No	Aspects	Ranks (Mean Weighted Scores)			
		HZL	CFCL	JKCL	SCL
1	Education	II (1.58)	II (1.42)	II (1.62)	II (1.69)
2	Clothing	III (1.48)	IV (1.17)	III (1)	III (1.38)
3	Food	I (1.88)	I (1.58)	I (1.67)	I (1.77)
4	Purchase of household assets	IV (0.95)	V (0.75)	IV (0.52)	IV (0.69)
5	Purchase of productive assets	V (0.27)	III (1.19)	V (0.48)	V (0.61)
6	Medical expenses	VI (0.25)	VI (0.67)	VI (0.19)	VI (0.38)

Kc = 0.93 NS

Table: 6 Distribution of the beneficiaries on the basis of satisfaction with the income

n = 106

S. No.	Satisfaction	f (%)				
		HZL (n_1=60)	CFCL (n_2=12)	JKCL (n_3=21)	SCL (n_4=13)	Total (n=106)
1	Satisfied	45 (75)	5 (41.66)	3 (14.28)	3 (23.07)	56 (52.83)
2	Desire to expand the enterprise	15 (25)	7 (58.33)	18 (85.71)	10 (76.92)	50 (47.16)

(76.92%) who wanted to expand their enterprise. Probe into the matter revealed that at HZL the beneficiaries had fixed source of regular income and were unaffected by demand or supply issues or problems of marketing, whereas the beneficiaries from other companies were dependent on the market and worked only on orders.

CONCLUSION

From the above results it can be concluded that Hindustan Zinc Limited, Chambal Fertilizers and Chemicals Limited, J.K. Lakshmi Cement Limited and Shree Cement Limited Played a significant role in entrepreneurship development among the rural women in the study area.

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KNOWLEDGE LEVEL OF MANGO ORCHARDIST ABOUT ILL EFFECT OF PESTICIDES & CHEMICAL FERTILIZERS

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ABSTRACT

The present study was conducted in Ratnagiri & Sindhudurg districts of south Konkan in Maharashtra to study the knowledge level of mango orchardist about ill effect of pesticides & chemical fertilizers. Knowledge about ill effects of pesticides and chemical fertilizers indicated that 72 per cent of the respondents were in the 'medium' knowledge group, while 19 per cent and 9 per cent of the respondents were in 'low' and 'high' knowledge, respectively. On an average, the knowledge score about ill effects of pesticide and chemical fertilizers among mango orchardists was 9.31 indicating medium knowledge of ill effects. It also reveals that there is association between knowledge level about ill effects of pesticides & chemical fertilizers and adoption of eco-friendly management practices of mango. It is therefore recommended that the concern agencies should consider the findings in planning the policy for eco-friendly mango as mango commodity is foreign exchange earner.

INTRODUCTION

Ill effects incorporates the technology which do have adverse ill effect of chemicals, their adverse effect on human health, toxicity to animals, hazard to environment, resistance developed by pest etc. Residual toxicity is the major problem of agriculture chemicals, many of the chemicals that are toxic to pests, are toxic to human beings also and their admixture in the food may cause nerve and bone malformation in addition to blood clotting. Unlike the slow release of nitrogen from organic source, the chemical fertilizer like urea releases nitrogen to the crops abundantly within a short span of time and the excess ammonia can cause infant disease methamoglobinemia. Even animals feedings on fodder supplied with excess urea can experience hair fall and skin disease. Amines produced due to high intake of chemical nitrogen may cause carcinogenic effects on human beings. Most of the pesticides and herbicides are poisonous to nervous and respiratory system apart from upsetting gastro intestinal system of human beings. If these chemicals are not denatured before the food is being used for consumption, they are prone to affect human beings. The chemicals can also pollute the drinking water supply and cause bone abnormalities. Industries producing these chemicals and fertilizers pollute the atmosphere by releasing toxic fumes which are bound to affect the ozone layer. Knowledge about these ill effect play important role in adoption and non adoption of various technologies.

Looking into above consideration the study entitled 'Knowledge level of mango orchardist about ill effect of pesticides & chemical fertilizers' was conducted with following objectives.

1. To study Knowledge level of mango orchardist about ill effect of pesticides & chemical fertilizers.
2. To study the association between knowledge level of mango orchardists about ill effects of pesticides & chemical fertilizers and adoption of eco-friendly management practices of mango.

RESEARCH METHODOLOGY

The present study was conducted in Ratnagiri & Sindhudurg districts of south Konkan in Maharashtra. These districts were selected

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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 were 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 200 farmers (100 small and 100 big orchardists) were included in the sample study. Scale developed by Pawar (2011) was used with necessary modifications

RESULTS AND DISCUSSION

1. Knowledge level of mango orchardists about ill effect of pesticides & chemical fertilizers

The results regarding distribution of respondents according to knowledge about ill effects of pesticides and chemical fertilizers is given in Table 1.

The data in table 1 regarding knowledge about ill effects of pesticides and chemical fertilizers indicated that 72 per cent of the respondents were in the 'medium' knowledge group, while 19 per cent and 9 per cent of the respondents were in 'low' and 'high' knowledge, respectively. On an average, the knowledge score about ill effects of pesticide and chemical fertilizers among mango orchardists was 9.31 indicating medium knowledge of ill effects.

In case of small orchardists 73 per cent respondents were having 'medium' level of knowledge, while 24 per cent and 3 per cent respondents were having 'low' and 'high' knowledge level about ill effects. Whereas, in case of big orchardists, 71 per cent, 15 per cent and 14 per cent respondents were having 'medium', 'high' and 'low' knowledge level about ill effects of pesticides and chemical fertilizers, respectively.

The findings are similar with the finding of Shashidhara (2006) who revealed that 65 per cent respondents having 'medium' knowledge level, while 21.25 per cent and 13.75 per cent respondents were having 'high' and 'low' knowledge level about ill effects of agricultural chemicals, respectively. Thus, findings were also supported with findings of Pawar (2011).

2. Association between knowledge level of ill effects of pesticides and chemical fertilizers and adoption of eco-friendly management practices

The results regarding association between

Table 1 : Distribution of respondents on the basis of knowledge about ill effects of pesticides and chemical fertilizers

S. No	Level of knowledge about ill effects of pesticides and chemical fertilizers	Small orchardists		Big orchardists		Total (n = 200)	
		F	%	F	%	F	%
1.	Low (< 7)	24	24.00	14	14.00	38	19.00
2.	Medium (7 to 12)	73	73.00	71	71.00	144	72.00
3.	High (> 12)	3	3.00	15	15.00	18	9.00
	Total	**100**	**100.00**	**100**	**100.00**	**200**	**100.00**
	Average (score)	**8.7**		**9.92**		**9.31**	

F = Frequency,%= Percentage

Table 2 : Association between knowledge level of ill effects of pesticides and chemical fertilizers and adoption of eco-friendly management practices of mango

S. No.	Knowledge of ill effects of pesticides and chemical fertilizers	Adoption level			Total (n = 200)	Chi-square value
		Low	Medium	High		
1.	Low	5(13.18)[1] (21.74)[2]	20(52.63) (14.10)	13(34.21) (36.11)	**38(100) (19.00)**	**17.54 ****
2.	Medium	17(11.81) (73.91)	111(77.08) (78.72)	16(11.11) (44.44)	**144(100) (72.00)**	
3.	High	1(5.56) (4.35)	10(55.56) (7.09)	7(38.89) (19.44)	**18(100) (9.00)**	
	Total	**23(11.50) (100)**	**141 (70.50) (100)**	**36(18.00) (100)**	**200 (100) (100)**	

** = Significant at 1 per cent level of significance
1 = Percentage of row 2 = Percentage of column

knowledge level of ill effects of pesticides and chemical fertilizers and adoption of eco-friendly management practices is given in table 2.

It was noted from the Table 2 that out of 38 mango growers from the low group, 20 (52.63%) had medium level of adoption, while 13 (34.21%) and 5 (13.18%) mango growers were found to be in low and high level of adoption group, respectively. In medium group, 111 (77.08%), 17 (11.81%) and 16 (11.11%) respondents possessed medium, low and high adoption level, respectively. In case of high group, 10 (55.56%), 7 (38.89%) and 1(5.56%) mango growers were reported in medium, high and low level of adoption, respectively about eco-friendly mango.

The analysis of Table 2 shows that the calculated chi-square value (17.54) is greater than its tabulated value of 1 per cent level of significance and 4 degrees of freedom. Therefore, null hypothesis (NH013) entitled 'there is association between knowledge level about ill effects of pesticides and chemical fertilizers and adoption of mango cultivation technology' was rejected and alternative hypothesis (RH13) was accepted. This reveals that there is association between knowledge level about ill effects of pesticides & chemical fertilizers and adoption of eco-friendly management practices of mango.

CONCLUSION

1. It was concluded that majority (73 %) of the respondents were in the 'medium' knowledge while 19 per cent and 9 per cent of the respondents were in 'low' and 'high' knowledge about ill effects of pesticides and chemical fertilizers, respectively.
2. It was found that knowledge level of ill effects of pesticides and chemical fertilizers were significantly associated with adoption of eco-friendly management practices.

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EFFECT OF SUPPLEMENTATION OF PROBIOTIC AND PREBIOTIC ON GROWTH PERFORMANCE AND ECONOMICS OF PRATAPDHAN CHICKEN

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ABSTRACT

The present study was undertaken to evaluate the effect of supplementation of Probiotic and Prebiotic on growth and economics of Pratapdhan Chicken. Ninety four- weeks old Pratapdhan chicks were randomly divided in three dietary treatments with 3 replicates of 10 birds each. The experimental groups included T1 control groups (basal diet), T2 basal diet supplemented with Probiotic (Lactobacillus acidophilus @ 250g /tonne) ,T3 basal diet supplemented with Prebiotic (Fructoligosaccharide FOS @ 0.05%). Body weights were measured at weekly interval from 4th to 16th weeks of age and weekly body weight gains were calculated. Economics of Pratapdhan chicks fed diet supplemented with probiotic and prebiotic were measured at the end of experimental trial. The overall body weight gain was significantly ($P<0.05$) higher in dietary group supplemented with probiotic as compared to other treatment groups. The supplementation of prebiotic in the diet had also higher ($P<0.05$) overall body weight gain as compared to control group. The benefit cost ratio was significantly ($P<0.05$) higher in group fed probiotic supplemented diet as compared to other dietary treatments.

INTRODUCTION

The total poultry in the country is 851.81 million which has registered an increase of 16.8% in 20th Livestock Census (BAHS, 2019). The total birds in the backyard poultry in the country is 317.07 million. The backyard poultry has increased by around 46% as compared to previous Census. The total commercial poultry in the country is 534.74 million in 2019 which has increased by 4.5% our previous Census. Pratapdhan chicken is dual-purpose (Eggs and Meat production) breeds of rural poultry production developed at MPUAT, Udaipur and this chicken are mostly suitable for backyard poultry farming.

The sub-therapeutic and indiscriminate uses of antibiotics to enhance growth and presentation and treatment of diseases have led to a problem of drug residues in animal product and emerge of new antibiotic resistance. There is new emerging concept of feeding of probitotic and prebitoitc in the diets of poultry for better health and productivity. Probiotic are live microorganism which were health beneficial for the host when used applicable and regulated quantity. Probiotic microorganism can modulate balance and activities of gastrointestinal microbiota, whose role is fundamental to gut homeostasis, (Durand and Durand, 2010).Use of probiotic and prebiotic feed supplementation that can improve the growth performance and protect chickens from microbial infection, (Ohiman and Ofongo, 2012). Prebiotic are non-digestible feed supplementation that metabolized by specific intestine microbiota and improve the health of host. They act through mechanism such as providing nutrients, preventing from pathogens, affecting gut morphological structure and modulation of intestinal microbiota, (Pourabedin and Zhao, 2015). Probiotic and prebiotic have potential feed additives that used for improved the gut health, immune system and

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microbiota by various mechanism that is like antibacterial, competitive exclusion(CE) and immune-modulatory properties of prebiotic and probiotic (Adhikari and Kim, 2017).

The information on feeding probitiotc and prebitotic in birds developed for backyard is very scarce. Therefore, the present investigation was undertaken to study the effect of supplementation of probiotic and prebiotic on growth performance and economics of Pratapdhan chicken.

RESEARCH METHODOLOGY

Ninety four- weeks old Pratapdhan chicks were randomly divided in three dietary treatments with 3 replicates of 10 birds each. The birds were wing banded and weighed individually at the beginning of the experiment and at weekly intervals from 4^{th} to 16^{th} weeks of age. The experimental groups included T1 control groups (basal diet), T2 basal diet supplemented with Probiotic (Lactobacillus acidophilus @ 250g /tonne) ,T3 basal diet supplemented with Prebiotic (Fructoligosaccharide FOS @ 0.05%). All the chicks were reared in deep litter housing under intensive system.

The Pratapdhan chicks from fourth weeks were fed chick feed and were fed grower feed from ninth weeks to sixteen weeks of age. The ingredient and nutrient composition of experimental diets are presented in Table-1.

Body weights were measured at weekly interval from 4^{th} to 16^{th} weeks of age and weekly body weight gains were calculated by live weight of previous week from that of current week in grams as BWG 5-4), BWG(6-5) etc.

Weekly body weight gain (g) = Current week body weight (g) - Previous week body weight (g)

The economics of supplementation of diets of Pratapdhan chicken was calculated at the end of the experiment i.e. at 16^{th} weeks of age by taking into consideration the feed cost and returns from the sale of birds. The benefit cost ratio was estimated as under

B:C Ratio = Total return (Rs) / Total cost (Rs)

The data were analysed in using analysis of variance as per Snedecor and Cochran (1994)

Table 1: Ingredient and nutrient composition of experimental diets

Feed ingredients	**Feed composition for chick ration (Kg /100 kg)**			**Feed composition for grower ration (Kg /100 kg)**		
	T_1	**T_2**	**T_3**	**T_1**	**T_2**	**T_3**
Maize	55	55	55	44	44	44
Soya cake	33	33	33	21	21	21
DoRB	10	10	10	32	32	32
DCP	2	2	2	3	3	3
Probiotic(*Lactobacillusacidophilus*)	-	25g	-	-	25g	-
Prebiotic(Fructoligosaccharide,FOS)	-	-	50g	-	-	50g
NutrientComposition						
Moisture (%)	9.58	9.62	9.40	9.58	9.62	9.40
Dry matter %	90.42	90.38	90.60	90.42	90.38	90.60
Crude protein (%)	21.5	21.22	21.47	17.5	17.22	17.47
Total Ether (%)	6.90	7.03	6.93	6.90	7.03	6.93
Total Fat (%)	3.93	2.63	3.06	3.93	2.63	3.06
Crude Fiber (%)	5.56	5.53	5.44	5.56	5.53	5.44
Nitrogen freeextract	62.12	63.60	63.10	66.12	67.60	67.10
Metabolizable energy (Kcal/kg)	2900	2900	2900	2600	2600	2600

RESULTS AND DISCUSSION

The data pertaining to weekly body weight gains are presented in Table-2.

Table 2: The body weight gain (g) of Pratapdhan chicken

Weeks	Treatments				
	T_1	T_2	T_3	SEm±	CD at 5 %
5th	32.20[b] ±4.15	34.35[a] ±2.10	39.43[a] ±1.44	2.567	7.908
6th	35.20 ±3.37	39.96 ±4.26	47.76 ±7.96	4.471	NS
7th	44.20[b] ±2.70	58.94[a] ±5.61	54.64[a] ±3.33	2.579	7.947
8th	47.18 ±5.08	63.67 ±8.66	61.77 ±7.06	5.690	NS
9th	56.49[c] ±3.91	74.36[b] ±2.65	93.29[a] ±0.99	3.365	10.369
10th	50.15[b] ±4.35	80.04[a] ±2.81	91.57[a] ±3.78	5.170	15.931
11th	129.83[b] ±5.27	149.26[a] ±3.76	151.46[a] ±4.55	5.190	15.991
12th	56.41[a] ±5.35	87.39[a] ±11.76	63.88[a] ±7.65	10.084	NS
13th	128.89[b] ±1.00	170.24[a] ±9.42	126.58[b] ±7.42	7.394	22.784
14th	111.99[b] ±22.40	141.10[a] ±11.77	112.93[b] ±10.77	6.523	20.098
15th	157.41[a] ±19.00	145.33[a] ±1.13	103.51[b] ±10.30	9.199	28.344
16th	168.06 ±13.03	175.60 ±19.23	140.51 ±8.14	11.631	NS
Overall gain	1018.05[c] ±8.89	1220.27[a] ±11.54	1087.38[b] ±1.78	7.539	23.229

The data pertaining to body weight gain showed significant difference among treatment at 5th to 16th weeks of age except 6th ,8th ,12th and 16th weeks, on which it was found non-significant. The overall body weight gain at 16th week of age was significantly highest at 1220.27±11.54 g in T2 (Probiotics) followed by 1087.38±1.78 g in T3 (Prebiotics) treatment and lowest in control 1018.05±8.89 g. Cesare *et al.* (2017) reported that Lactobacillus acidophilus supplementation produced a significant beneficial effect on body weight gain between 15-28 day in broiler which is similar to results obtained in present study. Murry *et al.*(2006) observed higher body weight gain on supplementation of probiotic containing Lactobacillus in broiler chicken. Kabir (2009) has also found that probiotic significantly improved body weight in broiler chicken.

The use of prebiotic has significantly improved body weight gain (Xu *et al.* ,2003) Similarly, Williams *et al.* (2008) have also observed that supplementation of FOS significantly increased average daily body weight gain of broilers. Hanning *et al.* (2012) and Shang and Kim (2017) observed higher final body weight in broiler chicken fed prebiotic. The results obtained in present study corroborated the findings of above workers.

The data pertaining to economics of Pratapdhan chicken is presented in Table-3.

The feed intake was significantly higher in T1 as compared to rest of the treatment groups. The difference in feed intake between T2 and T3 was found non-significant. Feed cost was significantly higher in T2 and T3 as compared to control group. The difference between T2 and T3was found non-

Table 3. The Economics of Pratapdhan chicken

Treatments	T_1	T_2	T_3	SEm±	CD at 5 %
Feed intake kg/Birds	4.25^{a} ±0.08	3.81^{b} ±0.04	3.81^{b} ±0.07	0.052	0.161
Feed cost with supp. (Rs/Birds)	^{b} 106.46 ±1.22	^{a} 112.53 ±0.87	^{a} 110.62 ±0.42	107.64 ±1.36	111.82 ±2.58
Total cost (Rs/Birds)	117.10^{b} ±1.35	123.79^{a} ±0.95	121.68^{a} ±0.47	1.354	4.173
Weight gain g/bird	1018.05^{c} ±8.89	1220.27^{a} ±11.54	1087.38^{b} ±1.78	7.539	23.229
Total return (Rs/Birds)	254.51^{c} ±2.22	305.06^{a} ±2.88	271.84^{b} ±0.44	1.885	5.807
B: C ratio	2.17^{b} ±0.03	2.46^{a} ±0.03	2.23^{b} ±0.00	0.031	0.095

significant. The overall weight gain (g/bird) at 16th week of age was significantly highest in T2 followed by T3 and significantly lowest in T1. Total cost (Rs/bird) was found significantly higher in T2 and T3 as compared to T1. The difference between T2 and T3was found non-significant. Total return (Rs/bird) was found significantly highest in T2 followed by T3 and significantly lowest in T1. Significantly highest B.C ratio was found in T2 as compared to rest of the treatments. The difference between T1 and T3 was found non significant. Omar (2014) concluded that probiotic play important role in improving the economic and productive efficiency of broilers. Jadav *et al.* (2015) reported that feeding of probiotics in broiler chicken is highly beneficial for economic production of poultry. The higher benefit cost ratio in present study is in line with the above findings and may be attributed to better utilization of nutrients.

CONCLUSION

The supplementation of probiotic in the diet of Pratapdhan chicken was found to be beneficial in terms of overall body weight gain and benefit cost ratio.

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UTILITY OF AGRO-ECOTOURISM: A PERCEPTION STUDY

Sreelekshmy S.* and Jayalekshmi G.**

ABSTRACT

The paper outlines the perception of agro-ecotourism operators about the utility of agro- ecotourism in Kerala along with their socio-psychological and economic characteristics like age, years of operation, innovativeness, economic motivation, creativity and farm waste disposal behaviour. The study was conducted in three districts of Kerala namely Alappuzha, Idukki and Wayanad, with the sample size 90 agro-ecotourism operators. These districts were identified as the major agro-ecotourism destinations in Kerala. Results indicate medium level of perception regarding utility of agro-ecotourism. The study implies that increase in economic motivation and innovativeness led to increase in perception of agro-ecotourism operators towards the utility of agro-ecotourism.

INTRODUCTION

Alternative forms of agriculture have been evolving as a result of crisis in intensive agriculture on a global level. Dairying, poultry farming, mushroom cultivation, apiculture are some allied activities which supports agriculture. Besides, farmers are now willing to try new methods away from the traditional and established practices to communicate with consumers directly and to gain additional revenue. Agro-ecotourism is one of such activity, which can bring extra revenue to the farm.

Sustainable economic development can be achieved through agriculture and tourism. Combining both agriculture and tourism as a single enterprise provides a framework of multi-functionality and creates diversity. Agro-ecotourism is a relatively new tourism product in Kerala. Being an agriculturally dominant state with various tourism destinations, Kerala has tremendous potential for developing agro-ecotourism on a large scale without much extra investment. Agro-ecotourism is a reliable way for farm diversification, to obtain supplementary income, to protect landscape and to promote agricultural and other local products.

The following study was conducted among the selected agro-ecotourism units in Alappuzha, Idukki and Wayanad districts of Kerala, which were identified as the major agro- ecotourism destinations. The aim of the study was to understand the perception of agro- ecotourism operators regarding the utility of agro-ecotourism, along with their social, psychological and economic characteristics like age, years of operation of the agro- ecotourism unit, innovativeness, economic motivation, creativity and farm waste disposal behaviour.

RESEARCH METHODOLOGY

Thirty agro-ecotourism operators each were selected from Alappuzha, Idukki and Wayanad districts of Kerala for the study thus making a sample size of 90. Perception on utility of agro-ecotourism is operationalized as the awareness of operators about the various features of agro-ecotourism. This variable was measured with the help of selected statements from the scale developed by Tew and Barbieri (2009). The total number of statements from the scale was fifteen. Operator's responses were rated with the help of a five point continuum namely, extremely important, very important, important, somewhat important and not important with respective scores of 5, 4, 3, 2 and 1. Similar pattern was followed to study the other selected variables like age, years of operation, innovativeness, economic motivation, creativity and farm waste disposal behaviour. The scoring range was between

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15 and 75. The data thus collected was statistically analyzed using the following statistical tools.

Categorization

Mean and standard deviation was calculated for the dependent variable and independent variables. The respondents were categorized into low, medium and high and their frequency and percentage were calculated.

Frequency and percentage analysis

Frequency and percentage analysis are simple statistical tools used to carry out comparisons. The frequency multiplied by 100 and divided by the total sample size gives the percentage.

Simple Correlation Analysis

This analysis was carried out to establish the relationship between the selected dependent and independent variables. The significance of their relation was also checked at 5 per cent and 10 per cent. Collected data was analysed with the above tools to reach the obtained results.

RESULTS AND DISCUSSION

As mentioned above, agro-ecotourism operator's perception on the utility of agro- ecotourism was operationalized as the operator's awareness about the benefits of various features of agro-ecotourism. This was measured using the scale developed by Barbieri and Tew (2009) with slight modifications and the results are represented in Table 1.

Majority of the respondents (71.11%) were having medium level perception on utility of agro-ecotourism. However, 15.56 per cent of the respondents were having low level of perception and 13.33 per cent of the respondents were having high level of perception. Among the agro-ecotourism operators of Idukki and Wayanad districts, majority of the respondents (73.34%) were having medium level perception, while the remaining respondents showed an equal distribution of 13.33 per cent in both low and high category, in both the districts. However, in Alappuzha district, 66.67 per cent of the respondents were having medium level perception, followed by low (20%) and high (13.33%) level perception.

Majority of the agro-ecotourism operators were belonging to the middle age category (72.22%). However, 12.22 per cent of the operators were belonging to young age category and 15.56 per cent of the operators were coming under old age category. In the case of years of operation of the agro-ecotourism unit, majority of the respondents were coming under medium category (84.44%), whereas 15.56 per cent of the respondents were belonging to higher category. None among the agro-ecotourism operators were in the lower category.

Nearly seventy six percentage (76.66%) of the operators were having medium level of innovativeness which were followed by low (16.67%) and high (6.67%) level of innovativeness. In the case of economic motivation, 94.44 per cent of the operators were belonging to the medium level category, whereas a small proportion of respondents were coming under lower category (5.56%). An important fact of interest identified from the table is that none of the agro-ecotourism operators were having higher economic motivation. While in the case of creativity, nearly eighty eight percentage (87.77%) of the agro- ecotourism operators were having medium level of creativity, followed by high (6.67%) and low (5.56%) creativity.

Farm waste disposal behaviour was operationalized as the extent to which farm wastes were disposed through various methods, with the eco preservation and conservation. It was observed that majority of the agro-ecotourism operators were having medium level of proper farm waste disposal behaviour (52.22%). However, 37.78 per cent of the respondents were belonging to higher category, followed by lower category (10%).

Correlation between the selected six variables with perception was studied and the result is depicted in Table 2.

Innovativeness and economic motivation shows a positive and significant correlation with perception of operators on utility of agro-ecotourism, while, age, years of operation, creativity and farm waste disposal behaviour does not exhibit a significant relationship with perception of agro-ecotourism operators on its utility.

Table 1: Distribution of operators based on their perception on utility of agro- ecotourism.

Category	Alappuzha		Idukki		Wayanad		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Low (<48.87)	6	20	4	13.33	4	13.33	14	15.56
Medium (48.87-61.12)	20	66.67	22	73.34	22	73.34	64	71.11
High (>61.12)	4	13.33	4	13.33	4	13.33	12	13.33
Mean=55 Standard Deviation=6.12								

Mean=55 Standard Deviation=6.12

Table 2: Correlation between perception on utility of agro-ecotourism and independent variables.

Independent variables	r values
Age	-0.1319
Years of operation	0.0461
Innovativeness	0.245**
Economic motivation	0.204**
Creativity	0.007
Farm waste disposal behaviour	0.025

CONCLUSION

The study revealed a medium level perception (71.11%) on the utility of agro- ecotourism. Seventy two percentage (72.2%) of the operators are in the age group of 35-55. Majority of the respondents (84.44%) belongs to medium level category in the case of years of operation. The finding was in line with the findings of Barbieri and Tew (2009) and Pinky (2014). Medium level of innovativeness was seen among the agro-ecotourism operators. The result was in line with the findings of Kumar (2010). Majority of the operators are having a medium level of economic motivation (94.44%) and creativity (87.77%). Economic motivation was found to influence the operators to understand about the utility of agro- ecotourism. This finding was in line with the findings of Pilar et al (2012). Majority of the operators are having medium level of eco-friendly farm waste disposal behaviour (52.22%).

Agro-ecotourism is a supplementary way to generate revenue through diverse forms of direct farm marketing and farm based non-farm business. It has an impact on farmers, community, tourists and the tourism operators. Agro-ecotourism makes the operators successful by providing new customers, better utilization of farm resources, providing off season revenue and assists the community to prosper by educating them about agriculture, creating job opportunity and by enhancing family quality of life.

Various features in an agro-ecotourism unit which attracts tourists differ in accordance with the locations, which refer to various crops grown, geographical factors, transport facility and perception on its utility. So, agro-ecotourism units should be established selectively after proper assessment of the motivation or demand of agri-tourists. Farmers should be made aware about the concept of agro- ecotourism as it will generate additional income and better utilizes the farm in an efficient way.

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A REVIEW PAPER ON HISTORICAL PERSPECTIVES OF PARADIGM SHIFTS IN ECO-AWARENESS

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ABSTRACT

Human was very creative and environmental friendly from ancient time.Beginning of environmentalism started in India from Khejrali.Chipko movement was the first incident in Khejrali, Jodhpur in 1787. After Chipko movement other issues related with environment has been generated like dams construction oppositions, stop mining activities etc. Day by day when population and resources increased environment resources degraded.The general conditions of the environment, the scale and arrangement of land and sea, the availability of resources, and the presence or absence of animals available for domestication, and associated organisms and disease vectors, that makes the development of human cultures possible and even predispose the direction of their development.From ancient time environmental awareness is a common practice for human beings.

INTRODUCTION

In contemporary times, growing industrialization with explosive population growth in several countries has highlighted the problem of protecting the natural environs such as plants, animals, water resources, soils, and metals on a world scale. The interaction between natural environments and the human population is considered an important issue, and is described as the problem of ecology and environment. Ecology as a term was coined in 1869, and is a relatively new science. Till recent times it was treated as a branch of biology but now it considered an independent subject. However, it is closely connected with biology. This subject deals with interaction between various living organisms such as plants, animals, and human beings.

With the emergence of humans, the need for food, shelter, and transport came to the forefront. In ancient times, humans lived on wild produce and hunting birds and animals. However, in the industrial age, the relation of humans with plants and animals has undergone a fundamental change and now many living organisms are preserved through human efforts.

Environment and Human Advance:

The environment has a direct bearing on human efforts. But it would be wrong to think of environmental determinism, for human efforts substantially affect the natural surroundings. Thus, deforestation followed by the production of cereal led to large settlements. On the other hand, changes in climate and river courses led to the desertion of some settlements and migration of populations.

Though there have been no major climatic changes since 9000 BC; on a world scale, there have been some important regional variations. Thus, many scholars of ancient climate hold that extreme aridity and freezing temperature prevailed in Central Asia in the third and the second millennia BC. Towards the turn of the second millennium BC it was bitterly cold. This compelled many people of south Central Asia to move towards the Indian subcontinent in search of a less cold area. This migration is attributed to the speakers of the Indo-Aryan language and the Rig Vedic people.

We cannot think of human advance in ancient times without the exploitation of natural resources. The earliest settlements in India were generally founded near lakes or rivers in hilly, plateau, or wooded areas where people could make stone and bone tools to earn a livelihood. These tools were used for hunting birds and animals, tilling the soil to grow plants and cereals, and also to prepare the

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sites for setting up dwellings.

Surroundings and Settlements:

It was almost impossible to found large agricultural settlements in the Gangetic plains without deforestation and cultivation of the hard alluvial soil. This could be effectively done only with the use of the iron axe and iron ploughshare from about 500 BC. For this, iron mines had to be discovered and the technology for the extraction and the manufacture of iron artifacts had to be developed in various parts of the country.

The hard alluvial soil of the mid-gangetic plains, the red soil of the Vindhyan zone, and the black cotton soil of the Deccan and western India needed iron shares for effective ploughing. Today, safeguarding the natural environment is emphasized. However, despite deforestation, the doab forests continued until the sixteenth to seventeenth centuries when wild animals were hunted in this area. This ecological change was completed only in modern times. In any case, human society progressed at the cost of plants and animals.

Once human beings started growing plants and rearing animals, they multiplied both of them. The location and size of settlements were conditioned by environmental factors, with soil and climatic conditions which determine the selection of sites. Favourable rainy zones with river, lakes, forests, hills, minerals, and fertile soils attracted many settlers. On the other hand, arid, desert areas without water resources discouraged people from settling there.

The Gangetic plains formed an attractive environmental zone. Numerous settlements were established there in the post-500 BC period and quite a number in the earlier period. Many towns were established in the doab and the mid- Gangetic plains. Rivers served as transport routes like the roads and railways of today. When they flooded, they washed away forested banks and prevented the forests from re-growing there. Moreover they irrigated the land thus made available to farmers.

Changes in river courses affected the fortunes of settlements around 2500 BC. The Sarasvati, coterminous with the Ghagar-Hakara, was joined by the Yamuna and the Sutlej, and the three together contributed to the growth of the Harappan culture. However, in 1700 iv,, the Sutlej, and possibly the Yamuna, moved eastward, adversely affecting post-urban Harappan settlements.

The river junctions served as sites for the early settlements. The junctions effectively cleared forests and helped human habitation. This can be said of Pataliputra, the first great city of India. This place lay on the junction of the Ganges and the Son. Not far from the town, the Gandak and the Ghagara too joined the Ganges on the north and the Punpun joined it on the south.

The presence of the rivers on three sides made Pataliputra virtually a water port and helped it to become the first great state capital. Though Pataliputra was located at the junction of the Ganges and Son, later the Son shifted westward. In prehistoric times, Chirand became important because it was located on the junction of the Ganges and the Ghaghara, and sites around it seem to have been forested.

This is indicated by the excavation of Neolithic tools in Chirand. Many of them are made of antler bones which suggest that deer were hunted in the nearby forest. Although rivers were preferred sites for settlement, people also settled near lakes and tanks. We find such sites in eastern UP and northern Bihar in the second millennium BC. The practice of settling near water reservoirs continues to this day.

Human Efforts:

Though the Harappan culture is found in an arid, semi-desert zone, this is attributed to good rainfall. Scientists speak of adequate rainfall in the Harappan area in the third millennium BC. Once the rainfall reverted to its usual level, this adversely affected the Harappan settlements. Plant and animal remains from Inamgaon in Maharashtra suggest the onset of an extremely arid phase around 1000 BC that forced the farmers to desert their homes and take to pastoral nomadism.

Rainfall certainly helped human society in

pursuing agriculture and founding settlements, but heavy rains during the tropical monsoon deterred people from regular work. Gautama Buddha used to suspend his mission of teaching Buddhism annually for four months during the rainy season and stay at such places as Rajagriha, Vaishali, and Shravasti for varsha-vasa.

He is said to have spent twenty-six rainy seasons in Shravasti. This idea still influences some people, and no marriages are performed in the rainy season, but today, unless the institutions are closed or their workers granted leave, people have to continue work despite heavy showers.

Some other natural hazards are far more catastrophic than heavy rainfall. They include floods, hurricanes, and earthquakes. We hear of a famine leading to the migration of some Jainas, in pre-Mauryan times from Magadh to south India. However, the researchers have yet to discover the sources that mention the natural hazards causing famines and other calamities.

Historical background towards the Environment:

In ancient India, rivers came to be regarded as divine. The Rig Veda depicts the Sarasvati as a goddess. However, in post-Vedic times, the Ganga emerges as the mother goddess, and the tradition persists to this day. As both earth and water sustained plants and animals, they came to be considered mothers, though there is nothing to show that plans were devised to protect either of them.

Many trees and plants, including neem, pipal, vat, shami, and tulsi are considered sacred. That is also the case with herbs, including grass. All these are valued because of their medicinal properties, and therefore they are preserved and worshipped. The desire to protect large and small trees is expressed in various ancient texts, and it continues to this day. At the conclusion of large sacrifices and even ordinary rituals, priests and the common worshippers wish peace and prosperity (shanti) to forest trees and plants in general.

More importantly, many ancient texts condemn the slaughter of animals. Gautama Buddha was the first person to stress the need to protect cows in a Pali canonical text called the Suttanipata. He stressed the virtue of rearing cows because in his view cattle help to grow plants and provide people with food, vitality, health and happiness. Hence his injunction that people should not kill cows. In the early Christian centuries, brahmanical texts lent religious colour to the Buddhist teaching, speaking of dire consequences in the next world for those who killed cows. Later, even the elephant came to be worshipped.

A background of ecology and environment may help the study of ancient India, and may be especially useful in the study of our prehistory. However, human society cannot advance by halting man's struggle against nature. In ancient times, this struggle was principally directed against plants and animals.

Once these were brought under control, efforts were made to multiply both of them. History deals primarily with interaction between humans in terms of time and place, but it cannot be correctly constructed unless historians bear in mind the ongoing interaction between human efforts, on the one hand, and the functioning of natural forces, on the other

Ancient India was a knowledge society that contributed a great deal to civilization. We need to recover the status and become a knowledge power. Spirituality must be integrated with education.

In India, traces of environment protection, sustainability can be identified through various sources of ancient Indian literature, where different themes such as preservation, safeguarding and management of the environment.

The Arthashastra gives a demonstration of Kautilya's concern and perception about the living animals, domestic as well as wild animals. Penalties and strict punishments were imposed for injuring these living creatures.

Vedas are considered as sacred Sanskrit texts of Hinduism. According to a few scholars, the great sage Ved Vyasa, codified and put the Vedas into

writing at the beginning of Kali Yuga (3102 BC). These are known as Shruti Vedas,

Later these Vedas became to demonstrate profound knowledge about biodiversity. The Ayurveda depicted the interrelationship between living species and the environment. In nut shell, it can be stated that ancient India was full of concerns and wisdom to preserve ecological balance and protect environment.

Public awareness issues and related organizations

Public awareness of the environment means the ability to emotionally understand the surrounding world, including the laws of the natural environment, sensitivity to all the changes occurring in the environment, understanding of cause and effect relationship between the quality of the environment and human behavior-

- Rachael Carsen wrote a book in 1962 "Silent Spring". In this book wrote about harms of DDT.
- Khejrali in Jodhpur in 1787 - Beginning of modern and Chipko Movement or revival of environmentalisation in India.
- Beginning of environmentalism in India from Khejrali.
- NGO's can take active role in creating awareness from grass root levels to the top-most policy decision maker -

Following NGOs are contributed their role for public awareness about environment:

1) KSSP: Kerala SashtraSahityaParishad 1970. It started silent valley movement "to stop the dam construction in the valley for hydro power production" and conservation of Biodiversity.
2) Dasholi Gram Swaraj Mandal: It was started by Chipko movement. Gauradevi was the leader of chipko movement. Shri SunderlalBahuguna against the U.P. forest officers for saving the trees. They defiled the Government order as Civil disobedience. This took a worldwide form.
3) Tarun Bharat Sangh: Leader Mr. Rajendra Singh "Save Aravalli" movement has been raise in Rajasthan Supreme Court in 1992 closed 400 mines of marble in Sariska.
4) Save Narmada Movement: Under MedhaPatekar against SardarSarovar Project and Narmada Sarovar Project to close down completely. In the start 5000 tribals were uprooted.
5) Tehri Dam Movement: By Sunder lalBahuguna. Against - Himalayas is a fragile ecosystem and highly seismic zone.
6) Appiko Movement: Under PanduramHegde - Against Nuclear power plant in Karnataka.
7) Friends of Doon: It is a biodiversity conservation movement in India. Vandanashive is the head. They stopped mining in Musoorie hill of granite with the order of Supreme Court.
8) ETF (Ecological Task Force): Retired person from the Indian Territorial Army - Planted trees with the help of forest department in Thar Desert one battalion near Indira Gandhi Cannal. ETF have worked in two area one in Mosoorie hills and other in Himalayas for reforestation.

Beginning of environmental education

In 1975, Belgrade Charter which was the beginning of Environmental Education Programme (EEP) by United Nation Environmental Programme (UNEP).

In Belgrade only decision was made that in 1977 in Georgia a global Environmental Education conference was made. More than 100 Head of the states gathered to make out the plan about the education-

Who to be educated?

What to be educated?

How to be educated?

In 1991, Supreme Court made a decision that in all the School and Colleges of India. Environmental Education Programme should be made compulsory. Special books should be written for school level for class I-XII. One hour minimum every day, talk should be about environment and

also there should be field visit.

Who?

(1) Women and Children.

(2) Politician and Burocrates because they are the decision maker.

(3) Technocrats (Engineers, technicians etc. - Execute development programme)

(4) Professionals (Doctors and lawyers etc.)

(5) General mass (Farmers, Industrial Labours, Managers etc.)

What?

(1) Judicious use of 5P's (Paper, Power, Petrol, Plastic and Potable water)

(2) Environmental Ethics - Everyone should get equal opportunities for living.

(3) Environmental Justices - All Sufferers due to environmental disaster or environmental cause should be given proper justice, not only monetary help. Before sighting on Industry, Visualize who is will justify it uses and cause.

(4) Benefits of a tree - 5 P's (Food, Fiber, Fuel, Furniture, Fresh Air)

(5) 3R's Philosophy (Reduction, Reuse and Recycle)

(6) Eco-Tourism

(7) Specific education

(a) Industrialist about - Industrial Waste, Industrial disaster and Air, Noise and Water.

(b) Farmers about - Biofertilizers, Agrochemicals.

(c) EIA and SIA

(d) Environmental friendly habits - Both side use of paper, walk for short distance.

(e) Environmental friendly materials - Use of cotton bags, discourage use of plastic bags.

How?

(1) Books, Periodical, Popular magazines.

(2) Visual aid by televisions, discovery channels, visuals showing ecological disasters and devastations.

(3) Laws and Legislative.

(4) Rallies, street plays and movement.

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8. **Professional Experience** .....
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Place: **Date:** **Signature**

REMARKS

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Indian Journal of Extension Education and Rural Development

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