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EDITORIAL

Dear Frinds,

Greetings

In.....

INDIAN JOURNAL OF EXTENSION EDUCATION

Volume 55

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Training: An Effective Tool for Transfer of Agricultural Technologies

Monika Jaiswal¹, Ajeet Singh², Kartikey Singh³ and Bhupendra Singh⁴

ABSTRACT

Training of farmers and farm women has always been regarded as critical input for the rapid transfer of technologies. The present study was carried in five adopted villages of Krishi Vigyan Kendra, Burhanpur during 2014-15 to 2018-19. Out of over 100 different training programmes organized on various topics like pre sowing techniques, crop management practices, post-harvest management, goatery production and livestock management practices by KVK, Burhanpur during last five years a sample of 500 adult members actively participated in the training programmes was selected. The study revealed that the on campus training was most preferred by majority of the farmers, followed by off campus training programme. The farmers rated one to three days duration training organized during lean period as most preferred training programme for farmers.

Keywords: Training, Preferences, Farmers and Farm women

INTRODUCTION

Various efforts for agriculture and rural development have been made by the government organizations, non government organization and other institutes from pre-independence to the present era. The efforts are mainly concerned to encourage farmers to adopt new agricultural technologies and efficient practices to change their situations for economic prosperity and livelihood security. To impart Vocational training to practicing farmers, farm women and rural youth; in-services training to field level extension workers is taken care by a farm science centre (Krishi Vigyan Kendra) at districts level in India with the aim. These Krishi Vigyan Kendras in addition to dissemination of new technology help inculcate entrepreneurship among the farmers and farm women so that they can establish their own enterprises depending upon the availability of the resources. As such the training has always been the central to the Krishi Vigyan Kendra. Training for farmers has been proven to yield variety of results. Murshed-E-Jahan and Pemsil (2011); Tripp and Hiroshimil (2005); Oreszczyń and Carr (2010); Yang *et*

al. (2008) on their study on Bangladeshi small farmers concluded that building the capacity of farmers through training is more valuable than the provision of financial support in terms of raising production and income. Present paper aims to document the training preferences of Burhanpur farmers and farm women under KVK training programmes. These training programmes were aimed at building the competencies, skills and capabilities of farmers in order to improve their farm practices and productivity in addition to preparing farmers for various entrepreneurial opportunities for improving their economic status.

METHODOLOGY

The study was carried out in adopted villages (Harda, Nimandar, Manjrod, Umarda, Sandas) of Krishi Vigyan Kendra, Burhanpur during 2014-15 to 2018-19. In total 100 different training programmes organized on various topics like Pre sowing techniques, Crop management practices, Post-harvest management, Goatery production and Livestock management practices. Five skill

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development training programmes, 10 rural youth training programmes, 20 Capacity Building training Programme and 65 one day farm and farm women training programmes covering approximately 2500 KVK, Burhanpur trained farmers made the population for the study. A sample of 500 adult members who were actively involved in the training programmes was selected. In order to identify perceived preferences of farmers, the responses of an individual beneficiary were recorded on three point continuum as most preferred, preferred and not preferred with respective scores 3, 2 and 1 by pre tested structured interview schedule. Mean was calculated for each aspect by adding up frequencies and multiplied with respective continuum scores and ranked accordingly.

RESULT AND DISCUSSION

Table 1 revealed that one day farmer and farm women training programme was most preferred by 40.00% farmers followed by rural youth training

programme (18.6%) followed by capacity building training (17.00%) and Skill development training (4.6%). This might be because of the involvement of KVK's farmers in more than one enterprise or activity at a time. Hence, farmers might have preferred one day training programme mostly. This finding was in line with that of Bhagat (1989) who reported the training need for all sectors. Similarly Nain *et al* (2013) concluded that future stress should be on disseminating information regarding income and employment opportunities.

Further, 1-3 days duration training was most preferred by majority (32.60%) whereas 3-5, 5-7 and 7-10 days training were preferred by 31.40, 11.80 and 7.20 per cent, respectively. 10-15 (5.40%) and 15-21 (4.60%) days training programme was least preferred. This could be due to the farmers' involvement in more activities. This finding was in concurrence with that of Khan *et al.* (2011), Nain and Trikha (2009) and Kumar *et al.* (2013) whereas the preferred duration of training varied considerably. As far as season of training programme was concerned, rainy

Table 1: Distribution of the farmers' preferences on various facets of training programmes

Facets of training programmes	Not Preferred (%)	Preferred (%)	Most Preferred (%)
a) Training Type			
One day F & FW training programme	0(0.0)	63 (12.6)	200(40)
Capacity building training programme	2(0.4)	17(3.4)	85(17)
Rural youth training programme	1(0.2)	9(1.8)	93(18.6)
Skill development training programme	1(0.2)	6(1.2)	23(4.6)
b) Venue of training			
On-campus training programme	3(0.6)	48(9.6)	303(60.6)
Off-campus training programme	0(0.0)	39(7.8)	107(21.4)
c) Subject matter for training			
Agronomy	1(0.2)	5(1.0)	63(12.6)
Soil science	2(0.4)	2(0.4)	29(5.8)
Plant protection	0(0.0)	7(1.4)	161(32.2)
Horticulture	2(0.4)	2(0.4)	97(19.4)
Animal husbandry	0(0.0)	6(1.2)	123(24.3)
d) Topics for training			
Pre sowing technique	3(0.6)	23(4.6)	13(2.6)
Crop management practices	0(0.0)	41(8.2)	127(25.4)
Post harvest technology	4(0.8)	21(4.2)	32(6.4)
Goatery production	1(0.2)	32(6.4)	61(12.2)
Livestock management practices	0(0.0)	43(8.6)	99(19.8)

Table 1 contd...

Facets of training programmes		Not Preferred (%)	Preferred (%)	Most Preferred (%)
e) Preferred training method				
Lecture		1 (0.2)	5 (1.0)	23 (4.6)
Lecture with discussion		2 (0.4)	2 (0.4)	59 (11.8)
Lecture with film show		0 (0.0)	7 (1.4)	157 (31.4)
Exposure visit		2 (0.4)	2 (0.4)	27 (5.4)
Exposure visit with film show		0 (0.0)	3 (0.6)	36 (7.2)
Practicals		0 (0.0)	11 (2.2)	163 (32.6)
f) Use of AV-Aids				
Audio aids	Radio	0 (0.0)	5 (1.0)	24 (4.8)
	Audio CD	3 (0.6)	2 (0.4)	22 (4.4)
Video aids	Charts	1 (0.2)	17 (3.4)	12 (2.4)
	Picture	3 (0.6)	12 (2.4)	20 (4.0)
	Models	0 (0.0)	31 (6.2)	22 (4.8)
	Boards	0 (0.0)	11 (2.2)	17 (3.4)
	Literatures	0 (0.0)	41 (8.2)	25 (5.0)
Audio visual aids	Projector	0 (0.0)	17 (3.4)	22 (4.4)
	VCD player	2 (0.4)	21 (4.2)	22 (4.4)
	LED/TV	0 (0.0)	34 (6.8)	31 (6.2)
	Multimedia	0 (0.0)	53 (10.6)	30 (6.0)
g) Preferred frequency				
Weekly		3 (0.6)	23 (4.6)	13 (2.6)
Monthly		0 (0.0)	41 (8.2)	127 (25.4)
Quarterly		4 (0.8)	21 (4.2)	32 (6.4)
Half yearly		1 (0.2)	32 (6.4)	61 (12.2)
Yearly		0 (0.0)	43 (8.6)	99 (19.8)
h) Duration of training programme				
1-3 days		0 (0.0)	11 (2.2)	163 (32.6)
3-5 days		0 (0.0)	7 (1.4)	157 (31.4)
5-7 days		2 (0.4)	2 (0.4)	59 (11.8)
7-10 days		0 (0.0)	3 (0.6)	36 (7.2)
10-15 days		2 (0.4)	2 (0.4)	27 (5.4)
15-21 days		1 (0.2)	5 (1.0)	23 (4.6)
i) Season of training programme				
Summer		1 (0.2)	9 (1.8)	100 (20.0)
Winter		0 (0.0)	30 (6.0)	107 (21.4)
Rainy		2 (0.4)	48 (9.6)	203 (40.6)
j) Preferred period for training programme				
Crop		0 (0.0)	39 (7.8)	107 (21.4)
Lean		3 (0.6)	48 (9.6)	303 (60.6)

season (40.60) was perceived as most preferred season for training, followed by winter season (21.40%) and summer season (20.00%) in the order of preference. Preferring rainy season for undergoing training could be due to the reason that farmers were usually free during this period. This finding was in similar with those of Yang *et al.* (2008) and Tripp *et al.* (2005). Likewise, the lean period (60.60%) was perceived as most preferred period for training followed by crop period (21.40%). Preferring rainy season for undergoing training could be due to the reason that farmers relatively feel free during this period. This finding was in accordance with those of Vimal *et al.* (2013). As far as venue of training programme was concerned, it was revealed that on-campus training was preferred most by 60.60 per cent farmers followed by off-campus training (21.40%). This might be due to non-availability of infrastructural and training material at villages, the farmers prefer training at KVK where physical facilities for imparting training were available. This finding was in accordance with those of Khan *et al.* (2011).

Table further shows that plant protection training was most preferred by 32.20 per cent farmers followed by animal husbandry (24.60%), horticulture (19.40%), agronomy (12.6%) and least preferred on soil science (5.80%). This might be due to disease, insect and pest attack are more a complex issue to handle now a days especially in the era of changing pests and their nature of damage in changing climate arena. Also farmers doesn't want to depend only on crop production but they prefer to diversify through animal production also. This finding was in accordance with those of Kirkpatrick *et al.* (2006). Further, crop management practices training was most preferred by 25.4 per cent farmers followed by livestock management practices (19.80%), goatery production (12.20%), post harvest technology (6.40%) and least preferred on pre sowing techniques (2.60%). This may be because still farmers level of awareness on importance of presowing techniques i.e. land preparation, seed treatment, variety selection, basal dose of fertilizer and soil testing is deficient. The results revealed that practical and lectures with film shows was most preferred method of training by 32.60 and 31.40 per cent

of farmers, whereas lecture with discussion and exposure visit with film show were preferred by 11.80 and 7.20 per cent, respectively. Exposure visit and lectures, was preferred by 5.40 and 4.60 per cent of the farmers, respectively. This could be due to their experience in various farming situations. This finding was in accordance with those of Oreszczyn *et al.* (2010). Also using multiple senses via seeing, hearing and doing was most effective method of training, whereas learn by hearing and doing and learn by doing were preferred by 9.80 and 8.00 %, respectively. Learn by seeing and doing, learn by seeing and hearing and learn by seeing was preferred by 7.20, 5.40 and 4.60 per cent of the farmers, respectively. This could be due to they mostly believe in practical. This findings are well supported by Pharate *et al.* (2010).

AV aids were not preferred by 0.82 farmers whereas preferred and mostly preferred by 22.18 and 22.45. The majority (25.40%) of farmers most preferred to undergo training monthly, followed by yearly (19.8%), half yearly (12.20%), quarterly (6.40) and weekly (2.60%). This might be due to the busy schedule of farmers. This finding was in similar with those of Sudeepkumar *et al.* (1993).

CONCLUSION

The on campus training was most preferred by farmers, followed by off campus training programme. The farmers had chosen Krishi Vigyan Kendra as most preferred venue for training. The farmers rated one to three days duration training as "most preferred", lean period and rainy season was perceived as most preferred time for arranging training programme for farmers. Results also revealed that training has been effective in enabling the farmers to develop their skill, knowledge, attitudes and transfer them to their farm fields. Not only that, the impact of training has also enabled the farmers to do their jobs much faster and easier and that they were highly motivated as well as satisfied with the possession of new skill, knowledge and attitudes.

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Students' Opinion on the Existing Educational Standard – A Study of the University of Horticulture and Forestry (UHF), Nauni- Solan (H.P.)

D.D. Sharma*, Hitesh Gupta, Abhay Bhardwaj and Amit Jharate

ABSTRACT

The study conducted on 100 students randomly selected from under -graduate and post-graduate faculty of Dr. Y.S. Parmar university of Horticulture and Forestry Nauni- Solan (H.P.) revealed that a cordial and good relationship existed between the teachers and the taught as well as male and female students in the university. Overall rating of the students on teaching standard in the university was found to be good. More emphasis on theory, taking theory classes in practical hours, inferiority complex among the students, fast delivery of the lectures by the teachers, unfriendly environment in the class, discouraging students feedback/questioning etc. were some of the main problems/difficulties faced by them. The study implies that the teachers should teach the students as per their learning capability /styles giving more emphasis on practical knowledge rather than the theoretical knowledge besides motivating them to participate in sports, games and other extra- curricular activities in order to further improve the existing education standard in the university. Sincere efforts should also be made to harness the talents of the students by organising various training programmes, workshops, seminars and orientation programmes for them.

Keywords: Congenial, Cordial, Extra-curricular activities, Opinion, Teacher-taught relationship

INTRODUCTION

Education plays a significant role in the life of a person. The ultimate aim of education is to enable an individual to lead a quality life. Hence, one needs to be educated to become a better person, to have a richer life with integrated personality. Teaching aids and equipment's play a pivotal role in effective and efficient role in creating effective teaching learning situation for the students. The experience and knowledge gained by the students can be retained for a longer period of time by use of a variety of audio-video aids in the class. In fact, the students have multi-dimensional personality having different learning styles. Hence, it becomes the moral duty of a teacher to keep pace of his teaching with the learning styles /learning capacities of the students. But, the teachers were found to make less use of this latest education technology and

make their presentation dull and boring without taking any feedback from the students, that is, they remain ignorant about what the students think about them and the problems being faced by them. Keeping this in view, the present study was undertaken to determine students' opinion towards existing education standard and to identify the main problems/ difficulties faced by the students in the present education system.

METHODOLOGY

The study was conducted at Dr. Y.S. Parmar University of Horticulture and Forestry (UHF), Nauni, (Solan) HP. A list of all the B.Sc. (Hons). 3rd year and final year students along with Post-graduate students of both the colleges viz; College of Horticulture and College of Forestry was obtained from the Registrar of the

university. Out of each College, 50 students each from Under-graduate and Post-graduate programme were selected randomly, thus, in all 100 students constituted the sample for the purpose of the present study. The data were collected with the help of well-structured and pre-tested interview schedule/questionnaire.

For the purpose of the present study, education standard in the selected University was operationalised as the students' opinion on the teachers' punctuality, preparedness for class, teaching /communication skills, seeking feedback from the students and creating congenial/friendly environment etc. in the class room. In order to measure the students' opinion towards existing education standard, a likert type scale was developed. The scale consisted of 40 statements, out of which, 27 statements were retained on the basis of "t" value i.e. the statements with "t" value 1.75 or more were retained and rest were rejected, as per the criteria given by Edwards (1948). The students' opinion was taken on five point continuum scale viz, Strongly agree, Agree, Undecided/do not know, Disagree and Strongly disagree with respective scoring of 5,4,3,2 and 1 for the positive statements. The scoring was reversed for negative statements. The respondents' frequency under each column of five point continuum scale was multiplied with their respective score to determine the total score of each respondent. The mean opinion score of the respondents was also calculated. On the basis of the total score and standard deviation, the respondents were divided into the following three opinion categories: Good: ($>\text{Mean} + \text{SD}$), Fair: ($\text{Mean} \pm \text{SD}$) and Poor: ($<\text{Mean} - \text{SD}$).

The main problems faced by the respondents were identified and then their opinion was taken on the degree of seriousness i.e. on the three point continuum scale namely, Most serious, Serious and Not so serious with respective scoring of 3,2 and 1. The frequency under each column of continuum was multiplied with the respective score in order to find out total score of each problem. Each problem was then ranked on the basis of the total score. The percentages of respondents under each three categories of problems were also calculated. The hypotheses were tested by computing various χ^2 tests for their significance. The Data were collected with

the help of well-structured and pre-tested interview schedule / questionnaire.

RESULTS AND DISCUSSION

The socio-personal profile of the respondents has been given in Table 1. It is clear from the Table, a majority of the respondents' (68%) belonged to rural area, female students (59%) and were in the age group of 22 to 26 years. Therefore, the study implies that more and more students from the rural area are taking interest in Agriculture as compared to urban areas.

Table 1: Socio-personal profile of the students (n=100)

Socio-personal traits	F %
Age (In years)	
19-21	12
22-23	46
24-26	34
>26	08
Gender	
Male	41
Female	59
Family Background	
Rural	68
Urban	32
Educational status	
B.Sc (Hons.) III rd year	25
B.Sc (Hons.) IV th year	25
M.Sc / MBA	25
Ph.D	25

On being asked why they have sought admission in a particular programme or discipline, it is evident from the data (Table 2) that good scope and opportunity for job was the prominent reason for taking admission by the students in a particular programme/discipline (41%). There were some other reasons like the discipline or programme being of their interest or passion (37%) and on the advice of their parents, relatives or friends (27%). However, those who stated that it was a forced choice, that is, there was no other alternative left for them were 9 per cent. There were a meagre percentage of those who replied that they sought admission only on the basis of competitive environment in the university concerned.

Table 2: Reasons for seeking admission in particular discipline/programme

Discipline/Programme	F (%)
Good scope/Opportunity for job	41
Discipline/programme was of my interest/my passion	37
On the advice of my parents / relatives / friends	27
Forced choice (as there was no other alternative)	09
Any other (Competitive spirit/ environment)	03

*Multiple responses

Kaur and Shukla (1989) reported that to seek a job in the State Department of Agriculture was the most preferred reason followed by those who wanted to adopt agriculture as a profession.

The respondents were asked about their opinion on the relationship between the teachers and the students. A majority of the respondents perceived Good to Very good relationship between the teachers and the taught. However, there were still 14 per cent of the students who found the relationship as Poor. The overall rating on teacher-taught relationship was found to be 2.85 which indicated that there was good relationship between the teacher and the students at (U.H.F) Nauni Solan. Hence, the study implies that sincere and concerted efforts should be made by the university authorities for improving the relationship between the teachers and the taught by frequently arranging 'get together', excursion visits, picnic etc. These findings were in consonance with those of Sharma *et al.* (2017) who reported that though a majority of students (60%) perceived the teacher-taught relationship as 'Good to very good', yet further efforts are needed to make the relationship more congenial.

Students' opinion on the relationship between male and female students was also studied and the results are

Table 3: Relationship between teachers and taught

Degree of Relationship	F %
Excellent	7
Very Good	18
Good	42
Fair	19
Poor	14
Overall rating (2.85)	Good

presented in Table 4 shows that about three forth of the respondents (72%) perceived the relationship among male and female students at U.H.F Nauni as 'Cordial'. While 18 per cent perceived this relationship as Very cordial. The remaining students found it as 'Not cordial' indicating thereby the need for its further improvement. Overall rating on relationship among genders was found to be 2.08 which indicated that there was a cordial relationship among the male and female students of the University. Those findings were in agreement with those of Sehgal and Sharma (2017).

Table 4: Relationship among genders (male and female students) in the university

Status of relationship	F %
Very Cordial	18
Cordial	72
Not Cordial	10
Overall rating = (2.08)	Cordial

The respondents were asked what they aimed at after the degree programme i.e. their preferences for the job; the response depicted in Table 5 shows that a majority of the respondents (70%) preferred 'Government Job' as their first preference after the completion of the degree programme followed by those who wanted to make their own career in private organization (12%), while 8 per cent aimed at starting their own business/enterprise. However, those who wanted to make civil services, Indian forest services and banking as their careers were found to be 8 per cent. It implies that a majority of the students preferred white collar jobs rather than private or their own business i.e. instead of Job providers they wished to be job seekers. These findings were in conformity with those of Kaur and Shukla (1989) and Sharma *et al.* (2017).

Table 5: Respondent's aim after the degree programme (Preference for the Job)

Aim after the degree programme	F %
Government Job (Professional)	70
Job in any private organization	12
Job in any NGO	02
Own Business/Enterprise	08
Any other (Civil services, IFS, Banking etc.)	08

Table 6: Status of existing education standard in the university

Status	F %
Excellent	6
Very Good	19
Good	44
Fair	19
Poor	12
Overall perceptual rating (2.88)	Good

The opinion of the respondent students was taken on the existing education standard in their university; and the findings are presented in Table 6 and Table 7. A perusal of the data revealed that in all a majority of the

respondents (63%) perceived the existing education standard in their university as '**good**' to '**very good**'. Those who found education standard as 'Excellent' were only 6 per cent. However, there were still 31 per cent respondents who reported that education standard in their universities was 'poor' to 'fair'. Overall perceptual rating was found to be **2.88** indicating good opinion of the students towards the education standard in the university. Therefore, the study implies that sincere steps should be taken by the concerned university authority to further improve the education standard in the university. Khanalave *et al.* (2001) also reported that five elements viz. teacher students, subject matter, teaching aids and

Table 7: Statement-wise opinions of the respondents

S.No.	Statements	MPS
1	The instructors come to the class on time	4.22
2	The instructors come to the class well prepared for delivering the lectures	3.91
3	The instructors speak spontaneously while delivering the lecture (Don't dictate word by word from notes)	3.48
4	Students get notes for xeroxing from their instructors (if desired)	3.80
5	The instructors deliver their lectures in such a manner that students cannot note down them properly	2.75
6	The instructors encourage feedback/questions from the students in the class	3.58
7	The instructors explain/illustrate the concept through examples	3.89
8	The instructors use audio-visual aids like charts, posters, transparencies, LCD projectors etc. in the class	3.90
9	The presentation style of the instructors is monotonous and creates boredom	2.45
10	The instructors cover the course content as per the prescribed syllabus	3.93
11	The instructors don't prescribe any books/references for the syllabus	3.97
12	The instructors summarize the lecture at the end	3.15
13	The instructors respond to any particular point/question being raised/asked in the class at that very moment even if the actual class hour is over	3.78
14	The instructors take theory classes in practical hours to complete the course content	2.39
15	The instructors give more emphasis on the theory rather than practical knowledge in practical classes	2.45
16	The discussion on the topic taught/to be taught is encouraged in the class	3.45
17	The students don't dare to ask questions in the class	3.13
18	The instructors keep their doors open for further clarification even beyond the class hours	3.90
19	The students feel difficulty in listening to the lectures in class	3.29
20	The students prefer discussion with the instructors for any clarification	3.49
21	The students give a warm response to their instructors when they enter the classroom	3.93
22	The instructors don't respond properly to the warm response given by the students in the class	3.73
23	The instructors maintain proper eye contact with the students in the ^{class}	3.99
25	The instructors' attitude is flexible	3.17
26	The instructors create friendly/congenial environment in the class	3.44
27	The instructors have adequate knowledge of their subject	3.89
Overall mean opinion score		3.37

*Mean Opinion Score

environment were very important for creating effective teaching learning situation in the class.

Respondents' opinion on each statement of opinion scale for education standard was also obtained which is depicted in Table 7. It was noticed from the data that the respondents were strongly agree with the statements at Sr. No. 1, 23, 11, 21 and 2 with their mean opinion score of 4.22, 3.99, 3.97, 3.93, and 3.91 respectively. This indicates that the respondents were positive in their attitude regarding the statements like "The instructors come to class on the time", "The instructors maintain proper eye contact with the students in the class", "The students give a warm response to their instructors", "The instructors cover the course content as per the prescribed syllabus", "the students give a warm response to their instructors, when they enter the class room" and that "the instructors respond to any particulars point/questions being raised/asked by the student in the class, at that very moment when if the actual class have is over". The respondents were found to have negative opinions on the statements at serial numbers 5,9,14 and 15 in which they perceived that the instructors delivered their lectures in such a manner that the students cannot note them down properly; (MPSF 2.75). The presentation style of instructors is monotonous and creates boredom (MPS=2.45), the instructors take theory classes in practical hours to complete the course content (MPS=2.39), and that instructors give more emphasis on theoretical knowledge rather than practical knowledge in practical classes (MPS=2.45).

Therefore, it is implied from the study that the teachers should provide more practical knowledge to the students and avoid taking theory classes in practical hours. They should deliver lectures as per the pace of the students' learning by using a variety of audio-visual aids like slide projectors, smart board, power point presentation etc. to make the subject as interesting as possible so that even the common student in the class can understand it. Sharma *et al.* (2017) also reported that more emphasis on the theory rather than practical, huge class size, inferiority complex among the students inadequate knowledge and practical attitude of some of the teachers were the main problems faced by the students.

Table 8: Overall opinions towards education standard

Level of opinion	F %
Good (>Mean + SD)	12
Fair (Mean $\pm$ SD)	72
Poor (<Mean - SD)	16

The overall opinion of the respondents was determined on the basis of mean score and standard deviation and presented in Table 8.

It has been noticed from the data that on overall basis, a majority of the respondent students (72%) perceived the existing education standard in the University as 'Fair'. Those who had reported the existing education standard as 'Good' and Poor were found to be 12 and 16 per cent respectively. Since a majority of the students opined that existing education standard was 'Fair'. Hence, the study implies that efforts should be made by the university authorities to identify the reasons of this opinion and corrective measures should be taken accordingly. Venkata Ranga Naika and Chandra Kandan (2006) also found that Chalk Board was used by a majority of teachers while it was desirable to use a variety of audio-video aids to break the monotony and create interest among the students.

The association between the respondents' selected socio-personal traits and their opinion/opinion on existing education standard was determined and the results are presented in Table 9. It was very surprising to note that all the selected socio-personal traits were found to have positive and significant association with the existing education standard in the University of Horticulture and Forestry, Solan. Therefore, it is implied that better the teacher-taught relationship better the relationship between

Table 9: Relationship of respondents' variables Vs Opinion on education standard

Variable	χ^2
Gender	30.59*
Family Background	8.77*
Teacher-taught Relationship	59.73*
Relationship between genders	27.26*
Perceptual rating	88.98*

*Significant at 5 per cent level

Table 10: Respondents' opinion on severity of problems faced by them

S.No.	Problems	Most Serious	Serious	Not Serious	TSS*
1.	The instructors don't encourage questioning/ feedback in class	10	51	39	61
2.	The instructors don't use audio-visual aids in the class	10	42	48	52
3.	Inadequate knowledge of the instructor	37	27	36	64
4.	Non-congenial/unfriendly environment in the class	29	33	38	62
5.	Faulty pronunciation of the instructor	18	37	45	55
6.	Fast or rapid delivery of lecture	22	49	29	71
7.	Biased attitude of the instructor	32	37	31	69
8.	Inferiority complex/hesitation among the students	34	37	29	71
9.	Non-availability of audio-visual facility in the classroom	20	31	49	51
10.	Huge/large class size	36	30	34	66
11.	More emphasis on theory rather than practical	46	38	16	84
12.	Taking theory class in practical class	33	43	24	76

*TSS (Total seriousness score) = Most serious + serious

male and female students, more the perceptual rating of university by the student respondents, better was their opinion towards existing education standard in the university. Hence, concerted efforts should be made by the university authorities to improve the teacher-taught relationship in the university by frequently organizing get together in form of games, sports, picnic, cultural activities, fete etc. and taking regular feedback from the students in case of any grievance or problem faced by them. The students need to be motivated and guided for excelling in various competitive examinations.

The respondents opinion on the severity of the problems was obtained on three point continuum scale i.e. most serious, serious and not serious. The percentages of respondents under each three point continuum was also computed. On the basis of total seriousness score, the problems were ranked and the results are given in Table 10.

It can be clearly observed from the data on the basis of total seriousness score, the problems at serial numbers XI (TSS=84) (More emphasis on theory rather than practical). VIII (TSS=71) i.e. Inferiority complex/hesitation among the students, XII (TSS=76) i.e. Taking theory classes in practical classes, VII (TSS=69) i.e. Biased attitude of instructors and VI (TSS=71) i.e. Fast/rapid delivery of lectures by the teachers were the

prominent problems faced by the students in the existing education standard at Dr. Y.S. Parmar University of Horticulture and Forestry (UHF) Nauni, Solan. Hence, the study implies that the instructors/teachers should keep a proper pace/speed of their lectures as per the learning capacity of the students, should emphasize on practical/experienced knowledge and to avoid taking theory classes in practical hours. On the other hand, the university authority should discourage enhancing students' strength until and unless the facilities are provided for effective teaching and learning in the class. Efforts should also be made to remove the hesitation among the students by organizing practical training courses on communication skill and by motivating them to participate more in cultural/co-curricular activities.

CONCLUSION

It has been concluded from the study that the teachers should give more emphasis on practical, theory classes should not be taken in practical hours, more use of audio-visual aids in the class and feedback from the students should be encouraged to remove the fear of hesitation among them besides motivating them to participate more in sports and extra curricular activities.

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Instrument to Assess the Farmers' Participation in Effective Canal Irrigation Management

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ABSTRACT

In the present study, an attempt was made to develop an instrument to measure the farmers' participation in effective canal irrigation management. The method of summated rating scale suggested by Likert (1932) and Edwards (1969) were followed to develop an instrument through six stages viz., identification of dimension, collection of items/statements, relevancy analysis, item analysis, reliability and validity of the scale. Based on the review of literature and discussion with experts in the related areas, six dimensions viz., farmers' participation in formulation of guidelines, planning and implementation activities, maintenance activities, responsibility sharing, crop planning activities and integrated crop management were listed and 60 items/statements were enlisted. Based on the relevancy percentage equal and more than 80.00 per cent and mean relevancy score of equal and more than 4.00 were considered for inclusion in the item analysis. After the relevancy analysis and item analysis, out of 60 items/statements, 34 statements were retained. In order to compute the scale values for each of the identified dimensions by adopting normalized ranking method recommended by Guilford (1954) and the total scale value ranges from 9.340 to 2.537, with farmers' participation in integrated crop management got highest rank and formulation of guidelines got lowest rank. The developed instrument was found to be reliable (0.96) and valid (0.98), hence it can be used to measure the farmers' participation in effective canal irrigation management.

Keywords: Canal irrigation management, Farmers' participation, Relevancy, Reliability, Validity

INTRODUCTION

India with 2.4 per cent of the world's total area has 16 per cent of the world's population but has only 4 per cent of the total available fresh water (Anonymous, 2008). This clearly indicates the need for water resource management, conservation and optimum use. The problem that seem to emerge with the rapid growth of the population and the consequent rise in demand for water leads to water shortages, which will be a greater concern in the coming years. Water is a critical input in agriculture, nearly all its aspects having a determining effect on the eventual yield. Good seeds and fertilizers fail to achieve

their full potential if plants are not optimally watered. The increasing scarcity of water for agricultural production around the world is a major cause for concern. Therefore, there is a need to make prudent and economic use of water by improved and scientific water management practices.

The development and construction of irrigation dam is not an end in itself. The operation and maintenance of created system is more important for realizing the full benefits envisaged in the project. Irrigation management is a social process, which deals with not only efficient use but also equitable distribution of irrigation water.

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Therefore, participation is crucial for agriculture development and is one of the critical components for success of natural resource management. Research reviews revealed that, there is no proper measuring procedure on participation of farmers' in effective canal irrigation management hence; an attempt has been made to develop an instrument to assess the farmers' participation in effective canal irrigation management

METHODOLOGY

The present study was carried out during 2018-2019 by employing a scientific methodology to develop an instrument to measure the farmers' participation in effective canal irrigation management. The developed instrument was tested for its reliability and validity. The detail steps followed in the methodology are explained under the steps listed below.

Farmers' participation in effective canal irrigation management is operationally defined as extent of water users' (farmers) involvement in different activities viz., equitable distribution of irrigation water, crop selection and management, scheduling of irrigation water, water delivery system and maintenance of field channels etc., for effective management of irrigation water. The method of summated rating scale suggested by Likert (1932) and Edwards (1969) were followed in the development of the instrument through the following steps viz., identification of dimensions, collection of items/statements, relevancy analysis, item analysis, reliability and validity of the scale.

Six major dimensions related to farmers' participation in effective canal irrigation management were identified based on review of literature and discussion with experts in the field of agricultural extension, agronomy and extension officers of Command Area Development Authority (CADA). The major six dimensions identified were: (1) formulation of guidelines, (2) planning and implementation activities, (3) maintenance activities, (4) responsibility sharing, (5) crop planning activities and (6) integrated crop management. The items on farmers' participation in effective canal irrigation management were collected exhaustively. Tentatively 60 items/statements pertaining to the farmers' participation in

effective canal irrigation management were prepared based on the available literature and discussion with agriculture extension experts, agronomists and CADA officials. The statements were edited as per the 14 point criteria enunciated by Edwards (1969) and Thurstone and Chave (1929). As a consequence nine statements were eliminated and the remaining 51 statements were included in the study. 51 items/statements under different dimensions were sent to 140 experts in the field of Agricultural Extension, Agronomy, CADA and other related areas to critically evaluate the relevancy of each items/statement on five point continuum viz., Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) and the above responses were assigned the score of 5,4,3,2,1, respectively for positive statements and reverse procedure was followed for the negative statements. The judges were also requested to make necessary modifications and additions or deletion of statements, if they desire so. A total of 79 judges returned the questionnaires duly completed were considered for further processing. From the data gathered, "relevancy percentage" "relevancy weightage" and "mean relevancy score" were worked out for all the 51 statements. Using the criteria individual statements were screened for relevancies by the following formulae.

i) Relevancy Percentage (RP)

$$R.P. = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{Maximum possible score}} \times 100$$

ii) Relevancy Weightage (RW)

$$R.W. = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{Maximum possible score}}$$

iii) Mean Relevancy Score (MRS)

$$M.R.S. = \frac{MR \times 5 + R \times 4 + SWR \times 3 + LR \times 2 + NR \times 1}{\text{No. of judges responded}}$$

Where, MR= Most Relevant, R= Relevant, SWR= Somewhat Relevant, LR= Less relevant

NR= Not relevant

Accordingly, statements having relevancy percentage equal and more than 80.00 per cent and mean relevancy score of equal and more than 4.00 were considered for inclusion in item analysis. Thus, 34 statements were retained out of 51 statements and these statements were considered for further processing and suitably modified as per the comments of experts wherever applicable (Table 1).

In order to compute the scale value for each of the identified dimensions by adopting normalized ranking method recommended by Guilford (1954). A list of 79 experts working in related area was prepared and

considered for seeking opinion. The judges were requested to give rank order based on the relative importance of the six dimensions selected on farmers' participation in effective canal irrigation management. After receiving ratings from the judges, they were used for calculation of scale values. Based on their relative importance, dimensions were ranked and then converted in to rank values using the formula

$$R_i = (n - r_i + 1)$$

Where, R_i = Rank values

n = Number of dimensions

r_i = Ranks given by judges to six dimensions

Table 1: Statement wise Relevancy Percentage and Means Relevancy Score of farmers' participation in effective canal irrigation management (n=79)

S. No.	Statements	Relevancy Percentage	Relevancy Weightage	Mean relevancy score
I	Farmers' participation in formulation of guidelines			
1.	Follow the warabandi schedule of the available water in irrigation system	83.79	0.83	4.18
2.	Agree to follow proper irrigation methods	88.60	0.88	4.43
3.	Take appropriate measures to avoid water wastage	89.62	0.89	4.48
II	Farmers' participation in planning and implementation activities			
4.	Involve in the selection of site for construction of field channels	89.11	0.89	4.45
5.	Estimate amount of irrigation water required for crops	87.84	0.87	4.39
6.	Planning to repair distributories/ field channels prior to monsoon	91.64	0.91	4.58
7.	Planning to increase the row width to minimize the flow of water.*	82.53	0.82	4.12
8.	Planning to install borders or blocked end furrows	80.25	0.80	4.01
9.	Recording irrigation date and amount of water to be applied to the field	85.82	0.85	4.29
III	Farmers' participation in maintenance activities			
10.	Maintain the irrigation and drainage structures for proper flow of irrigation water	92.91	0.92	4.64
11.	Participation on reconstruction/repair of distributories/ field channel	88.60	0.88	4.43
12.	Attending training organized by CADA for improving irrigation practices	85.82	0.85	4.29
13.	Participation in monitoring uniformity flow of irrigation water	87.08	0.87	4.35
14.	Participation in cleaning field channel	86.83	0.86	4.34
15.	Not to attend meetings for repair and maintenance*	81.01	0.81	4.05
IV	Farmers' participation in responsibility sharing			
16.	Farmers are not ready to pay water charges for usage of amount of water*	82.02	0.82	4.10
17.	Collection of water charges	82.53	0.82	4.12
18.	Contributing money for maintenance of field channel	81.77	0.81	4.08
19.	Discussing one's experience on irrigation water management with fellow farmers	83.54	0.83	4.17
20.	Participation in training organized by WUCS	83.03	0.83	4.15
21.	Motivating other farmers to participate in the water use activities	84.81	0.84	4.24

Table 1 contd.....

S. No.	Statements	Relevancy Percentage	Relevancy Weightage	Mean relevancy score
V.	Farmers' participation in crop planning activities			
22.	Adopting the recommended cropping pattern to save water	89.11	0.89	4.45
23.	Deciding the improved seed varieties	81.51	0.81	4.07
24.	Deciding other crops based on availability of water	89.11	0.89	4.45
25.	Deciding the area under each crop in advance	88.86	0.88	4.44
26.	Using irrigation water based on critical stages of crops	91.89	0.91	4.59
27.	Decision on time required to irrigate their field	86.58	0.86	4.32
28.	Deciding suitable management practices to conserve water	87.08	0.87	4.35
VI.	Farmers' participation in integrated crop management			
29.	Adopting the recommended seed rate which are drought tolerant	86.83	0.86	4.34
30.	Growing long duration crops during drought condition*	89.36	0.89	4.46
31.	Practicing the best/ improved method of sowing	86.83	0.86	4.34
32.	Involve in maintenance of plant population in relation to available water	87.84	0.87	4.39
33.	Use conservational tillage, to improve the water infiltration rate	85.06	0.85	4.25
34.	Use of cover crops/green manures to minimize leaching and erosion	89.62	0.89	4.48

*Negative statements

The calculation of scale value consists of working out the centile position (P) based on the formula recommended by Guilford (1954), then for working out values determined for each centile value (C) was done. Based on Hull Table (Hull, 1928), calculating Rank value (Rj) and finally determining the scale values (Rc) (Table 2).

$$P = \frac{(R_i - 0.05) 100}{n}$$

$$R_c = 2.357 * R_j - 7.01$$

Where, P = Centile position

C = Values determined for each centile value

Table 2: Calculation of scale values of all the dimensions based on the judges ranking

ri	Ri	D1	D2	D3	D4	D5	D6	TOTAL	P	C
1	6	7	7	6	9	8	42	79	91.67	9
2	5	8	3	5	28	21	14	79	75.00	6
3	4	10	19	4	22	16	8	79	58.33	5
4	3	9	28	25	9	6	2	79	41.67	5
5	2	12	7	24	8	23	5	79	25.00	4
6	1	33	15	15	3	5	8	79	8.33	2
Fji	79	79	79	79	79	79	474			
Rj=fjiC	320	374	355	442	410	548				
R=Rj/fji	4.051	4.734	4.494	5.595	5.190	6.937				
Rc*	2.537	4.148	3.582	6.177	5.223	9.340				

Where, ri = Ranks given by judges to six dimensions

Ri = Rank values

Rc = 2.357*Rj - 7.01

(Note: 2.357 and 7.01 are constant values)

P = Centile position

C = Values determined to each centile value

R_j = Rank value

R_c = Scale value

n = Number of indicators

It is apparent that all the six dimensions will not contribute equally towards farmers' participation in effective canal irrigation management. Hence the variation in contribution of each dimension represented by assigning different weightage ranging from 9.340 to 2.537 with this farmers' participation in integrated crop management got highest rank (I) and formulation of guidelines got lowest rank (VI) (Table 3).

Table 3: Scale values for six dimensions of farmers' participation in effective canal irrigation management

Dimensions	Final scale value	Rank
Formulation of guidelines	2.537	VI
Planning and implementation activities	4.148	IV
Maintenance activities	3.582	V
Responsibility sharing	6.177	II
Crop planning activities	5.223	III
Integrated crop management	9.340	I

Item analysis: To delineate the statements based on the extent to which they can differentiate farmers' participation in effective canal irrigation management, item analysis was carried out on the items/statements selected in the first stage. For item analysis, thirty farmers were selected from non-sample area and the respondents were asked to indicated their participation in each of the items/statement on a three point continuum like "regularly, occasionally and never". The scoring pattern adopted for positive statements were 3, 2 and 1 and scoring was reversed for negative statements.

Based on the total scores obtained, the respondents were arranged in descending order. The top 25 per cent of the respondents with their total scores were considered as high group and the bottom 25 per cent as low group. These two groups provide criterion groups in terms of evaluating the individual statements suggested by Edwards (1969). 't' value was calculated for each of the statement by using the following formula:

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

Where,

X_H = the mean score on given statement of the high group

X_L = the mean score on given statement of the low group

Σx_{2H} = Sum of squares of the individual score on a given statement for high group

Σx_{2L} = Sum of squares of the individual score on a given statement for low group

n = Number of respondents in each group

Σ = Summation

t = the extent to which a given statement differentiate between the high and low group.

After computing the 't' value for all the 34 statements, and only those with 't' value equal and greater than 2.145 were finally selected for inclusion in the scale. Wherein, all the 34 items/statements were significant at 5 per cent.

Reliability in its true sense refers to precision of the instrument constructed for any purpose. It is otherwise called extent to which repeated measure produces the same result. In any social science research newly constructed instrument has to be tested for its reliability before it is used. To establish reliability of the developed instrument a pilot study was conducted by administering the instrument to the 30 farmers in non-sample area comprising 34 items/statements. Split-half method developed by Brown prophecy was employed to measure the reliability of the scale. The reliability co-efficient of split-half test using Karl Pearson's co-efficient (r_{1/2}) was found to be 0.93. The reliability coefficient of the tool was found to be 0.96, which is higher than the standard score of 0.70, indicating the constructed instrument is highly reliable.

1. Half test reliability formula

$$r_{1/2} = \frac{N(\sum XY) - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)}}$$

Where, r_{1/2} = half test reliability

ΣX = Sum of the scores of the odd number items

ΣY = Sum of the scores of the even number items

ΣX^2 = Sum of the squares of the odd number items

ΣY^2 = Sum of the squares of the even number items

The Half test reliability which was found to be 0.93

2. Whole test reliability formula

$$r_{11} = \frac{2 \times r_{1/2}}{1 + r_{1/2}}$$

Where, r_{11} = whole test reliability

$r_{1/2}$ = half test reliability

The Whole test reliability which was found to be 0.96

Validity refers to the ability of the instrument to measure what it supposed to measure. Validity of an instrument is the property which ensures that the test scores obtained measure the variable they are supposed to measure. Content or construct and statistical validity are the methods generally followed to know the validity of the scale. The data were subjected to statistical validity, the validity co-efficient for the instrument was found to be 0.98, which is greater than the standard requirement of 0.70, hence the validity coefficient was found to be most appropriate and suitable for the tool developed.

Validity = r_{11}

Validity which was found to be 0.98

Thus, the developed instrument to measure the farmers' participation in effective canal irrigation management was feasible and appropriate (Table 4).

Table 4: Reliability and validity of the instrument

Particulars		Values
a. Reliability	Split-half ($r_{1/2}$)	0.93
	Whole-test (r_{11})	0.96
b. Validity	Statistical validity	0.98

The final instrument consisting of 34 statements were administered, to 30 respondents. The responses were collected on a three point continuum, namely "regularly, occasionally and never" and responses were assigned

the score of 3, 2, and 1, respectively for positive statements and reverse scoring procedure was used for negative statements.

The elimination of statements at various steps of the instrument construction is presented in Table 5. In the first step of collection of items/statements, the number of statements considered were 60 and number of statements were retained were 60. In the second step *i.e.*, editing of items, number of statements were considered 60 and 51 statements were retained. In the third step of relevancy analysis, 34 statements were retained out of the 51 statements. The fourth step of the instrument construction is item analysis, where in the number of statements considered were 34, and the same 34 statements were retained. In the fifth step of findings reliability and validity, the number of statements was considered 34 and same 34 statements were retained. Hence, the final instrument consisted of 34 statements.

Table 5: Elimination of statements at different steps of the instrument construction

Steps in instrument construction	No. of statements	
	Statements considered	Statements retained
Collection of items	60	60
Editing of items	60	51
Relevancy analysis	51	34
Item analysis	34	34
Reliability and validity	34	34

RESULTS AND DISCUSSION

The present instrument was developed by the following methodology from social science perspective to objectively assess the farmers' participation in effective canal irrigation management. The dimensions and items/statements were finalized based on the review of vast literature and also discussion with the experts in the related area. A list of 60 statements pertaining to the farmers' participation in effective canal irrigation management was prepared and based on the relevancy percentage equal and more than 80.00 per cent and mean relevancy score of equal and more than 4.00 were considered for the inclusion in item analysis. After the relevancy analysis and item analysis, out of 60 statements,

34 statements were retained in the final instrument (Table 1). Six dimensions identified for the study assumed scale values ranging from 9.340 to 2.537 indicating different weightage to be assigned based on the experts opinion arrived through judges rating. The scale values of respective dimensions were presented in the Table 2. The developed instrument was found to be reliable (0.96) and valid (0.98) (Table 4). The instrument helps in identifying the factors leading to farmers' participation effective canal irrigation management, which will further support in framing policies by the Government, designing training programmes on effective use of irrigation water and proper guidelines or motivation from Water Users Cooperative Societies etc., will help to improve the participation of the farmers in effective canal irrigation management.

CONCLUSION

The instrument consisting of six dimensions for the study and the scale values ranging from 9.340 to 2.537 and based on the relevancy percentage equal and more than 80.00 per cent and mean relevancy score of equal and more than 4.00 were considered for the inclusion in item analysis. After the relevancy analysis and item

analysis out of 60 statements, 34 statements were retained in the final scale. The developed instrument was found to be reliable (0.96) and valid (0.98), hence the instrument can be further used to measure the farmers' participation in effective canal irrigation management.

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Extent of Adoption of Improved Cultivation Practices of Watermelon

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ABSTRACT

Watermelon is an important vegetable crop grown in Solapur district as such present study was conducted in Solapur district of Maharashtra state. A total of 120 respondents from ten villages formed sample for the study. The data were obtained by interview schedule. It was observed that, 56.66 per cent of respondents had completely adopted harrowing, 52.50 per cent respondents had completely adopted rotavator for watermelon cultivation, 60.00 per cent of the watermelon growers had adopted normal recommended planting distance, 78.33 per cent of watermelon growers had completely adopted the recommended seed rate for sowing of watermelon, 74.17 per cent of the respondents had complete adoption of *sugar baby* variety of watermelon, 55.83 per cent of the respondents had complete adoption of recommended basal dose of fertilizers as per MPKV, Rahuri, 93.33 per cent of the respondents had completely adopted the cultural methods for weed the recommendation of management, 31.67 per cent respondents had adopted the flood method of irrigation. In overall, nearly two third 65.00 per cent of watermelon growers had medium level of adoption.

Keywords: Adoption, Improved cultivation practices, Watermelon and respondents

INTRODUCTION

Watermelon (*Citrullus lanatus* L.) is grown in tropical and subtropical regions of the world. The total area under cultivation of watermelon in India is 92 thousand ha and production of 2292.00 thousand MT. (Ministry of Agriculture, Govt. of India, 2015-16). Number of Indian states grow watermelon. Interestingly, these regions vary considerably in their climate, but the adaptability and versatility of watermelon allows the fruit to thrive in different types of soils. Watermelon is important vegetable crop having good prospects in Maharashtra state as well as country. It is an important vegetable crop grown in Solapur district due to its hardy nature and prolific bearing even in marginal lands. Its cultivation require little care and inputs. Also it has nutritional value, as well as, good selling price in market and can be kept for long time.

METHODOLOGY

The study was conducted in Solapur district located in the western part of Maharashtra. In Solapur district, Malshiras tehsil was purposively selected for the study on the basis of highest area under watermelon. The list of watermelon growing villages of Malshiras tehsil was obtained from Taluka Agriculture Officer. Ten villages from this tehsil were purposively selected for the study on the basis of area under watermelon crop. Twelve watermelon growers were selected from each village by simple random sampling method. Thus, in all 120 watermelon growers were selected. The pretesting of the interview schedules of 10 watermelon cultivators helped the researcher to make modifications and alternations in order to get spontaneous responses from the respondents. After making the required changes in the interview schedule, it was finalized and used for data collection.

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RESULT AND DISCUSSION

The data on adoption of recommended practices of watermelon cultivation is presented in Table 1. The adoption of the respondents regarding the recommended improved cultivation practices of watermelon presented in table no.1 is discussed. It was observed that cent per cent of the watermelon growers had complete adoption of land preparation tillage practices like ploughing, while, 56.66 per cent of respondents had completely adopted

harrowing and 52.50 per cent respondents had completely adopted rotavator for watermelon cultivation. It was found that cent per cent respondents were adopting sowing of watermelon during summer season in the month of Dec-Feb and 55.83 per cent during kharif season in the month of June-July. It was observed that that majority (60.00%) of the watermelon growers had adopted normal recommended planting distance of 2 x 0.5 m. The majority (78.33%) of watermelon growers had completely adopted the recommended seed rate for sowing of watermelon.

Table 1: Distribution of the respondents according to their of adoption of improved cultivation practices of watermelon

S.No.	Recommended practices	Adoption		
		Complete	Partial	No
1.	Preparatory tillage			
	A) Land preparation			
	1. Ploughing	100.00	00.00	00.00
	2. Harrowing 2-3 times and leveling	56.66	34.17	09.17
	3. Rotavator	52.50	31.67	15.83
	B) Time of Sowing			
	1. Summer-15 Dec-15 Feb (Temp-17°C to 18°C)	100.00	00.00	00.00
	2. <i>Kharif</i> (June-July)	55.83	32.50	11.67
	C) Planting distance: 2 x 0.5 m	60.00	13.33	26.67
2.	Seed and Sowing			
	2.0-3 kg/ha	78.33	16.67	5.00
3.	Selection of variety			
	a] Sugar Queen	100.00	00.00	00.00
	b] Madhubala	81.67	12.50	05.83
	c] Sugarbaby	74.17	18.33	07.50
	d] Madhu	68.33	21.67	10.00
	e] Arka manik	65.00	19.17	15.83
	f] Arka jyoti	60.00	17.50	22.50
	g] Milan	55.00	38.33	06.67
	h] Badshah	54.17	25.83	20.00
	i] Super king	50.00	35.83	14.17
	j] Other varieties	46.67	35.83	17.50
4.	Mulching			
	a] Spread 25-30 micron thick mulching paper (polythene) with 4 feet width on broad bed cover edges with soil. Be aware that paper should be spread parallel to bed and should not loose easily. Generally required 8-10 kg paper/ha	84.17	10.83	05.00
	b] Day before transplanting make holes at distance 15 cm to both sides of laterals. Distance between two holes should be 2 m in line. After making holes wet broad bed with drip irrigation.	86.67	10.00	03.33
	c] Then transplanting should be done with 12 day old plants. (Requires 10000-12000 seedlings / ha)	90.00	6.67	3.33

Table 1 contd....

S.No.	Recommended practices	Adoption		
		Complete	Partial	No
5.	Recommended dose of fertilizers			
	Application of fertilizers			
	<i>A] Major Nutrients</i>			
	1] Basal dose (full dose of P, K and 50 % N per ha)			
	N P K			
	50 kg 50 kg 50 kg	55.83	34.17	10.00
	2] Top dressing (Remaining 50% N per ha)			
	50 kg - -	57.50	36.67	05.83
	Application of manure			
	15-20 tonnes / ha	65.00	22.50	12.50
6.	Method used for application of fertilizers			
	A] Broadcasting by hand	74.17	20.00	05.83
	B] Fertigation (through drip irrigation) –according to recommended dose	77.50	13.33	09.17
7.	Micronutrients deficiency in watermelon	10.83	20.83	68.34
8.	Methods of integrated weed management			
	a] Cultural method-Hand weeding, Ploughing, Harrowing	93.33	02.50	4.17
	b] Chemical method	64.17	25.00	10.83
	c] Biological method	00.00	12.50	87.50
9.	Irrigation management			
	Method of irrigation			
	a] Flood method	31.67	26.67	41.66
	b] Drip method	68.33	21.67	10.00
10.	Proper stage of harvesting			
	1] Mature Stage-Heavy Dull Sound	100.0	00.00	00.00
	2] Drying of Tendril	100.0	00.00	00.00
11.	Major pest of watermelon			
	Methods of controlling pest			
	1] Chemical method	67.50	27.50	05.00
	{ a) Leaf minor & b) Red pumpkin beetle:-Dimethoate 0.05% in 10 lit of water			
	c) Fruit fly:- 20 ml Malathion /10 litre water + 100 g Jaggery d] Aphid &			
	e) Jassid:-0.1% Malathion or Dimethoate @ 1.5 ml / litre water }			
	2] Mechanical method	59.17	25.83	15.00
	{ a) Leaf minor:- Yellow sticky trap, Pheromone trap, Light trap			
	b) Fruit fly:- Rakshak trap (Dr. BSKKV, Dapoli)}			
	3] Biological method	3.34	5.00	91.66
	{ a) Leaf minor & b) Jassid :- NSKE 4% or Trizophos 20 ml/ 10 litre }			
12.	Major diseases of watermelon			
	Method of controlling diseases			
	Chemical method{ a) Blast:-Spraying Mancozeb or Copper oxychloride	59.17	18.33	22.50
	25g/10 litre waterb) Powdery mildew:-Spraying Carbendazim @ 10 g / 10			
	litre waterc) Wilt:-Seed treatment with Thirum 3g. }			
13.	Marketing channels available in your locality			
	a) Self marketing	92.50	4.17	3.33
	b) By auction	35.00	21.67	43.33
	c) Agril. Produce Market Committee	78.33	16.67	5.00
	d) Other	16.67	18.33	65.00

In respect of recommended watermelon varieties, it was observed that cent percent of respondents had completely adopted Sugar Queen variety, while, 81.67 per cent of the respondents had complete adoption of Madhubala variety. It was observed that nearly three-fourth (74.17%) of the respondents had complete adoption of Sugar baby variety of watermelon growers. It was observed that a large majority of the respondents had complete adoption of mulching practices of watermelon.

Regarding fertilizer management, it was revealed that 55.83 per cent of the respondents had complete adoption of recommended basal dose of fertilizers as per MPKV, Rahuri, while, 57.50 per cent of the respondents had complete adoption of recommended top dressing dose of N fertilizer of watermelon and 65.00 per cent had completely adopted the manure application in watermelon. It was observed that majority (74.17%) of the respondents had completely adopted the application of fertilizer for broadcasting by hand and 77.50 per cent of the respondents about fertigation (through drip irrigation) according to recommended dose. A substantial proportion (68.34%) of the respondents had not adopted the application of micronutrients.

It was observed that majority (93.33%) of the respondents had completely adopted the cultural methods for weed management, while, 64.17 per cent of the respondents about chemical methods for weed management. The biological method was not adopted by large majority (87.50%) respondents. The data in revealed that more than one third (68.33%) of the respondents had completely adopted the drip method of irrigation for watermelon, while, only 31.67 per cent respondents had adopted the flood method of irrigation. The recommended stage of harvesting of watermelon when drying of tendril with mature stage-heavy dull sound was completely adopted by all the respondents. It was observed that 67.50 per cent of the respondents had completely adopted chemical methods of pest control, while, 59.17 per cent respondents adopted the mechanical methods and a large majority (91.66%) were observed to non-adopt the biological methods. It was observed that more than half (59.17%) of the respondents had complete adoption of disease management in watermelon. It was found that a

large majority (92.50%) watermelon growers preferred self-marketing channel for marketing of watermelon, whereas, 78.33 per cent of the respondents sold watermelon through Agriculture Produce Market Committee and 35.00 per cent of the respondents sold their produce by auction.

Adoption of an innovation is one of the means by which farmers can improve their economic conditions. Adoption is a process that involves behavioral changes on the part of individuals. The data pertaining to the distribution of the watermelon growers by their extent of adoption of watermelon recommendations is presented in Table 2.

Table 2: Distribution of the respondents according to their adoption level of improved cultivation practices of watermelon (N=120)

Adoption category	Frequency	Per cent
Low (Upto 63 Score)	19	15.83
Medium (64 to 75 Score)	78	65.00
High (76 Score and above)	23	19.17
	Mean=69.78	S.D=5.85

The data presented in Table 2 indicated that majority of the respondents (65.00%) had medium level of adoption followed by 19.17 per cent and 15.83 per cent with high and low levels of adoption of watermelon recommendations, respectively.

CONCLUSION

Adoption is a mental process. In the modern era new things are being invented by agricultural scientists but all the innovations are not being adopted by many of the members of social system. Adoption of an innovation depends on many factors viz., awareness and knowledge of adopters, innovativeness, characteristics of an innovations etc. In this research observed that two third (65.00%) of respondent watermelon growers had medium level adoption, while, 19.17 per cent had high level of adoption and 15.83 per cent of watermelon growers had low level of adoption. The researcher hopes that this research study would be highly useful in understanding the adopting the improved cultivation practices

technology. Moreover, the results of this study will help the extension workers and other associated with watermelon production in performing their functions more effectively.

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Aspiration of Rural Youth Towards Agriculture

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ABSTRACT

Rural youth are very important segment of the rural society and they play a vital role in agriculture and rural development. The present study was conducted in the twelve villages of four Panchayat Samities of Akola and Amravati districts in Maharashtra State. An exploratory design of social research was used for the study. The finding revealed that the overall aspiration of the rural youth (49.17%) towards agriculture had medium level of aspirations, whereas, 33.33 and 17.50 per cent of the rural youth had low and high level of aspirations, respectively. Majority (47.73%) of the rural youth about horticulture had medium level of aspiration. With regards to dairy farming the majority (57.69%) of the rural youth had medium level of aspiration. Education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth about agriculture. With regards to horticultural activities, the variables like education, land holding, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found significantly correlated with the aspiration of the rural youth. Regarding dairy farming activities, variables like education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth.

Keywords: Agriculture, Aspiration, Dairy, Horticulture, Rural youth

INTRODUCTION

Youth unemployment in rural areas is often believed to be caused by the low aspirations of young people themselves, their families and local communities. A low aspiration among young people is one of the key factors who are not in education, employment or training in rural areas. Youths are also playing important role in agriculture by performing some farm activities and helping their families in different farm operations. Research evidence (Rojewski, 1999; Sherwood, 1989) have pointed out that aspiration is one of the psychological factors that influence the rural youth's decision for a career in the future. Aspiration plays an important role in life choice of the people, how they feel and think about themselves (Schaefer and Meece, 2009) including the rural youth.

The activities based on the youth's specific needs, desires and aspirations facilitate the mobilization of the rural youths, towards goal of rural development. Rural youths are closely involved in agriculture. Most often school dropout, unskilled and unemployed youths face serious difficulties and problems in their life. Due to lack of adequate literacy, lack of knowledge on agricultural information and technology they cannot achieve the desired production of crops. Many of them do not have enough skills in handling the modern agricultural technologies. So, many techniques and research are developing day by day. It is very necessary to make aware people about it. In that case rural youth play very important role, so it is very essential to study the aspiration of the rural youth towards agriculture.

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METHODOLOGY

An exploratory design of social research was used in the present investigation as the study emphasized on aspiration and attitude of the rural youth about agriculture and allied activities. The present study was conducted in the six villages of Akola Panchayat Samiti and Barshitakali Panchayat Samiti of Akola district and six villages of Chandur railway Panchayat Samiti and Bhatkuli panchayat samiti of Amravati district. From each selected village, ten rural youths were randomly selected as respondents. In all, total 120 rural youths were randomly selected from twelve villages. For the measurement of aspiration the procedure followed by Ranganathan (1984) was used with slight modification. To know the aspiration, respondents are asked to mention their aspirations in agriculture, horticulture and dairy by providing three items under each enterprise. Under each item of the enterprise three sub items were included in the study assigning score of 1, 2 and 3 on three point continuum. Thus the respondent could get a minimum and maximum score of three and nine, respectively for each of enterprise (agriculture, horticulture and dairy). The summation of the score obtained by the rural youth for all 9 sub items classified under three items indicates the aspirations towards a particular enterprise. The level of aspirations for each of three enterprises (agriculture, horticulture and dairy) was categorized and indicated below using the mean and standard deviation.

Category	Score range
Low	upto 4
Medium	5 to 8
High	above 8

RESULTS AND DISCUSSION

Profile of the Respondents

The data with respect to the various characteristics of the respondents have been discussed as below. It is observed that 43.33 per cent of the rural youth were educated upto higher secondary and college level education followed by 34.17 per cent were educated upto high school level education. Further 13.33 per cent of the rural youth were educated upto middle school level

and 9.17 per cent of the rural youth were educated upto primary school level. It was noted that no one was found illiterate among selected youth. Majority of the respondents were found unmarried (73.33%) and 26.67 per cent of them were married. It could be noticed that 39.17 per cent of the respondents were in small land holding group, followed by 30.00 per cent and 19.17 per cent of the respondents were in marginal and semi-medium land holding category, respectively. About 11.66 per cent of the rural youth were possessed land at marginal level.

It is revealed that near about fifty percent (48.33%) of the rural youth had annual income of in between Rs. 1,00,000 to Rs. 2,00,000, respectively. The remaining 27.50 per cent and 24.17 per cent of the rural youth belonged to annual income group of Rs. 1,00,000 and above Rs. 2,00,000, respectively. Majority of the rural youth i.e. 70.83 per cent were having medium mass media exposure, followed by 21.67 per cent were having low mass media exposure and only 7.50 per cent of them having high level of mass media exposure. It was seen that majority of respondents (45%) had medium extension contact, followed by 42.50 per cent respondents found in low level of extension contact and 12.50 per cent respondents had high level of extension contact. It was revealed that majority of respondents (67.50%) had medium level of extension participation, followed by 17.50 per cent respondents who had high level of extension participation and 15.00 per cent respondents had low level of extension participation.

It could be seen that majority of the respondents (71.67%) having medium achievement motivation, followed by 20 per cent of them having high achievement motivation. The remaining 8.33 per cent of the rural youth were having low level of achievement motivation. Achievement motivation is psychological character of an individual which tend him to be risk taker in occupation or profession and achieve some good things from his life. More than half of the respondents (52.50%) had medium level of economic motivation, followed by nearly one third of them (26.67%) having low level of economic motivation and 20.83 per cent of respondents belonged to high category of economic motivation. It means that rural youth in the study area were mediocre in orientation

towards profit maximization in their main occupation. Majority of the respondents (65.83%) had medium level of innovativeness, followed by 21.83 per cent of them having high level of innovativeness and remaining 12.50 per cent belonged to low level of innovativeness category.

Aspiration of rural youth towards agriculture and allied activities

The data in Table 1 shows that, 37.50 per cent of the rural youth engaged in agriculture do not aspire to increase the land holding, whereas, 51.67 per cent of them aspire to increase the land holding by 1 to 5 acre and only 10.83 per cent aspire to increase more than 5 acre.

Regarding the purchase of the agricultural implements, majority (60.00%) of the rural youth aspire for purchasing of basic implements while 29.17 per cent

aspire for medium and 10.84 aspire for purchasing of heavy implements. About 76.67 per cent of rural youth aspire to increase the crop production by 1-50 per cent in next three years, while 15.83 per cent aspire to increase the crop production 50-100 per cent in the next three years and 7.50 per cent of the rural youth do not aspire to increase the crop production in the next three year.

The data in the Table 2 reveals that, majority (63.63%) of the rural youth do not aspire to increase the area under horticulture crops in next three years, while 27.26 per cent aspire to increase area by 1 to 5 acre and the remaining 9.09 per cent aspire to increase the area by more than 5 acre. More than half (52.27%) of the rural youth aspire to take up vegetable cultivation, followed by 31.82 per cent aspire to start flower cultivation and 15.91 per cent aspire to go for fruits and plantation crops cultivation.

Table 1: Aspirations of rural youth in Agriculture (n=120)

Aspirations	Category	Rural youth	
		Number	Per cent
Increase the land holding in next three years	None	45	37.50
	1-5 acre	62	51.67
	>5 acre	13	10.83
Purchase of agricultural implements	Basic	72	60.00
	Medium	35	29.17
	Heavy	13	10.83
Increase the crop production in next three years	None	09	07.50
	1-50%	92	76.67
	50-100%	19	15.83

Table 2: Aspirations of rural youth in Horticulture (n=44)

Aspirations	Category	Rural youth	
		Number	Per cent
Increase area under horticultural crops in next three years	None	28	63.63
	1-5 acre	12	27.26
	>5 acre	04	09.09
Growing of different horticultural crops	Vegetable	23	52.27
	Flower	14	31.82
	Fruit & plantation	07	15.91
Increase the horticultural crops production in next three years	None	14	31.82
	1-50 %	26	59.09
	50-100 %	04	09.09

With respect to increasing the horticultural crop production in next three years, 31.82 per cent of rural youth do not aspire to increase the horticulture crop production in next three years, whereas, 59.09 per cent of rural youth aspire to increase the horticulture crop production by 1-50 per cent and only 9.09 per cent of them were aspire to increase the horticultural crop production more than 50 per cent in the next three years.

Table 3 reveals that, 46.15 per cent and 42.31 per cent of the rural youth aspire to introduce crossbred animals and local breeds respectively, while 11.54 per cent aspire to introduce both local and crossbreds. It was found that 46.15 per cent and 30.77 per cent of rural youth aspire for construction of brick walled and tiled

shelter for animals, followed by 30.77 per cent of rural youth who aspire for a separate kaccha house and 23.08 per cent of them were aspired for RCC construction of shelter for animals in the next three years. Majority (55.77 %) of the rural youth aspire for increasing the number of animals by 1-5, while 34.62 per cent of the respondents aspire to increase the animals by 5-10 and only 9.61 per cent of them aspire to increase animals more than 10.

Table 4 presents the data pertaining to overall aspiration of the rural youth in agriculture, horticulture and dairy. The data in the table reveals that, nearly half of the rural youth had medium level of aspirations, whereas, 33.33 and 17.50 per cent of the rural youth had low and high level of aspirations, respectively.

Table 3: Aspirations of rural youth in Dairy (n=52)

Aspirations	Category	Rural youth	
		Number	Per cent
Introduction of breeds	Local breeds	22	42.31
	Cross breeds	24	46.15
	Both	06	11.54
Construction of shelter for animals in the next three years	A separate kaccha house	16	30.77
	Brick walled and tiled	24	46.15
	RCC	12	23.08
Increase the number of milking animals	1-5	29	55.77
	5-10	18	34.62
	>10	05	09.61

Table 4: Overall aspirations of rural youth about agriculture and allied activities (n=120)

Aspirations	Category	Rural youth (n=120)	
		Number	Per cent
Agriculture (n=120)	Low (upto 4)	40	33.33
	Medium (5 to 8)	59	49.17
	High (above 8)	21	17.50
	Total	120	100.00
Horticulture (n=44)	Low (upto 4)	17	38.64
	Medium (5 to 8)	21	47.73
	High (above 8)	06	13.63
	Total	44	100.00
Dairy (n=52)	Low (upto 4)	16	30.77
	Medium (5 to 8)	30	57.69
	High (above 8)	06	11.54
	Total	52	100.00

Table 5: Coefficient of correlation of selected characteristics of the rural youth with their aspiration

Independent Variable	Aspiration 'r' value		
	Agriculture	Horticulture	Dairy
Education	0.520**	0.209*	0.354**
Marital Status	0.115 ^{NS}	0.140 ^{NS}	-0.017 ^{NS}
Land Holding	0.599**	0.385**	0.322**
Annual Income	0.651**	0.179 ^{NS}	0.323**
Mass media exposure	0.627**	0.192 ^{NS}	0.217*
Extension contact	0.636**	0.377**	0.305**
Extension participation	0.630**	0.453**	0.312**
Achievement motivation	0.733**	0.410**	0.379**
Economic motivation	0.721**	0.419**	0.369**
Innovativeness	0.653**	0.367**	0.307**
Attitude	0.846**	0.373**	0.293**

**Significant at 0.01 level of probability; *Significant at 0.05 level of probability; NS = Non Significant

The data in Table 4 also indicate that majority (47.73%) of the rural youth had medium level of aspiration, while 38.64 per cent had low level of aspirations and 13.63 per cent had high level of aspirations in case of horticulture.

With regards to the dairy farming, the data in table 4 revealed that majority (57.69%) of the rural youth had medium level of aspiration, while 30.77 per cent had low level of aspirations and 11.54 per cent had high level of aspirations.

The relationship of the profile of rural youth with aspiration about agriculture and allied activities is given in Table 5. One independent variable i.e. marital status was found non-significantly correlated with the aspiration of the rural youth towards agriculture. The other all selected independently variables like education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth about agriculture.

With regards to horticultural activities marital status, annual income and mass media exposure were found non-significantly correlated with the aspiration of the rural youth. Whereas the variables like education, land holding, extension contact, extension participation, achievement

motivation, economic motivation and innovativeness were found significantly correlated with the aspiration of the rural youth.

Regarding dairy farming activities only one independent variable i.e. marital status was found negatively and non-significantly correlated with the aspiration of the rural youth. The other all selected independently variables like education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth.

CONCLUSION

It can be concluded that nearly half of the rural youth towards agriculture had medium level of aspirations, whereas, 33.33 and 17.50 per cent of the rural youth had low and high level of aspirations, respectively. The variables like education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth about agriculture. With regards to horticultural activities the variables like education, land holding, extension contact, extension participation, achievement

motivation, economic motivation and innovativeness were found significantly correlated with the aspiration of the rural youth. Regarding dairy farming activities the variables like education, land holding, annual income, mass media exposure, extension contact, extension participation, achievement motivation, economic motivation and innovativeness were found to be significantly correlated with the aspiration of the rural youth. Therefore, there is urgent need to motivate the rural youth towards agriculture and allied activities as our country is dependent on agriculture and youth forms nearly one-third of the total population of India.

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Extension Agency Contact and Technology Sharing among Trainee and Non-trainee Layer Farmers

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ABSTRACT

The study was conducted to assess the extent of extension agency contact and technology sharing among layer farmers. For investigation equal (54) numbers of trainee and non-trainee layer farmers were selected from five different agro-climatic zones (out of nine) of state UP. Thus, total sample size was 108. These were measured by data collected through mailed questionnaire and telephonic survey. The study revealed that for trainee layer farmers, CARI (Central Avian Research Institute) was first choice and frequently contacted extension agency followed by Venkys and SDAH (State Animal Husbandry Department). While, for non-trainee layer farmers, SDAH was contacted more oftenly, followed by KVKs and Venkys. In case of technical sharing, about 72.23 per cent of trainee layer farmers had low level (<6 farmers) of technology sharing among farmers. About 14.81 per cent of layer farmers had medium (7-13 farmers) and rest (12.96%) were having high (>14 farmers) level of technology sharing. While, in case of non-trainees, huge majority (85.18%) of layer farmers were belonging to low level, followed by medium (9.26%) and high (5.56%) level of technology sharing among farmers. The average technology shared among farmers of the trainee and non-trainee layer farmers were 5.27 and 5.17, respectively. Technology sharing was higher in trainee layer farmers. This might be due to their high knowledge and adoption level, high socio-economic status due to training which makes them early adopters.

Keywords: Adoption, Extension agency, Knowledge, Layer farmers, Technology

INTRODUCTION

Eggs are economical source of high-quality protein, vitamins and minerals, while egg yolk contains additional cholesterol, fat-soluble vitamins and essential fatty acids. Poultry sector in India is valued at about Rs. 80,000 crores (2015-16) broadly divided into two sub-sectors – one with a highly organized commercial sector with about 80 per cent of the total market share (say, Rs. 64,000 crore) and the other being unorganized with about 20 per cent of the total market share of Rs. 16,000 Crore. About 79 per cent egg production done through commercial farm and rest 21 per cent were done by backyard poultry farms.

(Annual Report, DAHD&F, GoI, 2017-18). About 95 billion of eggs are produced from 260 million layers (BAH&FS, 2018). Layer farming in India has reached remarkable growth with the average growth rate of 8 to 10 per cent per year (Chatterjee and Rajkumar, 2015). The annual per capita availability also increased to 74 eggs. However, it is far below the recommended level of consumption of 180 eggs per annum by Indian Council Medical Research. At present scenario, the Indian poultry sector has assumed much focus due to the growing demand for poultry products particularly in urban areas because of their high food value. Most of the urban and rural population have been nourishing themselves with

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eggs and meats. Fowls, Ducks and Turkey are the three common poultry birds, reared either for egg production (i.e. layer birds, 86.99 per cent egg production by improved fowl, 11.83 per cent by desi fowl, 0.91 per cent by desi duck and 0.26 per cent by improved duck) or for meat production (broiler birds). Considering the economic importance of poultry sector in the country, there is a huge potential for it to grow further. In most of the developing countries, extension service serves as a major source of information to the farmers. However, farmers do not get information specific for their agricultural activities due to various reasons one of them being failure to meet the extension agents (Wakhungu 2010). The situation hinders poultry productivity and reduces their contributions to the agriculture sector and to the achievement of broader economic and social development goals. Layer farmers share technical knowledge to the other farmers by motivating them to adopt the layer farming, further helping them in establishing the farm. Given the above scenarios, an intervention which complemented extension agencies contacts used, and technology sharing by layer farmers was done in state UP.

METHODOLOGY

A field survey comprising of 108 layer farmers was carried out in five agro-climatic zones of state Uttar Pradesh to assess the impact of layer farming training programme. The respondents (trainee layer farmers) were belonging to 5 agro-climatic zones out of 9 agro-climatic zones. As far as zone wise distinction of trainees is concerned, twelve, three, seventeen, eleven and eleven trainee layer farmers were from mid-western zone, Western plain zone, mid-plain zone, north eastern plain zone and eastern plain zone, respectively. Equal number (54) of non-trainee layer farmers was selected from same agro-climatic zone as respondents. Thus, total sample size was 108. For study, a mailed questionnaire and interview schedule was developed for data collection. Personal interview, direct observation and telephonic survey were used to collect data from the respondents. The collected data were compiled, tabulated and analysed by using standard statistical procedures and meaningful inference and conclusions were drawn out. Extension agency channels were divided into two categories personal localite

sources and cosmopolitan based on their origin. This was measured by direct questioning and responses were given scores like 2, 1 and 0 for often, occasionally and never, respectively. Ranks were given with the help of weighted mean scores. Findings of technology sharing were represented in terms of frequency and percentage.

$$\text{Weighted mean score} = \frac{X(2) + Y(1) + Z(0)}{X + Y + Z}$$

Where, X = Number of respondents who contacted an extension agency 'often'

Y = Number of respondents who contacted an extension agency 'occasionally'

Z = Number of respondents who contacted an extension agency 'never'

RESULT AND DISCUSSION

Socio-personal profile

Majority 44.44 per cent of layer farmers were belonging to middle (37-46 years) age, followed by young and old (27.78% each) age group. Deka *et al.* (2013) also reported similar findings as 49.00 per cent of the respondents were belonged to middle, followed by young (45%) and old (6%) age group. Majority (80.56%) of the layer farmers had education up to graduate and above, followed by higher secondary (13.89%) and high school level (5.55%) education. None of the layer farmer was middle, primary, functional literate or illiterate. Thorat (2005) also reported similar trends that nearly two-fifth (39.09%) of the poultry entrepreneurs were had college level education, followed by higher secondary (34.55%), secondary level education (19.09%) and high school level (7.27%). Majority (73.14%) of layer farmers professed poultry as primary occupation, followed by agriculture (9.26%), government job & animal husbandry (5.56% each), business (3.70%) and other (2.78%). While, agriculture was secondary occupation for half of the layer farmers (50%), followed by animal husbandry (41.67%) and other (8.33%) occupation. The 'other occupation' includes that aquaculture, architecture, egg trading and beauty parlour. About 36.00 per cent of layer farmers were belonging to small land holding, followed by marginal (34.26), medium (21.30%), landless (7.40%) and large

(0.93%) categories. Overwhelming majority (95.24%) of layer farmers had low level of experience in poultry farming, followed by medium and high (both 2.38%) experience in poultry farming. The mean poultry farming experience of layer farmers was 5.11 years.

Extension agency contact

The data given in Table 1 reveals that the trainee layer farmers contacted to CARI, was “oftenly” by 72.22 per cent farmers at rank I, followed by Venkys (“oftenly”, 72.22%, II rank), SDAH “oftenly” (55.56%, III rank) and KVKs occasionally (75.93%, IV rank), NGOs and cooperatives societies were never used by trainee layer farmers. While, in case of non-trainee layer farmers, SDAH “oftenly” (90.74%, I rank), followed by KVKs (“occasionally”, 61.11%, II rank) and Venkys (“oftenly”, 50.00%, III rank), CARI, NGOs and cooperatives societies were never used by non-trainee layer farmers. On overall basis, majority (73.15%) of layer farmers contacted to SDAH “oftenly”, followed by Venkys (“oftenly”, 72.22%), CARI (36.11%, “oftenly”) and KVKs (“occasionally” 68.51%). Rank wise, SDAH was at ranked I, followed by Venkys (II) KVKs (III), CARI (IV) and NGOs and cooperatives societies (V). It is obvious from above data that CARI was utilized often by overwhelming majority (92.59%) of trainee layer farmers, while the entire non-trainee layer farmer never utilized CARI as an extension agency. Venkys was highly utilized by trainee layer farmers (72.22%) as compare to non-trainee (50.00%) layer farmers. It may be inferred from the results that majority of non-trainees are more efficiently connected to SDAH and KVK than trainees, while trainees were getting information from CARI more efficiently. All the respondents were found to contacting to one or more extension agencies. Babu (2013) also reported similar trends that about 18.33 per cent of respondents were contacted the State Department of Animal Husbandry (SDAH), followed by CARI (16.67%), other universities (16.67%) and IVRI (6.67%). None of the layer farmers ever contacted NGO or cooperative society for getting information about layer farming.

Technology sharing

The data given in Table 2 reveals that majority (72.23%) of trainee layer farmers were belonging to low

Table 1: Distribution of trainee and non-trainee layer farmers according to extension agency contact

Agency	Trainees (n=54)					Non-trainees (n=54)					Pooled (n=108)				
	Often	Occasionally	Never	WM	Rank	Often	Occasionally	Never	WM	Rank	Often	Occasionally	Never	WM	Rank
SDAH	30 (55.56)	8 (14.82)	16 (29.62)	1.30	III	49 (90.74)	5 (9.26)	0 (0.00)	1.91	I	79 (73.15)	13 (12.04)	16 (14.81)	1.64	I
KVK	13 (24.07)	41 (75.93)	0 (0.00)	1.24	IV	21 (38.89)	33 (61.11)	0 (0.00)	1.39	II	34 (31.49)	74 (68.51)	0 (0.00)	1.36	III
CARI	39 (72.22)	13 (24.08)	2 (3.70)	1.68	I	0 (0.00)	0 (0.00)	54 (100)	0	IV	39 (36.11)	13 (12.03)	56 (51.86)	0.88	IV
VENKY	39 (72.22)	7 (12.97)	8 (14.81)	1.57	II	27 (50.00)	17 (31.49)	10 (18.51)	1.31	III	66 (61.11)	24 (22.22)	18 (16.67)	1.50	II
NGO	0 (0.00)	0 (0.00)	54 (100)	0	V	0 (0.00)	0 (0.00)	54 (100)	0	IV	0 (0.00)	0 (0.00)	108 (100)	0	V
Cooperative society	0 (0.00)	0 (0.00)	54 (100)	0	V	0 (0.00)	0 (0.00)	54 (100)	0	IV	0 (0.00)	0 (0.00)	108 (100)	0	V

Table 2: Distribution of trainee and non-trainee layer farmers according to technology sharing

Technology sharing (numbers)	Trainees (n=54)	Non-trainees (n=54)	Pooled (n=108)
Low (up to 6)	39 (72.23)	46 (85.18)	86 (79.62)
Medium (7-13)	8 (14.81)	5 (9.26)	13 (12.03)
High (14 and above)	7 (12.96)	3 (5.56)	9 (8.33)
Mean±SE	5.27±1.17	5.17±0.65	5.29±0.59

level (<6 farmers) category of technology sharing followed by medium (14.81%) and high (12.96%) category. While, in case of non-trainees, huge majority (85.18%) of layer farmers were belonging to low level category of technology sharing among farmers followed by medium (9.26%) and high (5.56%) level of categories. All together, huge majority (79.62%) of the layer farmers were belonging to low level category of technology sharing among farmers followed by medium (12.03%) and high (8.33%) level of categories. However, the proportion of trainee layer farmers in medium (14.81%) and high (12.96%) categories was higher as compared to medium (9.26%) and high (5.56%) categories of non-trainee layer farmers. Technology sharing was higher in trainee layer farmers. This might be due to their high knowledge and adoption level, high socioeconomic status due to training which makes them early adopters. The pooled data reveals that the mean of technology shared farmers was 5.29. The average technology shared among farmers of the trainee and non-trainee layer farmers were 5.27 and 5.17, respectively.

CONCLUSION

Layer farming is being professed by middle and old aged farmers having graduate and post graduate education, small land holding and layer farming as primary occupation. CARI was mostly utilized by trainee layer

farmers as they got training from there. Non-trainees had correspondence mainly with the state animal husbandry department's officials. Other than these two, KVK and private organisation Venkys were the most contacted extension agencies. There was negligible role of NGO and cooperative societies regarding information provisioning about layer farming. Layer farmer's shares technology to other farmers more efficiently than non-trainees. So, need based trainings should be organized for non-trainee layer farmers by CARI also to bring them as far with trainee layer farming.

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Pulses Production in Lalitpur District of Bundelkhand: Constraints and Opportunities

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ABSTRACT

Per capita net availability of pulses in the country declined sharply over the years due to stagnation of productivity as well as decline in area. For present study, fifteen villages of three blocks and from each village 12 farmers were selected randomly making a total of 180 farmers from Lalitpur district of Bundelkhand region to find out the constraints and opportunities in pulse production. It was revealed that stray animal & blue bull, middle man and lack of education were socio-personal constraints. Among infrastructural constraints lack of irrigation facility, non availability of quality seed were major. Other constraints included high infestation of pest and diseases (wilt, root rot and pod borer), non availability of inputs at proper time (quality seed, bio-pesticide and herbicides etc.), low market price, lack of technical guidance as perceived by the pulse farmers.

Keywords: Chickpea, Constraints, Farmers, Lentil and field pea, Pulse production

INTRODUCTION

Pulses in India have long been considered as the poor man's only source of protein and named as "the poor man's meat" because the consumption of dairy and animal products is very low among the poorest segment of both rural and urban India. Pulses also play predominant role in food and nutritional security due to their high nutritional value (20-30% protein) (Srivastava *et al.*, 2010). Pulses contribute substantially to food production system by enriching the soil through biological nitrogen fixation, improving soil physical conditions and maintenance soil condition. India accounts for 33 per cent of the world area and 22 per cent of the world production of pulses, also, India is the largest producer (25.7% to the world production) consumer and importer of pulses in the worlds (Chauhan *et al.*, 2016). Pulse production can be increased

by 5-6 million tonnes by 2020 by promoting adoption of shorter duration pulse varieties and varieties that are disease and pest resistant (Joshi *et al.*, 2017). It has been projected that total pulse requirement for the burgeoning 1.69 billion population by 2050 will be 32.0 million tones (Yadav *et al.*, 2019). There is a big gap in supply and demand of major pulses in India, suggesting a shortage of pulse for domestic consumption to the tune of 114.50 lakh tonnes of Gram (Chickpea) and 365.60 lakh tonnes of Tur (Pigeon pea) by 2030 (Jadhav *et al.*, 2018). Pulse account for around 20 per cent of the area under food grain and contribute around 7-10 per cent of the total food grains production in the country. Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh and Karnataka are the top five pulses producing state. In India, pulses constitute a group of 12 crops that include mainly chickpea pigeonpea (*Cajanus cajan* L.), chickpea (*Cicer*

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arietinum L.), mungbean (*Vigna radiata* L. Wilczek), urdbean (*Vigna mungo* L. Hepper), lentil (*Lens culinaris* L.) and fieldpea (*Pisum sativum* L.). Since more than 80 per cent of the area under pulses is under stressed rainfed environment, the quality seed of improved varieties has emerged as the most vital input for enhancing pulses production in India. U.P. plays an important role in pulses production by contributing about 9.0 per cent to the total pulses production of the country. Among pulses, chickpea contributes maximum (28%) followed by lentil (22%), urdbean (16%) pigeonpea (14%) and moongbean (2%) in the total production of pulses in U.P. Bundelkhand region is consisting of 13 districts including 7 districts in UP and 6 districts in MP. In U.P. Bundelkhand is a major pulses growing region of India (Sharma and Sisodia, 2018). The 7 districts of Bundelkhand viz., Banda, Chitrakoot, Jalaun, Mahoba, Hamirpur, Lalitpur, and Jhansi are famous for pulses cultivation and these areas are considered as pulse bowl in the country. The major *kharif* crops in the NFSM (Lalitpur District) district are Pulses (90%) and in the *rabi* season pulses (59%) and wheat (41%) are the major crops. Overall, 74 per cent of the GCA has been allocated to pulses and 21 per cent to wheat and 5 per cent to other crops in the district (Shekhar and Bhatt, 2012). The present study was undertaken to analyze the factors affecting pulse production in Lalitpur district of U.P.

METHODOLOGY

The present study was conducted in purposively selected block Jakhaura, Birdha and Mehrauni of the Lalitpur district. From each block 5 villages were identified for the study. From each village 12 farmers were selected randomly. Thus, the total a sample of 180 farmers was drawn from the fifteen village of three block of the district. Data were collected through interview schedule and group discussion. Thereafter data were analyzed by using simple calculation frequency and percentage. The exhaustive list of constraints was prepared in advance from review of literature to formulate the schedule.

RESULTS AND DISCUSSION

The data presented in the Table 1 show that maximum farmers were in middle (39%) age followed by young

Table 1: Socio- Personal Characteristics of the Respondents (N-180)

Variables	Categories	No.	%
Age	Young (0-30 years)	42	23.0
	Middle (30-45 years)	70	39.0
	Old (45 to 70 years)	68	38.0
Education	Illiterate	40	22.2
	Low (0-5 th)	42	23.3
	Medium (6 th -12 th)	79	43.8
	High (12 th -above)	19	10.5
Family size	Small (Up to 4 members)	64	35.5
	Medium (4 to 8 member)	92	51.0
	Large (8 th above)	24	13.3
Family type	Nuclear	82	45.5
	Joint	98	54.5
Land holding	Marginal (up to 2 ha)	29	16.0
	Small (2 to 4 ha)	47	26.0
	Large (8 th above)	104	57.7
Occupation	Farming	98	54.4
	Labour	60	33.3
	Business	12	6.7
	Service	10	5.5

(23%) and old (38%) involved in pulse production in the area where as 43.8, 23.3 and 10.5 per cent had a Medium, Low, and High level of education, respectively. It was found that 35.5 per cent of them had small family size, while only 13.3 per cent had large family size. About 55.0 per cent respondents were having joint family and 45.5 per cent belonged to nuclear family. It was observed that 57.7 per cent respondent had large land holding, while 26 and 16 per cent had small and marginal respectively. It was found that 54.4 per cent holding farming, while one-third of them were labourers; and about 6 per cent of them followed business or service as occupation.

The data in Table 2 shows that majorly five constraints were perceived by the farmers as Stray animal and blue bull was ranked the first. Similar results reported by Nain *et al.* (2015) whereas Crop damage by wild animals and high cost of input were the other major constraints. The other constraints like that Middle Man (69.4%), Education (63.8%), Labour Scarcity (56.6%) and High Transportation Cost (52.7%) were reported as important

Table 2: Socio-Personal Constraints (N=180)

Constraints	Frequency	Percentage	Rank
Education	115	63.8	III
Labour sacristy	102	56.6	IV
Stray animal and blue bull	126	70.0	I
Middle man	125	69.4	II
High transportation cost	95	52.7	V

Table 3: Infrastructural constraints

Constraints	Frequency	Percentage	Rank
Non availability of quality seed at time of sowing	120	66.6	II
Lack of effort towards seed production	94	52	V
Poor quality input in the market	110	61	IV
Lack of irrigation facility	124	68.8	I
Lack of Soil Testing facilities	117	65	III

constraints ranked at II, III, IV and V place respectively. Similar results have also been reported by Pandey *et al.* (2016).

It was found that lack of irrigation facility with 68.8 per cent was placed that Ist rank among infrastructural constraints (Table 3). The other constraints like non availability of quality seed at a time of sowing (66.6%), lack of soil testing facilities for providing quality inputs (65%), poor quality inputs in the market (61%), lack of interest towards seed production (52%), were reported constraints ranked at II, III, IV & V respectively. Similar results have also been reported by Kumar *et al.* (2010).

It is evident from Table 4 that lack of technical knowledge about pulse production (68.3%), lack of motivation about pulse production (63.8%), low risk bearing ability of the farmers (60%), negative attitude of

Table 5: Financial constraints technical constraints marketing constraints

Constraints	Frequency	Percentage	Rank
High labor charges	109	60.5	III
Lack of subsidy on HYV	118	65.5	I
High cost of weedicides and pesticides	115	63.8	II
Non availability of credits facility in a time	90	50.0	V
High cost of equipments	84	46.6	VI

the farmers about pulse production (51.6%) and lack of confidence about technical knowledge provided by government agencies (49.4%) were major psychological constraints respectively.

It was observed that lack of subsidy on HYV (65.5%), high cost of weedicide and pesticide (63.8%), with high labors charges (73.8%), non availability of credit facility in a time (50%) and high cost of equipments (46.6%) were financial constraints as assigned by the respondents respectively.

The data presented in Table 6 reflects that lack of technical guidance at a right time as (69.4%) was ranked 1st, followed by lack of knowledge about seed treatment, lack of knowledge about fertilizer application method and doses, unavailability of suitable variety and lack of knowledge about seed rate with an overall percentage 67.2, 64.4, 63.3 were major technical constraints. The other constraints were lack of knowledge about package of practices, lack of knowledge about insect pest and disease management and lack of knowledge about bio-fertilizer with an overall percentage 60.5, 53.8, 50.0 and 46, respectively. The perusal of data presented in Table 7 clearly show that monopoly of traders was major marketing constraint. Low price of agriculture

Table 4: Psychological constraints

Constraints	Frequency	Percentage	Rank
Low risk bearing ability of the farmers	108	60.0	III
Lack of motivation about pulse production	115	63.8	II
Lack of technical knowledge about pulse production	123	68.3	I
Negative attitude of farmers towards pulse cultivation	93	51.6	IV
Lack of confidence about technical knowledge providing by Govt. agencies	89	49.4	V

Table 6: Technical Constraints

Constraints	Frequency	Percentage	Rank
Unavailability of suitable variety	114	63.3	IV
Lack of knowledge about package of practices	107	59.4	VI
Lack of technical guidance at a right time	125	69.4	I
Lack of knowledge about seed treatment	121	67.2	II
Lack of knowledge about seed rate	109	60.5	V
Lack of knowledge about fertilizer application methods and doses	116	64.4	III
Lack of knowledge about weed management	97	53.8	VII
Lack of knowledge about insect pest and disease management	90	50.0	VIII
Lack of knowledge about Bio fertilizer	83	46.0	IX

Table 7: Marketing Constraints

Constraints	Frequency	Percentage	Rank
Price fluctuation	110	61.0	IV
Lack of storage facility	102	56.6	V
Low price of agriculture commodities in peak season	125	69.4	II
Monopoly of traders	130	72.0	I
Biasness by Mandi Officers	90	50.0	VI
Malpractices of middle man	118	65.5	III

commodities in peak season and malpractices of middle man followed. Other marketing constraints were price fluctuation, lack of storage facilities and biasness by Mandi officers.

Suggestions of pulse growers for minimizing the constraints presented in Table 8 shows that easy provision of timely quality input (70.5%) can solve the issue at large. The other suggestions made by the respondents include extension agencies should conduct required training at a right time (67%) , Government department should arrange

quality inputs at a time (63.8%), Organize kisan goshti at a village level (60.0%), field visit and field day be organized by extension officer (54.4%), Govt. department should convey right information at right time (50%) and Technical information should be published in newspaper, technical bulletin and extension literature (43.3).

CONCLUSION

On the basis of study it may be concluded that the maximum numbers of pulse farmers experienced various constraints in adoption of pulse production technologies. The most important problems were lack of sufficient irrigation, climate change scenario, stray animals and blue bull. Lack of timely technical knowledge, unavailability and high cost of new variety, fluctuation of price and monopoly of traders were constraint perceived by the respondents in adoption of scientific pulse production technology. To overcome such problems, there should be research and development of short duration varieties of pulses as catch crop, identify the niche markets and policy for enhancement of variety/seed replacement rate and

Table 8: Suggestion of Pulse growers to minimize the constraints

Suggestion	Frequency	NPS Percent	Rank
To provide timely quality inputs	127	70.5	I
Extension agencies should conduct required training at right time	121	67.0	II
Organize Kisan Gosthi at village	108	60.0	IV
Technical information should be published in Newspaper, Bulletin and folder	78	43.3	VII
Govt. department should convey right information at right time	90	50.0	VI
Field days and field visit organized by extension officer	98	54.4	V
Govt. department should arrange quality inputs	115	63.8	III

quality production. Research on modification of agronomic practices and their different components for excelling production under changing climatic scenario need to be strengthened.

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Utilization of Phule Jal Mobile App Among the University and KVK Scientists of Maharashtra State

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ABSTRACT

The mobile phone has become most ubiquitous technological device in the human history. In India number of smart phone users has surpassed 204 million in recent past. Most popular mobile properties are accessed via mobile apps in present days. This study was conducted on Irrigation Mobile App developed by Mahatma Phule Krishi Vidyapeeth, Rahuri. The study was conducted during 2016-17 on Utilization of Irrigation Mobile Apps by University and KVK Scientists. The investigation was carried in 10 districts with variety of geographical characteristics of Maharashtra state having the jurisdiction of Mahatma Phule Agricultural University. From selected districts 12 KVKs, 4 RECs and 5 DECAs were considered for this study. 70 trained University and KVK scientists were purposively selected as respondents for the present investigation. The findings of the investigation revealed that majority of (72.86%) of the university and KVK scientists belonged to medium utilization category, followed by low (14.29%) and high (12.85%) utilization categories, respectively. Evapotranspiration (ET_r) calculation feature had “very frequently” used by the 24.28 per cent respondents when analysed feature wise extent of utilization of *Phule Jal* app “Frequently” used features of Phule Jal mobile app were Online mode (62.86%), less frequently used feature was “Offline mode” feature by 57.14% whereas 67.15% of the respondents were “Not at all” using the “Evapotranspiration calculation” feature.

Keywords: KVK Scientists, Phule Jal Mobile App, University, Utilization

INTRODUCTION

During the last couple of decades, the spread of wireless technologies in general and individual mobile usage in particular has been revolutionary. The explosive growth of wireless communication and mobile phone industry started in early 1990s with the transition from analog to digital mobile phone networks. With the introduction of 3G mobile phone networks and devices, the growth was not only sustained but also exponentially increased. This led to spreading of this technology beyond imagination. By the end of 2010, the number of global mobile phone subscribers has surpassed 5.1 billion and

majority of the networks have been converted to 3G. These current facts and future prospects make it obvious that, the mobile phone became one of the most ubiquitous technological devices in the human history. The number of mobile users has globally surpassed the number of personal computers. There are about 2.08 billion smart phone users globally. In India number of smart phone users in 2014 were 123.33 million and was estimated 204.1 million in 2016. Many of the most popular mobile properties are mainly accessed via mobile apps in present days. Mobile Apps are software applications designed to run on smart phones, tabs and other mobile devices. There are various mobile apps which are being used for different

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purposes like entertainment, information sharing purpose, getting agricultural information purpose and much more. “Phule Jal” App has been developed by the Mahatma Phule Krishi Vidhyapeeth, Rahuri for proper irrigation scheduling to crops, only when needed and only in the amounts needed, i.e. determining when to irrigate and how much water to apply. It is expected that with proper irrigation scheduling, crop yields will not be limited by water stress from droughts and the waste of water along with energy used in pumping will be minimized. *Phule Jal* calculates reference evapotranspiration by the different standardized methods. Reference-evapotranspiration (ET_r) is estimated of a reference surface of a full grown alfalfa calculated from measured weather data. The weather data used to calculate ET_r include solar radiation, temperatures, humidity, wind speed, bright sunshine hours (BSSH) and evaporation data. The crop coefficient (K_c) is multiplied by the reference evapotranspiration rate to determine crop water use for that day. Looking into the important role of *Phule Jal* Mobile App an attempt has to make to investigate utilization of *Phule Jal* Mobile App by University and KVK Scientists.

METHODOLOGY

Investigation was conducted in 10 districts of Maharashtra state which comes under the jurisdiction of Mahatma Phule Agricultural University. Selected 10 districts have variety of geographical characteristics. From selected districts 12 KVKs, 4 RECs and 5 DECs were considered for this study. 70 trained University and KVK scientists were purposively selected as respondents. The information was collected from the 70 trained

University and KVK scientists with the help of well designed structured interview schedule. The data were processed by using frequencies and the parameters like percentage, mean, and standard deviation according to requirement. Utilization of the *Phule Jal* Mobile App of University and KVK Scientists was measured on four point continuum as very frequently, frequently, less frequently and not at all by assigning the score of 4, 3, 2 and 1, respectively. Based on the obtained total scores, the respondents were classified into three categories namely, ‘low’, ‘medium’ and ‘high’ by using mean and standard deviation

RESULTS AND DISCUSSION

It is evident from the Table 1 that majority (72.86%) of the university and KVK scientists belonged to medium utilization category, followed by low (14.29%) and high (12.85%) utilization categories, respectively

It is observed from Table 2 that Evapotranspiration (ET_r) calculation feature of *Phule Jal* app was “very frequently” used by the 24.28 per cent respondents, followed by Report viewing feature (10%) and Online mode (8.57%) along with Training Purpose (8.57%). The

Table 1: Distribution of the respondents according to their Utilization (N=70)

<i>Phule Jal</i> Utilization	Frequency	Percentage
Low (up to 11)	10	14.29
Medium (12 to 16)	51	72.86
High (17 and above)	9	12.85
Total	70	100
Mean = 13.47	S.D. = 2.5	

Table 2: Feature wise utilization of *Phule Jal* App

Features	Utilization Extent (N=70)			
	Very Frequently	Frequently	Less Frequently	Not at all
Online Mode	6 (8.57)	44 (62.86)	19 (27.15)	1 (1.42)
Offline Mode	0 (00.00)	12 (17.14)	40 (57.14)	18 (25.72)
For Calculating Evapotranspiration (ET _r)	17 (24.28)	43 (61.43)	7 (10)	3 (4.29)
For calculating ET _r by Taluka	0 (00.00)	0 (00.00)	23 (32.85)	47 (67.15)
For viewing Reports	7 (10)	39 (55.71)	17 (24.29)	7 (10)
For Training others	6 (8.57)	13 (18.57)	7 (10)	44 (62.86)

“Frequently” used features of *Phule Jal* mobile app were Online mode (62.86%), evapotranspiration calculation (61.43%), report viewing (55.71%) and training purpose (18.57%), respectively. It was also observed that more than half (57.14%) of the respondents were less frequently using the “Offline mode” feature followed by “Evapotranspiration” (32.85%) and “Report Viewing” (24.29%) whereas, more than half (67.15%) of the respondents were “Not at all” using the “Evapotranspiration” feature followed by “Training purpose” (62.86%) and “Offline mode” (25.72%). The results from the studies by Verma and Sharma (2013); Jha *et al.* (2014) and Rahul (2016) also found differential level of extent of use of components.

CONCLUSION

It may be concluded that the majority of the university and KVK scientists belonged to medium utilization category and majority of the respondents had “very frequently” used Evapotranspiration (ETr) calculation,

“Frequently” used features of Phule Jal mobile app were Online mode. So the University may organize training programmes to motivate for more practical use of this app and the publicity need to be made, also some features of no use or of less importance should be either remove or modified accordingly.

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Perceived Effectiveness of Educational Module on Brucellosis in Dairy Animals

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ABSTRACT

The study was carried out in six district of Haryana and Punjab state to assess the perceptions of dairy farmers on effectiveness of educational modules on brucellosis in dairy animals. To disseminate the information among dairy farmers regarding brucellosis prevention in dairy animals an “Educational module” was developed and the action research study explored the feedback on the module. The findings revealed that majority of the respondents were highly satisfied with information function of educational module followed by subject quality and functionality component of educational module. Perceived feedback on effectiveness of different characteristics revealed that module meet the needs of target group, applicability of educational module in field condition, color scheme used in information module, quantity of information provided and sufficient and simplicity of content for enhancing knowledge were ranked in respective order among the five component of information module.

Keywords: Brucellosis, Dairy farmers, Educational module, Perceived feedback

INTRODUCTION

In present era, well-designed, job oriented and experience based learning environments have the immense potential to support individual learners in transferring their knowledge to solve real-world problems (Brown *et al.*, 1994). This can be achieved by developing a well-planned, self-learning educational module. Educational modules consist of concise units of study material composed of theoretical and practical content delivered to learners. Information module or educational module is reusable and adaptable to different learning scenarios and objectives (Barbosa, 2004). Such modules aims at providing ways to establish effective educational products capable of creating and or improving motivational learning situations and provide a complete set of features addressing the conceptual, instructional and didactic

perspectives to the learners (Merrill, 1983). The experimental module designed for the present study was intended to provide a context for learning materials to dairy farmers on brucellosis. For theoretical contents information were incorporated from books, research papers, web information, research scientist experience and so on in educational module. Practical contents included the instructional activities and evaluations, and their resulting artifacts which were incorporated through photograph and graphics in information module. Brucellosis is the second most important zoonotic disease after rabies affecting public health and economy of many nations throughout the world particularly India (Hegazy *et al.*, 2016), the educational module was developed having significant relevance to overcome against brucellosis. Therefore, concerning above risk and high probability of disease incidence among dairy farmers and

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rural people, the present study aims to explore the perceived effectiveness of Educational module on brucellosis in Dairy animals.

METHODOLOGY

The study was carried out in six districts of Haryana and Punjab state. These districts were selected based on highest cattle population. From Punjab state; Ferozepur, Gurdaspur and Ludhiana and from Haryana state; Sirsa, Hisar and Karnal district were selected as these districts have first, second and third rank in cattle population, respectively. From each selected districts, 10 commercial dairy farmers were selected through snowball sampling method. Thus, a total of 60 respondents were selected and interviewed to get first hand information. The degree of effectiveness of the developed Educational Module on brucellosis was assessed through respondent's perceived feedback. In this study a simple interview schedule was used to measure the perceived feedback on effectiveness of Educational Module on brucellosis. It was anticipated that better the perception of respondents in terms of satisfaction derived from the various components of information module greater is its effectiveness. On the basis of satisfaction level, the

respondents were categorised into three groups viz., highly satisfied, satisfied and least satisfied. Then frequency, percentage, weighted mean score and rank were calculated for each component and each statement.

RESULTS AND DISCUSSION

Perceived feedback about different component of Educational Module

The satisfaction level about different component of Educational Module was assessed and it was found (Table 1) that respondents were highly satisfied with "Information function" with weighted mean score of 0.87. This could be due to the fact that educational module adequately covered content and presented with simplistic features which made it relevant among the users. "Subject quality" followed with weighted mean score of 0.83. The probable reasons for this could be because respondents had different preference on preciseness, simplicity, text size etc. Functionality component received a weighted mean score of 0.79; which may be due to the fact that respondents found that it beneficial for them. "Engagement and aesthetic value" received weighted mean score of 0.76 and 0.72 respectively. Findings of

Table 1: Respondents perceived effectiveness about different component of "Educational Module" on Brucellosis in Dairy animals (n=60)

Component of Educational Module	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Engagement	25 (41.67)	27 (45.00)	8 (13.33)	0.76	IV
Functionality	33 (55.00)	17 (28.33)	10 (16.67)	0.79	III
Aesthetic value	19 (31.67)	32 (53.33)	9 (15.00)	0.72	V
Information function	39 (65.00)	18 (30.00)	3 (5.00)	0.87	I
Subject quality	35 (58.33)	19 (31.67)	6 (10.00)	0.83	II

(*Figures in parentheses indicate percentage)

Table 2: Perceived Effectiveness of Engagement Component of Educational Module

Characteristics	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Create interest among users	22 (36.67)	34 (56.67)	4 (6.66)	0.77	II
Meet the needs of target group	24 (40.00)	33 (55.00)	3 (10.00)	0.78	I
Spacing is artistic and appropriate	17 (28.33)	38 (63.33)	5 (8.33)	0.73	III
In Module content is given more importance than appearance	14 (23.33)	41 (68.34)	5 (8.33)	0.72	IV

(*Figures in parentheses indicate percentage)

the study are in accordance with the study of Verma *et al.* (2019) and Shrija *et al.* (2018). After obtaining perceived effectiveness of educational module on brucellosis, problem or lacuna were solved by incorporating the suggestion of respondents.

The findings revealed that majority of the respondents were satisfied with all characteristic of 'engagement component' of educational module. 'Educational module' meet the need of target group was given first rank with weighted mean score of 0.78, because respondents found that it is directly related to dairy animals and help in solving the problem of brucellosis. Create interest among users was accorded second rank with weighted mean score of 0.77; this could be because respondents get attracted towards educational module. While spacing is artistic and appropriate and content was given more importance than appearance in educational module with weighted mean score of 0.73 and 0.72, respectively. The probable reasons for this could be because respondents had varying degree of exposure.

Findings regarding functionality component and its satisfaction level revealed that applicability of educational module in field condition was ranked first with weighted mean score of 0.90. The possible reasons behind this

could be the incidence of brucellosis in dairy animals which respondents perceived. The degree of easiness in obtaining desired information in simplest way was with weighted mean score of 0.75 while heading and subheadings which helped the users in locating the information with weighted mean score 0.72.

The findings further reveals that majority of the respondents were satisfied with different characteristic of module in term of aesthetic value components. Color scheme used in educational module was ranked first with weighted mean score of 0.79 followed by layout of module is good was given second rank with weighted mean score of 0.78. The probable reasons for this could be because respondents had curiosity and interest in module. While visual appeal, content presentation style and gestural designed of aesthetic value component of educational module was given third, fourth and fifth rank with weighted mean score of 0.75, 0.73 and 0.72, respectively. The results receive support from Nain *et al.* (2019) where as information packages were perceived effective in terms of content, format and illustrations. The reasons behind this could be the easy understanding and systematic presentation of information in the educational module.

Table 3: Perceived Effectiveness of Functionality Component of Educational Module

Characteristics	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Applicability of Educational module in field condition	44(73.33)	14(23.33)	2(1.66)	0.90	I
Degree of easiness in obtaining desired information in simplest way	19(31.67)	37(61.67)	4(6.66)	0.75	II
The Module contains headings and subheadings which helps in clarifying and understanding the information to users	15(25.00)	40(66.67)	5(8.33)	0.72	III

(*Figures in parentheses indicate percentage)

Table 4: Perceived effectiveness of aesthetic value component of educational module

Characteristics	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Layout of Educational Module	23(38.33)	34(56.67)	3(5.00)	0.78	II
Content presentation style	16(26.67)	39(65.00)	5(8.33)	0.73	IV
Gestural design of Educational Module	13(21.67)	43(71.67)	4(6.66)	0.72	V
Visual appeal	22(36.67)	31(51.67)	7(11.67)	0.75	III
Color scheme used in Educational Module	26(43.33)	31(51.67)	3(5.00)	0.79	I

(*Figures in parentheses indicate percentage)

Table 5: Perceived Effectiveness of Information Component of Educational Module

Characteristics	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Clearly visible Content on each page	11(18.33)	44(73.34)	5(8.33)	0.70	VI
Sufficient Quantity of information	29(48.33)	26(43.34)	5(8.33)	0.80	I
Accuracy of Educational Module description	09(15.00)	48(80.00)	3(5.00)	0.70	V
Credibility of information provided	24(40.00)	35(58.33)	1(1.67)	0.79	II
Quality of visual information	17(28.33)	36(60.00)	7(11.67)	0.72	IV
Accuracy and appropriateness of the health information	16(26.66)	43(71.67)	1(1.67)	0.75	III

(*Figures in parentheses indicate percentage)

Table 6: Perceived effectiveness of subject quality component of educational module

Characteristics	Highly Satisfied	Satisfied	Least Satisfied	WMS	Rank
Preciseness of content	21(35.00)	36(60.00)	3(5.00)	0.77	II
Simplicity of content in enhancing knowledge	25(41.67)	31(51.67)	4(6.67)	0.78	I
Worth recommending to other users	19(31.67)	34(56.67)	7(11.67)	0.73	III
Appropriateness of the text size of the words used	12(20.00)	42(70.00)	6(10.00)	0.70	IV

(*Figures in parentheses indicate percentage)

Results regarding perceived feedback about information component and its satisfaction level, it was found (Table 5) that quantity of information provided on module was ranked first with weighted mean score of 0.80 followed by credibility of information was ranked second with weighted mean score of 0.79, respectively. The possible reasons behind this could be the awareness of respondents about involvement of research scholar and scientist of ICAR-National Dairy Research Institute, Karnal in design and development of information module. Accuracy and appropriateness of the health information, quality of visual information and accuracy of information module was given third, fourth and fifth rank with weighted mean score of 0.75, 0.72 and 0.70, respectively. This is due to the fact that respondents found information useful in prevention of brucellosis.

Findings regarding subjective component of information module, it can be clearly seen (Table 6) that simplicity of content in enhancing knowledge was ranked first followed by preciseness of content about brucellosis in information module was ranked second with weighted mean score of 0.78 and 0.77, respectively. Recommending

educational module to other users and text size of the words used in information module was appropriate.

CONCLUSION

From the study it may be concluded that the majority of the respondents were highly satisfied with information function, subject quality and functionality component of information module. Educational campaigns must be initiated by adopting such information module to increase awareness of brucellosis among dairy farmers. Such educational campaigns must also highlight the importance of disposing aborted foetuses and placentas appropriately and avoiding the high risks associated with inappropriate risky practices.

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Association of Profile Characteristics of Rice Growers and Adoption of Recommended Package of Practices

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ABSTRACT

Rice (*Oryza sativa* L.) is one of the most important cereal grains in the world today and serves as a staple food source for more than half of the world's population. In *Konkan* region the area is about 0.44 million hectares with a production of about 15.10 lakh tons in the year 2013-2014 and for the region the package of practices of rice cultivation is being recommended by DBSKKV, Dapoli since 1972. The present study was conducted in Palghar district of Konkan region of Maharashtra state. Six villages from each of the two tehsils namely Wada and Palghar were selected purposively for this study on the basis of maximum area under cultivation of rice crop. From each selected village 10 rice growers were selected from making a total sample of 120 farmers. The data were collected through personal interview method. The extent of adoption of recommended rice cultivation technology by the farmers was at medium level. The annual income, extension contact, input availability, knowledge level were found associated with adoption level.

Keyword: Adoption, Farmers, Rice, Socio economic profile

INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most important cereal grains in the world today and serves as a staple food source for more than half of the world's population (www.thecropsite.com). Rice production; consumption and trade are concentrated in Asia. More than 90 per cent of global production is occurring in tropical and semi-tropical Asia. China and India are the major rice producing countries in the world, together contributing 55 per cent of the world rice production. (Source: www.usda.com). In India, rice is the promising crop to acquire self sufficiency of food grain production for the population. India is facing the challenges of food and fodder production to meet the demand of rising human and cattle population. There is no single solution to the challenge of global food security, instead, many options are available

to sustainably improve rice systems and enhance the overall performance of the global rice economy to reduce poverty and hunger. Priorities will differ greatly among countries and even within regions of countries. Highest yield may be obtained only under favourable physical technological and environmental conditions including soil fertility, well distributed rainfall and so on. The poor socio-economic condition of the farmers has a bearing on their investment capacity also poor supply system is responsible for yield gap at farmers' field as compared to research station's yield Singh *et al.* (2011). The present study was attempted to unravel the association of adoption of recommended practices with their socio personal attributes so that strategies in terms of capacity building or infrastructural support or policy interventions may be designed.

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METHODOLOGY

Present study was carried out in Palghar district of Konkan region of Maharashtra state. Two tehsils namely, Wada and Palghar were selected purposively for this study on the basis of maximum area under cultivation of rice crop. From each selected tehsil six villages were randomly selected, applying the criterion of maximum rice area. Thus, total twelve villages were selected. From each selected village ten respondents were selected randomly. Thus, total 120 respondents were randomly selected for this study. Exploratory study design was used. Personal characteristics were documented and adoption level of recommended practices of rice was associated with them to draw meaningful inferences.

RESULTS AND DISCUSSION

Association between the personal and socio-economic characteristics of the farmers namely, age, education, family size, area under rice cultivation, annual income, farming experience, extension contact, knowledge level and their extent of adoption of recommended cultivation practices of rice was tested by Chi-square test. The results are presented in Table 1.

It could be observed from Table 1 that the association between age and extent of adoption was 'non-significant'. In 'young' age group, only 66.67 per cent of the respondents had 'medium' extent of adoption. In 'middle' age group, more than three-fifth (69.14%) of the respondents had 'medium' extent of adoption. In 'old' age group more than three-fifth (66.66) of the respondents had 'medium' extent adoption. The chi square value 1.16 was found to be non-significant which means that there was no statistically significant association between age of paddy growers and adoption level of recommended rice cultivation practices. The finding receives support from Bhosale (2010); Dhenge (2013) and Krishna *et al.* (2007).

The association between education of rice growers and extent of adoption was 'non-significant'. Among the 'Illiterate' respondents 72.72 per cent had 'medium' extent of adoption. Among the respondents who had 'pre-primary' level of education, 60.86 per cent of the respondents had 'medium' extent of adoption. In

Education category, 'secondary' 68.09 per cent of the respondents had 'medium' extent of adoption. Among the respondents having 'higher'-secondary' education, 73.67 per cent of the respondents had 'medium' extent of adoption. In the education category, 'graduate' 75.00 per cent of the respondents had 'medium' extent of adoption.

In 'small' family size, only 83.34 per cent of the respondents had 'medium' extent adoption whereas in 'medium' family size, (62.69%) of the respondents had 'medium' extent of adoption. The chi-square value 4.90 was found to be statistically non-significant, as such there was non-significant association between Family of size paddy growers and their adoption level of recommended rice cultivation practices.

In the category, 'low area under rice cultivation', 42.85 per cent of the respondents had 'medium' adoption. There were 71.19 per cent of the respondents with 'medium' adoption who had 'medium area under rice cultivation'. In the category, 'high area under rice cultivation', 72.34 per cent of the respondents had 'medium' adoption. The chi-square value 26.72 was found to be significant. Hence, it may be inferred that there was significant association between area under rice cultivation of rice growers and their adoption level of rice among rice cultivation practicing farmers.

In the category, 'low rice yield', 50.00 per cent of the respondents had 'low' adoption. In the category, 'medium rice yield', 71.70 per cent of the respondents had 'medium' adoption. It indicated that rice growers with higher rice yield adopted more recommended practices. The chi-square value 23.74 was found to be significant showing significant association between rice yield of rice growers and their adoption level of recommended rice cultivation practices. Similar findings stand reported by Meena *et al.* (2012); Sasane *et al.* (2012) and Singh and Pandya (2012).

In the category annual income, 'low', 50.00 per cent of the respondents had 'medium' adoption. In the category, 'medium annual income', 70.84 per cent of the respondents had 'medium' adoption. In the category, 'high annual income', 75.00 per cent of the respondents had 'medium' adoption. The chi-square value 40.62 was found

Table 1: Association between socio economic variables of the rice respondents and their adoption of recommended package practices of rice

Variable/ Classification	Adoption Level			
	Low	Medium	High	Total
Age				
Young (upto 38 yrs.)	03(14.29)	14(66.67)	4(19.04)	21(100.00)
Middle (39 to 62 yrs.)	9(11.11)	56(69.14)	16(19.75)	81(100.00)
Old (63 yrs. and above)	3(16.67)	12(66.66)	3(16.67)	18
Total	15	82	23	120
$\chi^2 = 1.16$; Non-Significant d.f. = 4				
Education				
Illiterate (No Education)	02(18.18)	08(72.72)	01(9.10)	11(100.00)
Pre-primary (upto 4 Std)	06(26.09)	14(60.86)	03(13.05)	23(100.00)
Primary (5 to 7 Std))	02(16.67)	08(66.66)	02(16.67)	12(100.00)
Secondary (8 to 10 Std))	04(8.50)	32(68.09)	11(23.41)	47(100.00)
Higher secondary (11 to 12 Std))	01(5.27)	14(73.67)	04(21.06)	19(100.00)
Graduate (1 year degree programme and above)	-	06(75.00)	02(25.00)	8(100.00)
Total	15	82	23	120
$\chi^2 = 8.26$; Non –Significant d.f. = 10				
Family Size				
Small (upto 3 members)	01(3.33)	25(83.34)	04(13.33)	30(100.00)
Medium (4 to 5 members)	11(16.41)	42(62.69)	14(20.90)	67(100.00)
Big (6 members and above)	03(13.04)	15(65.22)	05(21.74)	23(100.00)
Total	15	82	23	120
$\chi^2 = 4.90$; Non-Significant. d.f. = 4				
Land holding				
Low (upto 1.0 ha)	7(50.00)	6(42.85)	1(7.15)	14(100.00)
Medium (1.01 to 2.0 ha)	8(13.56)	42(71.19)	9(15.25)	59(100.00)
High (2.01 to 4.0 ha)	0(00.00)	34(72.34)	13(27.66)	47(100.00)
Total	15	82	23	120
$\chi^2 = 26.72$; Significant d.f. = 4				
Rice yield				
Low (upto 22 qt)	7(50.00)	6(42.85)	1(7.15)	14(100.00)
Medium (23 to 32 qt)	8(7.55)	76(71.70)	22(20.75)	106(100.00)
High (33 qt and above)	0(00.00)	0(00.00)	0(00.00)	0(00.00)
Total	15	82	23	120
$\chi^2 = 23.74$; Significant d.f. = 4				
Annual Income				
Low (upto Rs. 36619/-)	7(43.75)	8(50.00)	1(6.25)	16(100.0)
Medium (Rs. 36620/- to Rs. 67464/-)	8(8.33)	68(70.84)	20(20.83)	96(100.0)
High (Rs. 67465/- and above)	0(00.00)	6(75.00)	2(25.00)	8(100.0)
Total	15	82	23	120
$\chi^2 = 40.62$; Significant d.f. = 4				

Table 1 contd....

Variable/ Classification	Adoption Level			
	Low	Medium	High	Total
Experience in rice cultivation				
Low (upto 21 yrs.)	09(26.47)	23 (67.64)	02(5.89)	34(100.00)
Medium (22 to 38 yrs.)	05(8.06)	42(67.75)	15(24.19)	62(100.00)
High (39 yrs. and above)	1 (4.16)	17 (70.84)	06 (25.00)	24 (100.00)
Total	15	82	23	120
$\chi^2 = 12.01517$; Significant d.f. = 4				
Extension contact				
Low (upto 1)	02(40.00)	03(60.00)	-	5
Medium (2 to 3)	12(12.90)	65(69.90)	16(17.20)	93
High (4 and above)	01 (4.55)	14(63.64)	07(31.81)	22
Total	15	82	23	120
$\chi^2 = 7.27$; Non-Significant d.f. = 4				
Input availability				
Low (upto 6)	01 (9.09)	08(72.73)	02(18.18)	11
Medium (7 to 13)	14(15.39)	64(70.32)	13(14.29)	91
High (14 and above)	0(00.00)	10(55.55)	08(44.45)	18
Total	15	82	23	120
$\chi^2 = 78.06$; Significant d.f. = 4				
Knowledge level				
Low (upto 49)	08(53.34)	07(46.66)	-	15
Medium (50 to 60)	06(6.67)	65(72.23)	19(21.10)	90
High (61 and above)	01(6.67)	10(66.67)	04(26.66)	15
Total	15	82	23	120
$\chi^2 = 27.51$; Significant d.f. = 4				

(Figure in parentheses indicate respective percentages)

to be significant showing that there was significant association between annual income of rice growers and their adoption level of rice among rice cultivation practicing farmers.

In the category 'low experience in rice cultivation', 67.64 per cent of the respondents had 'medium' adoption. In the category of 'medium experience in rice cultivation' 67.75 per cent of the respondents had 'medium' adoption. In the category 'high experience in rice cultivation' about 70.84 per cent of the respondents had 'medium' adoption. The chi-square value 12.01 was found to be significant.

In the category, 'low extension contact' 60.00 per cent of the respondents had 'medium' adoption. There

were 69.90 per cent of the respondents had 'medium' adoption who had 'medium extension contact'. In the category, 'high extension contacts' 63.64 per cent of the respondents had 'medium extension contact'. The chi-square value 7.27 was found to be non-significant.

In the 'low input availability' category, 72.73 per cent of the respondents had 'medium' adoption. There were 70.32 per cent of the respondents had 'medium' adoption who had 'medium input availability'. In the 'low knowledge level' category, 53.34 per cent of the respondents had 'low' adoption. In the category, 'medium knowledge level', 72.23 per cent of the respondents had 'medium' adoption. In the category, 'high knowledge of

the respondents 66.67 per cent had 'medium' adoption. The chi-square value 27.51 was found to be significant. Hence, the conclusion can be drawn that there was significant association between knowledge about rice technology by the rice growers and their adoption level of recommended rice cultivation practices.

CONCLUSION

Rice growers were middle age group, moderately educated, having an average five members in their family. The statistics in respect of their annual income, extension contact, input availability, knowledge level, which were associated with adoption, suggested that they were poor to fair in respect of these characteristics. The extension system should consider these facts while planning and executing the programmes for agricultural development of the farmers. It was observed that the extent of adoption of recommended rice cultivation technology by the farmers was at medium level. The study has clearly indicated the practices which were fully and partially adopted as well as not adopted by the farmers. These observations may serve as feedback for future line of action. Demonstration and training on rice technology need to be taken massively by concerned extension and development agencies in these areas for the practices which were least or non-adopted. The association between profile of rice growers and their adoption namely, area under rice cultivation, rice yield, and annual income, experience of rice cultivation, input availability and knowledge level about rice technology and their extent of adoption of selected agricultural technologies was significant. However, the association of age, education,

family size and extension contact, with extent of adoption of selected agricultural technologies was non-significant.

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Causes of Technological Gap in Green Gram Cultivation in District Ramabai Nagar U.P.

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ABSTRACT

The study was carried out in district Ramabai Nagar of U.P. Two Blocks selected, four villages, two from each development blocks and 80 respondents were selected for the study. Most of the respondents belonged of the middle age group, 56.25 per cent respondents belonged to backward caste. The analysis of technology gap in green gram crop showed that highest gap was found about knowing the insect, pest disease and their control and the lowest gap was found about knowing of the sowing time. The findings revealed that wider technological gaps exist in the farmers about the production recommendation for green gram cultivation. This gap in most of the green gram growing operations needs to be reduced, if the green gram yields have to improve on the farmers' field. Emphasis on green gram demonstration and farmer training for reducing the gaps is need of the hour.

Keywords: Demonstration, Production, Socio-economics, Technology

INTRODUCTION

Role of pulses in Indian agriculture needs hardly any emphasis. The pulses are an integral part of the cropping system of the farmers all over the country because these crops fit well in the crop rotation followed. Pulses are important constituents of the Indian diet and supply a major part of the protein requirement. Pulses crops besides being rich in protein and some of the essential amino acids enrich the soil through symbiotic nitrogen from atmosphere. The prices have increased considerably and the consumer is hard hit to buy his requirements. There is not much possibility of the import of pulses in the country. The production of pulses has to be increased internally to meet the demand. Moong is the most important pulse crop of India and contributes nearly 52.5 per cent of the world average and production of green gram. Moong occupies about 38 per cent of area under pulses and contributes about 50 per cent of

the total pulse production of India. It is used for human consumption as well as for feeding to animals. Both husks and bits of the 'dal' are valuable cattle feed, fresh green leaves are used as vegetable (sag), straw of moong is an excellent fodder for cattle. The Major moon moong production areas are situated in Madhya Pradesh, Rajasthan, Uttar Pradesh, Haryana, Maharashtra and Punjab. It is inevitable to draw the empirical answers to the research question that why there is more yield gap of pulses and the levels and reasons for non-adoption of recommended practices in pulses especially the most important crop like moong. Many researchers like Chaudhary *et al.* (2009); Fournier *et al.* (2007) and Maghade *et al.* (2008) explored the technology gap as well as extension gap in various crops and reasons thereof. As observed by Kumbhare *et al.* (2014) that the technology gap in pulses was observed more than extension gap at farmers' field, hence, the potential

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extension interventions are needed to reduce the technological gap as well as extension gap in pulses. Similarly, Nain *et al.* (2015) suggested horizontal expansion through short duration pulse production, genetic enhancement, development of new types of inputs implements and machinery, development of varieties for intercropping system, introduction of INM, development of varieties resistant to *Helicoverpa* and wilt diseases as some of the research and development agenda to be addressed immediately. The present study aims to find out technology gap at micro level so that appropriate strategy may be suggested and implemented.

METHODOLOGY

The study was conducted in district Ramabai Nagar of U.P. Two Blocks were purposively selected, four villages, two from each development blocks were selected randomly for the study. The today number of respondents were 80. The data were collected with the help of personal interview method during. The data were analyzed tabulated and the results were drawn with the help of appropriate statistical methods including percent, mean and ranking.

RESULTS AND DISCUSSION

It was revealed that farmers were not aware about almost all production recommendation technological gap

in green gram cultivation in District Ramabal Nagar. Table 1 indicates that the technological gaps in green gram cultivation ranged from 8.33 to 62.50 per cent. The highest gap was found about knowing of the disease control. The second major technological gap of 58.33 per cent was noticed in the seed treatment and 50 per cent in irrigation. A gap of 37.50 per cent was found in sowing methods and manure and fertilizer, 30 per cent was found in varieties and 25 per cent gap was found in land preparation, for seed rate and intercultural operation 12.5 per cent gap was found whereas in harvesting 8.33 per cent gap was found in sowing time.

Causes responsible for the low production of green gram

The causes like technological, economic, supply and services and administrative reasons responsible for the low production of green gram were studied and causes wise result have been discussed.

For the technological causes, leaving the cases of undecided, percentage of 'Agreed' have been calculated compared by χ^2 test by the test the homogeneity among them. It is observed from the analysis of the data that the statements from I to VII were not homogeneous. (Chi-square = 56.76*). The Table 2 further reveals that the 87.5 per cent respondents were unaware about the insect, pest and disease control (VI), 81.01 per cent

Table 1: Technological gap at farmers' level in green gram cultivation

Practices of green gram cultivation	Max. attainable score	Mean score obtained	Gap in score	Gap in %	Rank
Selection of soil	3	2.5	0.5	11.66	VIII
Land Preparation	2	1.5	0.5	25.00	VI
Varieties	5	3.5	1.5	30.00	V
Sowing time	3	2.75	0.25	8.33	IX
Seed rate	3	2.25	0.75	25.00	VI
Seed Treatment	3	1.25	1.75	58.33	II
Sowing methods	2	1.25	0.75	37.50	IV
Manure and fertilizer	4	2.5	1.5	37.50	IV
Irrigation	2	1.00	1.00	50.00	III
Intercultural operation	2	1.5	0.5	25.00	VI
Disease Control	4	1.5	2.5	62.50	I
Harvesting	2	1.75	0.25	12.50	VII

Table 2: Technological causes

Causes	I	II	III	IV	V	VI	VII	Total	χ^2
Agree	(a ₁) 48	64	33	32	48	70	20	(R ₁)318	56.76*
Disagree	(b ₁) 30	15	28	25	30	10	40	(R ₂)178	
Total	(C ₁)78	79	61	60	78	80	60	(N)496	
% of agreed	61.53	81.01	54.09	58.33	61.5	87.5	33.33	64.11	

*Significant

respondents were unaware about the seed treatment (III), 61.53 per cent respondent were unaware about the selection of seed (I), 58.33 per cent respondents were unaware about the irrigation (IV), 54.09 per cent respondents were unaware about the depth of sowing (III) and 33.33 per cent respondents were unaware about the harvesting technology. It is obvious from the table that the maximum number of respondents (87.5%) was unaware about the insect, pest and disease control.

For the economic causes, leaving the cases of 'undecided', percentage of 'Agreed' have been calculated compared by χ^2 test by the test the homogeneity among them. It was observed from the analysis of the data that the statements I to V were not homogeneous. (Chi-square = 21.20*). Table 3 further indicates that the 88.75 per cent respondents agreed to the statements of high cost of chemicals and equipments (II), 66.66 per cent respondents agreed of the statements of less risk bearing capacity of farmers.

For the supply and service causes, it was observed from the analysis of the data that the statement form I to III were not homogeneous. (Chi-square = 21.20*). The data in Table 4 further indicated that the 88.75 per cent respondents agreed to the statements of high cost of chemicals and equipments (II), 66.66 per cent respondents agreed of the statements of less risk wearing capacity of farmers respectively. Thus it is clear from the table that the maximum number of respondents (88.75%) agreed to the statement of high cost of chemical and equipments.

For the administrative causes, leaving the cases of 'Undecided' percentage of 'Agreed' have been calculated compared by χ^2 test by the test the homogeneity among them. It was observed from the analysis of the data in Table 5 that the statement form I to IV were not homogeneous. (Chi-square = 11.08*). The data further reveals that 77.27 per cent respondents agreed to the statement of barriers in the distribution of required varieties and seed (IV), 75.52 per cent

Table 3: Economic causes

Causes	I	II	III	IV	V	Total	χ^2
Agree	(a ₁)70	71	40	50	40	(R ₁)217	21.20*
Disagree	(b ₁)10	9	30	25	15	(R ₂)89	
Total	(C ₁)80	80	60	75	65	(N)360	
% of agreed	87.5	88.75	66.66	66.66	61.53	75.27	

*Significant

Table 4: Supply and services cause

Causes	I	II	III	Total	χ^2
Agree	(a ₁) 40	65	48	(R ₁)153	17.18
Disagreed	(b ₁) 20	15	23	(R ₂)58	
Total	(C ₁)60	80	66	(N)211	
% of agreed	66.66	81.25	72.72	72.31	

Table 5: Administrative causes

Causes	I	II	III	IV	Total	χ^2
Agree	(a ₁) 33	48	50	51	(R ₁)182	11.08*
Disagreed	(b ₁) 30	30	18	15	(R ₂)93	
Total	(C ₁)63	78	68	66	(N)275	
% of agreed	52.38	61.53	73.52	77.27	66.18	

*Significant

respondents agreed to the statements of inefficient extension workers (III), 61.53 per cent respondents agreed to the statements of irregular visit of the staff during season (II) and 52.38 per cent respondents agreed to the statement of lack of technical knowhow of the staff (I). Thus it is found that the maximum number of respondents (77.27%) agreed to the statement of barriers in the distribution of required varieties and seed.

CONCLUSION

The findings reveal that wider technological gaps exist in the farmers about the production recommendation for green gram cultivation. These gaps in most of the green gram growing operations need to be reduced, if the green gram yields have to improve on the farmer's field. Thus it emphasizes on green gram demonstration and farmer training for reducing for reducing the gaps. The causes like technological, economic, supply and service and administrative etc. existed in the study area due to which optimum yield from green gram cultivation was hurdles seriously to enhance production and productivity of green gram.

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Local Self-Governance a Right Platform for Empowering Rural Women

Adline Shanta Tigga

ABSTRACT

Panchayat Raj Institutions (PRI) is beginning to transform the process and priorities of local Government in India as well as the women also have been brought into politics. Women representation in the Panchayati Raj system is a unique experiment which translates the idea of empowerment of women in reality. The process of challenging the existing power relation and gaining great control over the sources of power may be termed as empowerment. At the same time empowerment is an active, multidimensional process, which enable women to realize their full identity and powers in all spheres of life. It is not a commodity to be transmitted nor can it be given away, power has to be required and once acquired it needs to be exercised, sustained and preserved. Empowerment is a process of awareness and capacity building leading to greater participation decision making and transformative action. This paper is an attempt to know extent of empowerment of panchayat women. The study was carried out in Pusa Block of Samastipur district in Bihar. In order to have a clear understanding of the extent of women empowerment through local self governance, the study included both the positional women leader of gram panchayats of Pusa block and reputational women leader of this institution. The data obtained were quantified and put to statistical analysis for drawing meaningful conclusions. This paper concluded that there was an overall positive impact of increased participation of women in Gram Panchayats.

Keywords: Decision making, Empowerment, Gram panchayat, Local self governance

INTRODUCTION

The evolution of women's representation in the panchayat in the decades of 1980's and 1990's as finally included in the seventy third amendment make an interesting reading. It also helps in understanding the motivation in its introduction, the invisible limit in the political commitment and challenge that women face in using this new political space. The committee on the status of women in India noted in 1974, the ineffectiveness of the taken representation of women in panchayat and staying away from a bolder initiative, recommended as a transitional measure, statutory women's panchayat as part of the panchayat structure. With the implementation of 73rd Amendment Act, 1992, India is at a crucial

structure in the evaluation of Panchayati Raj institution the Indian brand of rural local self Government. It has envisioned people's participation in the process of planning, decision making, implementation and delivery system. The panchayat Acts of State Governments have subsequently been amended to incorporate the stipulations of the Central Acts thus the constitutional mandate has heralded uniform pattern throughout Indian states. Manikyamba (1989) in her study of Andhra Pradesh found that socio-economic background in general and political backgrounds in particular are important determinants of shaping the nature and level of participation of member in political institutions. The study further revealed that education and participation were interrelated and economic status gave a sense of confidence and encouragement to participate.

Although empowerment is a process of awareness and capacity building leading to greater participation decision making and transformative action the participation of the poor women members is mostly found in significant. Present research is an effort of understanding the extent of women empowerment through local self governance,

METHODOLOGY

The study was carried out in Pusa Block of Samastipur district in Bihar. The selection of the district and its Community Development Block i.e. Pusa Block was made purposively with the consideration that the Panchayati Raj in the state was just nascent and so the structural as well as the functional status of Panchayat in different blocks of the district might not have changed much. In order to have a clear difference of the extent of women empowerment through local self governance, the study included both the positional women leader of gram panchayats of Pusa block and reputational women leader of this institution (50 each). The data obtained were quantified and put to statistical analysis by using different statistical tools for drawing meaningful conclusions. The participation in five major activities to four different extents (<25%, 25-50%, 50-75% and >75%) were measured. On the basis of the participation scores obtained by the respondents, participation index was calculated with the help of the formula given below.

$$\text{Participation Index} = \frac{\text{Score obtained}}{\text{Maximum possible score}} \times 100$$

RESULTS AND DISCUSSION

The success of any programme depends to a fact extent or the degree and nature of participation by all concerned in its planning execution and evaluation. The intensity of participation in the proceedings of the programmes play crucial role in accomplishing the tasks and achieving the objectives. With this concept in mind, the extent and nature of participation of positional women leader and the reputational women leader was studied and vice-versa to see their empowerment. The finding has been presented through Table 1.

It is evident from Table 1 that the maximum participation in selection of project was recorded by the comparison to positional women leader and the reputational women leader. There were (14.0%) of the positional women leader who were reported to participate and play effective roles in selection of the project. The magnitude of participation was more than 75.0 per cent. Further 16.0 and 18.0 per cent members were found to participate in this activity to the extent of 50.0 to 75.0 per cent and 25.0-50.0 per cent, respectively. Thus, the rest, majority of the respondents of the positional women leader had the lowest degree of participation i.e. less than 25.0 per cent. The pattern of participation was similarly observed in case of the reputational women leader too. Among these leaders, also 14.0 per cent mentioned to be participating in the selection of projects at the tune of more than 75.0 per cent and 60, 12 and 14 per cent reputational women leaders participated in selection of the projects to the extent upto 25 per cent, 25.0 to 50.0

Table 1: Participation of positional women leader and reputational women leader in local self governance (N=50)

Activities	Extent of participation							
	Positional women leader				Reputational women leader			
	< 25%	25-50%	50-75%	>75%	< 25%	25-50%	50-75%	>75%
Selection of projects	26 (52.0)	9 (18.0)	8 (16.0)	7 (14.0)	30 (60.0)	6 (12.0)	7 (14.0)	7 (14.0)
Planning for execution of the projects	28 (56.0)	11 (22.0)	5 (10.0)	6 (12.0)	33 (66.0)	6 (12.0)	9 (18.0)	2 (4.0)
Allotment and release of fund for the projects	27 (54.0)	11 (22.0)	6 (12.0)	6 (12.0)	41 (82.0)	4 (8.0)	6 (12.0)	-
Initiation of the work	26 (52.0)	10 (20.0)	8 (16.0)	6 (12.0)	31 (62.0)	11 (22.0)	3 (6.0)	5 (10.00)
Selection of workers to conduct the projects	28 (56.0)	7 (14.0)	10 (20.0)	5 (10.0)	32 (64.0)	11 (22.0)	3 (6.0)	4 (8.0)

*Figures in parenthesis indicate percentage.

per cent and 50-75 per cent, respectively. On clubbing the positional women leader and reputational women leaders separately in two groups on the basis of extent of participation below 50.0 per cent and above 50.0 per cent it can be seen that there were 75.0 per cent reputational women leader found to be participating poorly as compared to 50.0 per cent among the positional women leaders. The extent of participation recorded in respect of other activities. In planning for the execution of the projects 22 per cent positional women leader were found to participate to the extent of more than 50.0 per cent. Among the 2nd group of leaders also 22.0 per cent reported to participate to this extent. With respect to the extent of participation by positional women leader in allotment and release of funds for the projects appeared to be partial only. There were 54.0 per cent members with less than 25.0 per cent participation. Among the reputational women leaders the number at such a low level of participation swelled to 82.0 per cent. In the initiation of the work only 14.0 per cent the positional women leaders were found to participate to the extent of more than 50.0 per cent. Among the reputational women leader only 16.0 per cent were found to participate to this extent. With respect to selection of contractors/workers to conduct the projects only 30.0 per cent positional leaders were found to be able to participate to the extent of more than 50.0 per cent and the situation was found more worse in the extent of participation in this activity for reputational leaders which was only 14.0 per cent. 64.0 per cent reputational women leaders substantially had low level of participation. Their participation intensity scores were less than 25.0 per cent. There were 30.0 per cent positional leader who had medium level of participation. The participation index score of 20.0 per cent member were between 50.0 to 75.0

per cent and that of the rest 18.0 per cent members above 75.0 per cent. There were 16.0 and 12.0 per cent reputational women leaders had high and very high levels participation.

Thus it can be concluded from Table 1, the contention of that both positional and reputational women leader had low level of participation in various developmental activities of Gram panchayat. To what extent this level of participation of the women folk, especially of the positional leaders to the local self governances could be helpful in fulfilling the objectives may be a subject of investigation in future studies. However, it is certain that present reputational leader were found participating to the extent of more than 50.0 per cent. It is revealed from the above table that the both women leaders were not finding it convenient to participate fully in various roles of local self governance. Although the members were slightly better off in frequency of participation in the decision making for approval of the projects of development in a gram panchayat, at their different stages, there appeared to be a large scope for improvement unless suitable measures are taken to improve the extent of participation by the positional women leaders and the reputational women leaders of the projects, this base institution may not be able to rise to the expectations made from it. Singh (2001) also reported that panchayat organization lack adequate participation and involvement of all section of rural society in its functioning.

On the basis of the participation scores obtained by the respondents, participation index was calculated and the observation thus obtained is presented in Table 2. On perusal of Table 2 it is indicated that 32.0 per cent positional leaders position is a matter of great concern.

Table 2: Magnitude of participation by positional women leader and reputational women leader as indicated by participation index score (N=50)

Level of participation	Positional women leader		Reputational women leader	
	Frequency	Percentage	Frequency	Percentage
Low (P.I. < 25%)	16	(32.0)	22	(44.0)
Medium (P.I. 25-50%)	15	(30.0)	14	(28.0)
High (P.I. 50-75 %)	10	(20.0)	8	(16.0)
Very high (P.I. > 75%)	9	(18.0)	6	(12.0)

CONCLUSION

Positional women leaders participation in the local self governance was more than the reputational women leaders but not much satisfactory, in terms of the period of commencement of the 73rd amendment. Still both the categories of women were not much empowered. They were feeling inconvenient to participate fully in various programmes of gram panchayats. There is a need of capacity building of women leaders and the gram panchayat institution in providing right platform in local self governance so that substantial change may take place.

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Gender Mainstreaming through Livestock Entrepreneurship

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ABSTRACT

Women share of workforce in agriculture, livestock, forestry and fishery is more than 50 per cent in all states. Despite considerable involvement and contribution of women in the society, gender inequalities exist in access to technologies, credit, information, inputs and services including land and livestock and their contribution is rarely acknowledged. Participation of women in economic activities is now emerging as a universal phenomenon. Social and economic empowerment through entrepreneurial skill of women is the key factor for overall development of any country. Challenges usually faced by women entrepreneurs in India include low literacy rate (60% of women are still illiterate), visualized role of women as confined to household activities only, lack of access to resources, lack of motivation, lack of support from family members, lack of suitable infrastructure, lack of marketing facilities and lack of proper storage facilities in rural areas. Besides these, they are also plagued by low risk bearing ability, lack of information regarding new technologies, lack of training, lack of finance and other social and cultural constraints. The present paper is an attempt to highlight the interwoven nexus of gender mainstreaming, women empowerment, livestock and rural women. The paper also suggests some of the approaches to develop women entrepreneurship in livestock sector.

Keywords: Aquaculture, Dairy, Entrepreneurship, Gender, Livestock, Poultry

INTRODUCTION

India is an agriculture based country and livestock sector is an integral component of it. It is a source of food, income, employment and foreign exchange. For small income producers, it provides draught power and organic fertilizer for crop production; serves as store of wealth and means of transportation as well (Garcia *et al.*, 2006). About 90 per cent of livestock is owned by small farmers and landless rural households. These small holders, especially the landless livestock holders, are extensively dependent on income from the sale of milk and animals to meet their daily household expenses. Even in the mixed farming systems, livestock is the main source of income for rural households and a source of productive employment for the poor. The livestock production is largely in the hands of women and they are performing

phenomenal work in the rural areas (Waters Bayers, 1985).

Most of the livestock activities are incomplete without the assistance of women. Economic Survey 2017-18 says that with growing rural to urban migration by men, there is 'feminisation' of agriculture sector, with increasing number of women in multiple roles as cultivators, entrepreneurs, and labourers. In fact animal husbandry is becoming feminized and they contribute 60 to 80 per cent of labour in the animal husbandry (Younas *et al.*, 2007). They undertake various activities of livestock management such as fodder collection, grazing of animals, care of animals, feeding, watering, and health care, management, milking, cleaning of animal sheds etc. Their involvement in the post-harvest operations like household-level processing, value addition is the exclusive

responsibilities of women. They also prepare cooking fuel by mixing dung with twigs and crop residues. So one can say rural women remain busy from dawn to dusk in various agricultural activities and livestock management.

Women constitute around 50 per cent of the global population. A large number of women around the world are unwaged. The world economy suffers a lot because of a disproportionate opportunity for women at work places. In India, concept of gender sensitization is of recent origin. Women have become aware about their rights and situations and entered in different fields of business. They have established their own successful business empires. They are contributing towards the growth of economy and improvement of their socio economic conditions, however, their participation in decision making activities is minimal (Nain and Kumar, 2010). Government of India has given due importance to gender sensitization and women empowerment in the country (Borkar *et al.*, 2017)

Gender Mainstreaming and Women Empowerment

Gender mainstreaming is an approach to policy-making that takes into account both women's and men's interests and concerns. The concept of gender mainstreaming was first introduced at the 1985 Nairobi World Conference on Women. Women have undergone a radical transformation from merely a homemaker to a dynamic multifaceted personality contributing to the socio-economic growth worldwide. As per NSSO, the present share of workforce in agriculture, livestock, forestry and fishery is more than 50 per cent in all states. Despite considerable involvement and contribution of women in the society, their contribution has not been duly acknowledged. Significant gender inequalities also exist in access to technologies, credit, information, inputs and services probably because of inequities in ownership of productive assets including land and livestock. The process of creating this knowledge and awareness 'of' and responsibility 'for' gender among professionals enabling them to address gender issues in appropriate and most effective ways is called 'gender mainstreaming'. Mainstreaming is not about adding a "woman's component" or even a "gender equality component" into an existing activity. It goes beyond increasing women's

participation; it means bringing the experience, knowledge, and interests of women and men in any policy, programme, reform or activity or any developmental agenda.

Similarly, women empowerment refers to the creation of an environment for women where they can take decisions of their own for their personal benefits as well as society. It is an active, multidimensional process which enables women to realize their potential and powers in all spheres of life including economic empowerment. Economic empowerment is nothing but making women aware about their role /importance in economic development and provide them space for attaining financial independence and account their significant contributions in an enterprise.

Livestock and Rural Women

In India, women in animal husbandry and livestock sector constitute 69 per cent of the labor force as against 35 per cent in crop farming (Economic Survey 2002-03). They form the backbone of agriculture and allied activities, comprising the majority of agricultural labourers and play a significant and crucial role in agriculture and livestock developmental activities. Livestock production is largely in the hands of women. In fact animal husbandry is becoming feminized Women do a bulk of livestock related activities like fodder collection, feeding, health care of animals, watering, milking and household level processing (Planning Commission, 2012). Women accounted for 93 per cent of total employment in dairy production (Qureshi *et al.*, 2016). Depending upon the economic status, women perform the tasks Such as fodder collection, feeding, watering, and health care, management, milking and household-level processing, value addition and marketing etc. are performed by women. Despite of their significant role and considerable involvement and contribution in livestock management and production, women's control over livestock and its products is negligible and there is significant gender inequalities exist in access to technologies, credit, information, inputs and services probably because of inequities in ownership of productive assets including land and livestock. Therefore, there is a need to correct gender bias in livestock sector, veterinary education, research and service delivery systems as to enhance the effectiveness of women-oriented livestock development programs.

Developing women entrepreneurs through livestock sector

Right efforts on from all areas are required in the development of women entrepreneurs and their greater participation in the livestock based entrepreneurial activities. Some efforts which can be taken into account for effective development of women entrepreneurs in livestock sector may be considering women as specific target group for livestock based developmental programmers, vocational training to women community enabling them to understand the production process and production management including management skills, encouraging women's participation in decision-making enhancing professional competence and leadership skills, removing psychological causes of failure like lack of self-confidence and fear of success, continuous monitoring and improvement of animal husbandry related training content, capacity building in marketability and profitability of products and continued counselling through committed NGOs, psychologists, managerial experts and technical personnel to existing and emerging livestock women entrepreneurs

Gender Mainstreaming through Livestock Entrepreneurship

Entrepreneur associated to livestock farming / business, production of livestock related raw materials and livestock related processing industries is considered as livestock entrepreneur. In other terms, a person who is linked directly or indirectly to the animal husbandry or livestock sector is referred as livestock entrepreneur. Since the dairy industry has become more consumer oriented due to health consciousness and increase in purchasing power leads to development of innovative practices of organized retailing, supply chain management, balanced product portfolio, product development. It leads to increase demand for milk and milk products in recent years. Dairy farming is one of the important enterprises which dominate the economic activities of the woman in the rural areas of India. Women accounted for 93 per cent of total employment in dairy production. Depending upon the economic status, women perform the tasks of collecting fodder, watering, feeding and other animal management activities. Therefore, it serves as a profitable

enterprise for rural women as they are well aware about animal behaviour and production characteristics. Women can be guided for small scale dairy farming and commercial dairy business. They can start their own dairy farms by rearing small number of animals and with proper business plan, scientific management and care can ensure maximum production and profit from dairy farming business. If woman has to expand her dairy enterprise on a commercial basis successfully, she has to adopt new and modern dairy farming tools, time and energy saving tools/ drudgery reducing technologies, etc. Also specific entrepreneurial skills of dairy and poultry farmers need to be recognised and capacity building interventions need to be initiated for their socio economic upliftment (Gupta *et al.*, 2013). As there is more than 60 per cent fodder deficit in India, they can also start seed /fodder banks in the potential areas. Women can combine together, purchase fertile land and produce quality fodder and supply them to the nearby livestock farmers. For this they need to undergo specialized trainings from various organisations.

High demand for goat and its products with potential of good economic returns have been deriving many progressive farmers to take up the goat enterprise on a commercial scale. Goat is mainly reared for milk, meat, sale of breeding stock as an income source. This versatility allows the producer to plan and operate a more stable economic production unit. In many parts of the India, some of the goat breeds are raised for fiber, meat, and milk and cheese production. In general, the role of women in goat keeping is very significant in the rural families and goat is the most important means through which rural women are able to contribute meaningfully to the cash needs for her and their family members. Most of the activities like sale/purchase of goat, grazing of goats, feeding and watering, care of kids, cleaning of pen and household maintenance, milking of goats, health management and breeding management of goats were performed mainly by women. Thus, goat rearing is the most useful way of women's earning those who stay at home. Among the livestock livelihood, goats are more economical than cattle as they are less investment oriented. An increased level of adoption of technologies and availability of good quality breeding stock would be

essential to make the commercial goat farming more successful. Simultaneously, emerging favourable market conditions and easy accessibility to improved goat technologies are also making this enterprise a profitable venture for these women.

Poultry farming is another important livestock activity for rural women as it generates cash income and provides employment opportunities and improves household nutrition. Rural women are primarily responsible for the care and management of the bird under backyard poultry systems. Poultry rearing has significant advantages over other livestock activities to rural women, because: it is easy to manage and can be taken up under diversified agro-climatic conditions. It can provide quick returns and constant source of income throughout the year, as it enjoys good market demand and prices. Backyard Poultry Farming (BYPF) enhances women's social status and decision-making power in the household by increasing women's income and can be used as a tool to reduce poverty in rural areas. The BYPF rearing had shown a remarkable impact on women's livelihoods across the country. Since women got to deal with different people while purchasing and marketing birds or eggs, these women slowly gained confidence. Various centrally and state government sponsored schemes are promoted for empowering the BPL families mainly the women farmers eg. National Livestock Mission (NLM), Rural Backyard Poultry Development (RBPDP) which covers beneficiaries from BPL families to enable them to gain supplementary income and nutritional

The Indian aquaculture is mainly male-dominated and that is largely because it involves fieldwork, travel and living in remote areas. But it has increased significantly with the emergence of fish processing as a growth area within the manufacturing sector in the past years. A recent FAO study found that women's involvement in rural aquaculture had led to a 10- 20 per cent increase in fish production and almost all women fish farmers shown a significant improvement in their socioeconomic conditions. Women play a major role in aquaculture production as labourers and managers of the production process: fishing, processing and marketing. Women form the core of the industrial fisheries labour force through their involvement in postharvest or processing activities. The involvement

of women in these activities generates supplemental income to support their families. Some of the government agencies, NGOS, NABARD, NFDB have identified several fisheries technologies, which could facilitate women to become entrepreneurs and enhance their incomes. The various fields that can be chosen by women entrepreneurs in this sector are mainly composite fish culture prawn culture, integrated fish culture along with horticulture and animal husbandry, backyard hatcheries, fish-feed manufacturing, fish marketing (wholesale/retail), fish processing and packaging, value addition, net mending/repairs, ornamental fish farming etc. Financial support to these enterprises is provided by NABARD through a rural credit system which provides capital for short-term production/marketing activities, and medium term and long-term loans for technically feasible and financially viable projects through State Cooperative Banks, State Cooperative Agriculture, and Rural Development Banks, Regional Rural Banks and Commercial Banks.

Approaches and Strategies for Gender Mainstreaming through Livestock Sector

Lack of access to credit was a major constraint for poor women workers to develop any economic activity. Public banks were not adapted to these women who were mainly illiterate, had no collateral and little knowledge about how to use or manage credit efficiently. Rural Bank or cooperative-type bank are the right choice that targets poor women from the informal sector. Its main objective is to help women come out of poverty by providing them with financial services adapted to their situation and capacities. These Bank designed financial products to meet the women's needs and the bank created a door-to-door service so that savings could be collected regularly without requiring the women to travel to the bank. The services provided by the bank help women avoid exploitative moneylenders build their own savings, assets and learn about financial and business management. Along with this awareness should be created about various credit facilities, financial incentives and subsidies through various channels. Government and NGOs offered various schemes and opportunity to the rural entrepreneurs. But, they are unaware of these schemes and opportunities due to their illiteracy. So they should to be educated by

the conducting workshops and seminars related to their business. Financial institutions like ICICI, SIDBI, IDBI, IFCI, and SFC should also be encouraged to provide finance to rural entrepreneurs with low rate of interest and limited collateral security with liberal terms and conditions. Simultaneously, rural women could be motivated to avail finances from these kinds of institutions for starting the entrepreneurial activities.

The SHGs are voluntary associations of people formed to attain some common goals. Members in SHG agree to save regularly and convert their savings into a common fund and to use this common fund for management and business activities. The biggest problem with the SHGs is increasing substantially in rural areas as majority of them are unorganized. These groups are mobilizing thrift deposits, but unable to receive timely, matching and revolving funds to generate employment activities to earn their livelihood. To overcome these constraints SHGs are being actively promoted by government of India through Ministry of Rural Development and Employment, RBI, NABARD, DRDA, Line Departments of State Governments, NGOs, etc at various capacities. NABARD has been working as a catalyst in promoting and linking more and more SHGs to the banking system. Simultaneously the SHG should be promoted to adopt latest technologies to thrive in various market and that could be only possible if they are provided with extension and training support on a sustained manner. Therefore, there is a need for the extension workers, researchers and technologists to provide a helping hand to them.

Women dairy Cooperatives (WDC) may serve as good option for rural women to become more empower as they are authorised to make their own decision outside the home. Most of the women dairy co-operatives in India are based on the principle of maximization of farmer profit and productivity through cooperative effort. This pattern, known as the Anand Pattern, is an integrated cooperative structure that procures, processes, and markets produce. (Datta and Ganguly, 2002). The dairy activity is now largely based upon a three tier system under which, the primary village cooperative societies of women are linked with district union and state federation which are guided

by the national co-operative dairy federation in India. For e.g. Gujarat Co-Operative Milk Marketing Federation – AMUL, Karnataka Milk Federation – NANDINI, Rajasthan Co-Operative Dairy Federation– SARAS, Bihar Milk Federation– SUDHA, Tamil Nadu Co-operative Milk Producers’ Federation Limited–Aavin.

A Producer Organisation (PO) is a legal entity formed by primary producers, viz. farmers, milk producers, fishermen, weavers etc. A PO can be a producer company, a cooperative society or any other legal form which provides sharing of benefits among the members. As small producers are not able to harness the benefit of economies of scale. Besides in livestock marketing, there is a long chain of intermediaries who very often work non-transparently leading to the situation where the producer receives only a small part of the value that the ultimate consumer pays. Therefore, through aggregation the groups of women producer can avail the benefit of economies of scale. They will also have better bargaining power vis-à-vis the bulk buyers of produce and bulk suppliers of inputs. Promoting Livestock based producers organization run by women ensures investment of various stake holders involved in animal husbandry sector to improve the production and profitability. Creation of a separate label for women’s products which can give women greater recognition for their work, and develop a sense of pride and ownership of their products. Similarly, Promotion of value addition to the livestock products such as milk, egg, meat, and fish has huge profit potential. Value of the products get increased many folds during processing, and thereby provide excellent returns. Women can start their own milk parlour, where they can sell processed milk and milk products like flavoured milk, khoa, ice cream, paneer, shrikhna, curd, gulabjamun, whey milk, ghee etc. or meat centre where fried chicken, chicken, mutton keema, etc. could be sold. Marketing of these value added products could be done in their own brand name and they can start chain of parlours/hotels thereafter. Women may also opt for converting farm wastes (dung, urine, wasted fodder etc.) especially of local or deshi cows to produce biogas, vermicompost plant elixirs and pesticides etc. and sold as products that have higher market values. NABARD provides financial support to these POs through “Producers Organisation

Development Fund". Government of India provides budgetary support to these POs for its Equity Grant and Credit Guarantee Fund Scheme for the Farmer Producer Company. For creation of storage and other agricultural marketing infrastructure under the Integrated Scheme for Agricultural Marketing (Ministry of Agriculture, Government of India), FPOs are eligible to get higher subsidies. CAPART, Ministry of Rural Development also operates schemes through which support for some activities can be obtained by the PO.

Understanding the market and preparing it to respond to emerging market trends would be the prime instrument for enhancing the women livelihood opportunities in the livestock sector. Rural women entrepreneurs are facing tough competition from the large scale organizations and urban entrepreneurs. The women producers are not collective in their approach for marketing their products because they are too widely scattered and mostly uneducated. The women entrepreneurs are heavily dependent on middlemen for marketing of their products who pocket large amount of profit. Government should take steps to provide market information of different products and finance to the rural entrepreneurs at concessional rates. They should be encouraged to have a regular income by providing market-related and technical support and identifying local and national marketing opportunities. Innovative technology should be publicly announced in order to get its acceptance among the rural entrepreneurs. Access to infrastructural and storage facilities and means of transport are other means of marketing to be supported to these women in rural areas. Integrated marketing services should be provided to the rural producers through exploring, developing and establishing first the internal (local market) and then the national market for their products. Various models like rural haat, trade fairs, livestock fairs etc facilitate linkages with markets and private companies should be promoted for showcasing their products. The promotion, protection and branding of women products is an important strategy to increase female participation and benefits within an organization. The various market charges recovered from livestock dealers were registration fee, sales tax, toll tax and certificate charges are to be made at concessional rates.

Information about support system is a must for an enterprise. In short-term it is the information which helps in sound decision making. The information could be on infrastructure facilities, incentives available, financial tie-ups, availability of raw materials, tax concessions, etc. Innovative institutional and operational mechanisms and business models need to be developed to enable small-scale producers, especially women, to seize market opportunities along agricultural value chains, while taking into account issues of gender-based power inequalities and access to choices and resources. As livestock products are intrinsically difficult to trade because they are perishable, so require freezing, canning, drying, or processing of some sort to allow adequate shelf life to send to distant markets. Provision of State of Art- Abattoir cum meat processing plants and cold storage facilities at field level, establishment of custom hiring centres for the women, availability of quality inputs in bulk through authenticated sources can promote more women entrepreneur in this sector. Regional feed-fodder banks needs to be encouraged for milk production in summer months when most Indian cattle and buffaloes go dry.

One of the most significant barriers faced by Indian women is their low level of literacy as education is key to achieve self-reliance and fight poverty. Building women's capacity, especially leadership skills, is crucial to build women's self-confidence. Various organization have been developing tools and methodologies for strengthening the capacity of women to ensure that gender goals can be achieved and sustained in the long run. Capacity development enables women to access information about various organizations and to become members, and to participate more actively in their activities as well as decision making processes. On-farm technical trainings and extension services including trainings on veterinary health care, clean milk production, improved feeding practices involving local feed resources, better breeding and animal husbandry integrating the helpful traditional practices. In addition they also need the skills to run their own business. These include accounting skills, managerial skills and, marketing skills. Marketing management skills should be improved among the rural entrepreneurs to face the problems of entrepreneurship. Entrepreneurship development cell

should be established at all the villages level to provide guidance and counselling to motivate the rural entrepreneurs regarding the use of modern technology. Training institutions supported by the Ministry of Agriculture and Farmers' Welfare, Ministry of Rural Development, Government of India (www.rural.nic.in) also impart skill and capacity building training which can be made use by these women entrepreneurs. To develop entrepreneurship development individual's motivations and aspirations trigger it and their entrepreneurial competencies, adoption of best practices and facilitative socioeconomic factors play sequential role in reaching agnpreneurial success (Singh *et al*, 2016). As such the practical convergence needs to take place.

Governments play an important role in creating the enabling environment so that effective, inclusive and gender equitable organizations can flourish and act as important contributors to poverty reduction and the achievement of food security. An enabling environment will be a gender sensitive one when policies and legislation that directly or indirectly recognize that women and men from various social groups have differentiated roles and priorities; and therefore, adopt the appropriate measures so that all rural women and men can participate in, and benefit from emerging opportunities (FAO, 2000). Therefore various schemes and plans of government for the encouragement of women entrepreneurs should be strongly executed at different levels. Policies should be flexible to facilitate local circumstances. The nature of enterprises to be established in rural areas must be conducive to those areas in economic, social and environmental terms. Rural enterprise policy should cover all types of rural enterprise. There should be consistency and co-ordination with respect to the choice of rural enterprise locations.

Approaches to Develop Women Entrepreneurs in Livestock Sector

Right efforts on from all areas are required in the development of women entrepreneurs and their greater participation in the livestock based entrepreneurial activities. Considering rural women as specific target group for livestock based developmental programmers, helping women farmers to identify their production,

processing & market related constraints through awareness, exposure, exchange of information through other women farmers, extension officers and other stakeholders, establishment of continuous contact with women farmers to provide knowledge and information, empower and facilitate to demand and access services; redress their concerns & grievances; and capture ground reality for use in policy making and improving delivery through; Farmers portal, Kisan Call Centres, Common Service Centres, Short message services and Community radio stations etc. Assisting women farmers to make best use of livestock technologies and good practices of improving livestock produce through capacity building has to go a long way. Linkages with information source, new technologies and market related information such as, demand, supply and prices has a role to play. Knowledge generators (public & private, formal & informal systems) need to develop specific knowledge portals for capturing, collating and disseminating knowledge through all channels including print and electronic media, farm journals, regular meets etc. Test all indigenous technical know-how (ITKs), identify women farmer innovators, recognize their skills and leverage for field extension as farmer consultants on the philosophy of 'Farmers Field Schools' for the women farmers and introduction of ICT in delivery of extension messages and market information to the women farmers/entrepreneurs. A mechanism may be put in place to provide weekly/ daily personalized information (thru SMS/MMS) to the women farmers through Veterinary Universities/ Departments of Animal Husbandry/ KVKs. Path-breaking methods such as Kala Jathas, Extension Buses can be tried to deliver the message effectively on a large scale. The e-procurement of inputs and services required by the women farmers may be promoted to give them negotiating power to get the livestock inputs at the most competitive rates without transaction costs. Road side display models milk and meat products for the existing and emerging livestock women entrepreneurs may be promoted. Networks of women entrepreneurs and their proper linkage in the Research-Extension-Farmer-Market loop need to be ensured for the existing and emerging livestock women entrepreneurs. No doubt the group approach and synergising the efforts of all stakeholders have always yielded better results (Singh *et al.*, 2014). Proper motivation supported by

technical backstopping by research institutes, forward and backward linkages for financial needs, learning-by-doing, supported by network collaboration may enhance the competitive potential of new entrepreneurs. Although information and knowledge are important asset in an enterprise, but the economic evaluation of such knowledge along with the desirable psychological traits of the potential entrepreneurs need to be supported and motivated through examples, role models, expert opinion and counseling (Nain *et al.*, 2015). Focus need to be on nutritional value and new or unknown products for which technical skills and ability of the women entrepreneurs need to be sharpened. Extension Agencies and Women Farmers' Organizations have a bigger role to play.

CONCLUSION

Gender mainstreaming and gender sensitization is a challenge but through livestock based enterprises / ventures in rural area can help to meet these challenges. These enterprises not only enhance national productivity, generate employment but also help to develop economic independence, personal and social capabilities like; economic empowerment, improved standard of living, improvement in leadership qualities, involvement in solving problems related to women, decision making capacity in family and community, build-up self confidence, increased social relations, political participation, increased participation in various developmental programs and enhance awareness etc. amongst rural women. Livestock women entrepreneurs may contribute significantly in rural and economic development in India. However, lacks of suitable gender mainstreaming and gender sensitization policies, supportive network, financial and marketing prospects may hamper their entrepreneurial activities. National policies should be resolute in tackling this issue and local bodies should ensure the implementation of these policies at the community level and at last but not the least the rural women needs to be motivated to take up entrepreneurship as a career, with training and sustaining support systems providing all necessary assistance.

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Perceived Communication and Psychological Factors by Shopkeepers Regarding Goods and Services Tax (GST)

Shatakshi Semwal^{1*}, Ella Rani², Vandana Verma³ and Joginder Singh Malik⁴

ABSTRACT

India has gone through a lot of changes during past years and this scenario had an adverse impact on India's economy. First there was demonetization to choke back the black money and later there was Goods and Services Tax (GST) that is still updating its tax slabs. Due to the implementation of GST, both consumers and shopkeepers find themselves with low knowledge level and negative perception of GST. So, there arises the need to find the factors affecting the people in accepting and rejecting this new tax reform. The present study was conducted in Hisar city of Haryana state where 30 respondents from five respective sections were selected i.e. Food, Clothing and Textiles, Electrical appliances, Medical and Cosmetics and Communication and Transportation; thus making a total sample of 150 respondents. Data inferred that majority of the respondents had accessibility to newspapers, televisions and mobile phones to receive and share information. Further, they used to obtain information regarding GST from their friends and the shopkeepers' meetings held in their area; processing and its evaluation was done by discussing it with elders and other shopkeepers; and dissemination of information was done through the group meetings and newspaper articles/social media posts respectively. It was also found that they had high change proneness with medium risk orientation and entrepreneurial motivation. The present study may attract the attention towards giving the shopkeepers and consumers efficient and effective news about various household products and holding training for paying their personal taxes.

Keywords: Communication variable, Goods and Services Tax, Mass media exposure, Psychological variable, Shopkeepers

INTRODUCTION

India is going through a lot of changes in recent past years. First there was demonetization to choke back black money and remove corruption followed by GST. He ralded as one of the India's biggest tax refinement since Independence Goods and Services Tax (GST) replaced the previous cascading tax system and came into force after 17 thundering and uncertain years of debate, unifying more than a dozen central and state levies. The new tax regime was ushered under the One Hundred and First

amendment of the constitution of India, officially known as the constitution (One Hundred and First Amendment) Act, 2016, in the parliament at the late night of 30th June and came into force on 1st July 2017. The one National GST unifies the country's USD 2 trillion economy and 1.3 billion people into a common market (Rani, 2017).

The proposed GST is likely to change the whole scenario of previous indirect tax system. India has got a well-structured and simplified taxation system, where authoritative segregation has been done among the

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Central government, different state governments and local bodies. The Department of Revenue under, Ministry of Finance, Government of India is solely responsible for the computation of taxes. The department levy taxes on individuals or organizations for income, custom duties, service tax and central excise. However, the agriculture based income taxes are levied by the respective state governments. Local bodies have got the power to compute and levy taxes on properties and other utility services like drainage, water supply and many others. The past years have witnessed tremendous reformations of the taxation system in India.

In India dual system of GST is proposed including CGST and SGST. In India, GST is a dual taxation power bestowed on union and state governments where three taxes applicable under GST includes Central GST (CGST), State GST (SGST) and Integrated GST (IGST). CGST is collected by the central government on an intra-state sale (within state), SGST is collected by the state government on an intra-state sale (within state), IGST is collected by the central government for inter-state sale (state to state). GST is levied on each of these stages which make it a multi-stage tax. Goods and Services Tax (GST) include One Tax One Nation which is governed by a GST council and its chairman (Ministry of Finance Minister). GST council's recent decisions were nevertheless systematically eroding the strongest features of new regime i.e. simplicity and transparency. In addition, cess of 15 per cent, 22 per cent and 28 per cent or other rates on top of 28 per cent GST applies on few items like aerated drinks, luxury cars and tobacco products (Anonymous, 2019).

GST has been perceived as a revolutionary structure to ensure a uniform taxation system in Indian market and bringing compliance and advocacy. However, there are certain challenges and constraints faced by the shopkeepers in implementation of GST as increased legal formalities and complications of return filing, etc. and further, it has impacted small and medium enterprises by increasing their operational costs and impacting their profitability. There need to be an intense focus on the awareness, media exposure and psychology of the people as this will encourage professionals to understand the way to make people understand about the taxation system and they can support and accept the GST implementation.

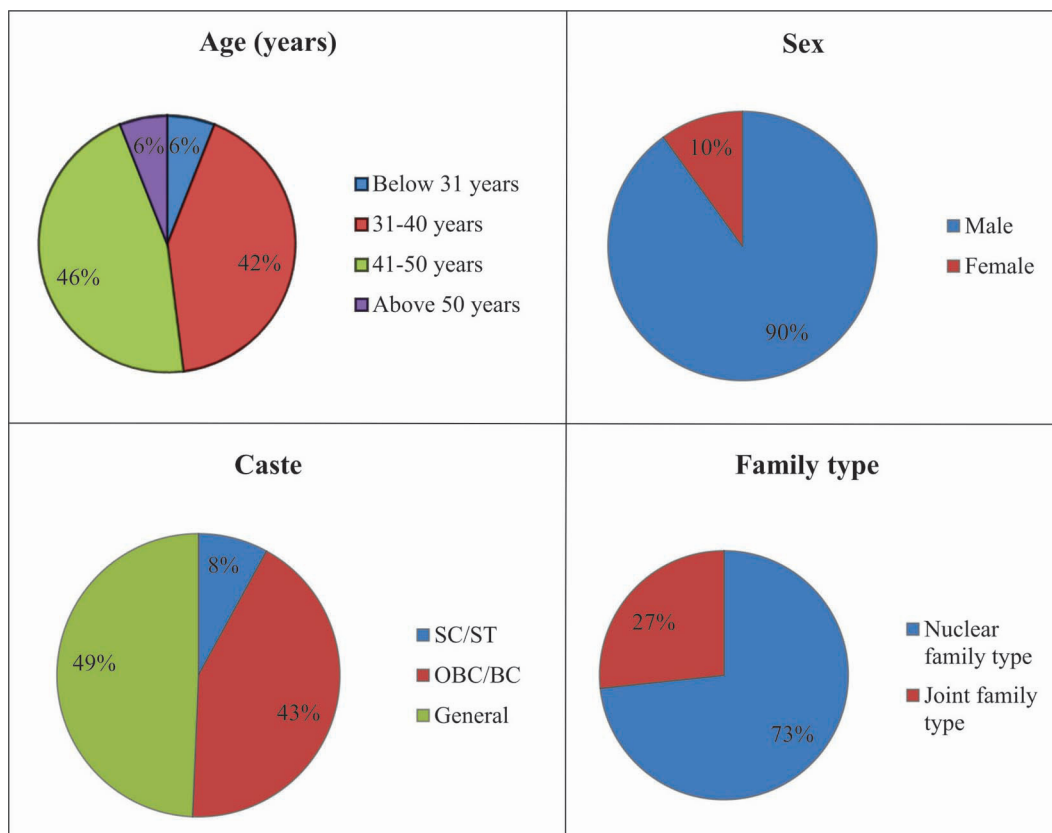
METHODOLOGY

The present study was conducted in Hisar district from Haryana state. The study was conducted in urban markets of Hisar city. Urban markets viz. Rajguru market, PLA market, Red square market and Auto market was selected randomly. Thirty (30) respondents were selected randomly from each section of household product i.e. food, clothing, electrical appliances/equipments, medical and cosmetics and communication and transportation items etc. making a total of 150 shopkeepers (including both male and female). A well structured interview schedule was used for the collection of data regarding the communication and psychological variable of shopkeepers in context with Goods and Services Tax (GST). Data was collected personally by the researcher and statistical tool for data analysis were frequency, percentages, weighted mean scores and rank.

RESULTS AND DISCUSSION

The results shows that the majority of the respondents were male having 41-50 years of age, belonging to general caste, who had nuclear family type and small family size (Figure 1). Whereas, results regarding the business profile highlighted that more than half of the respondents had self started their business with a rented type of shop having 11-20 years of experience with a annual turnover of Rs 30.1 to Rs 40 lacs. Overwhelming, majority of them were GST registered and do provide GST bills/invoices to their customers and increase in workers hiring capacity was noticed after GST implementation (Figure 2).

The communication pattern of the respondents was studied through two parameters viz. mass media exposure and information source utilization. The perusal of Table 1 clearly shows the mass media possession of respondents in terms of print and electronic media and its frequency has been calculated on three point continuum scale. It is evident from the Table that in print media cent per cent of the respondents had subscribed the newspaper and always use it and Rank IInd was given to magazines. In electronic media, cent per cent of the respondents had an exposure to television (Rank IIIrd) and always use it, which was followed by mobile phones and computer/laptops (with internet, 60.6% each) and landline (42%, rank IInd), mobile phones and computer/laptops (without

Figure 1: Socio personal profile of shopkeepers

internet) was given Rank Ist. Only 2.6 percent of respondents possessed radio as a mass media (Rank IVth) for attaining information. Regarding utilization of electronic mass media, most of the respondents had exposure to mobile phones with or without internet, computer/laptops with or without internet which were given first rank with

weighted mean score 3.0 which was followed by landlines (IInd rank), television (IIIrd rank) and radio (IVth rank) respectively for attaining information regarding GST. Similar findings have been reported by Sharma (2018) that respondents obtain information regarding GST from their friends.

Table 1: Mass media exposure of respondents for attaining information regarding GST (N=150)

Mass media	Assets possession	Frequency of use			Weighted Mean Score	Rank
		Always (3)	Sometime (2)	Never (1)		
Print						
Newspaper	150 100.00)	119	31	-	2.79	I
Magazine	17 (11.33)	2	9	6	1.76	II
Electronic						
Radio	4 (2.66)	-	4	-	2.00	IV
Television	150 100.00)	79	71	-	2.52	III
Landlines	63 (42.00)	60	3	-	2.95	II
Mobile phones (without internet)	59 (39.33)	59	-	-	3.00	I
Mobile phones (with Internet)	91 (60.66)	91		-	3.00	I
Computers/Laptops (without Internet)	12 (8.00)	12	-	-	3.00	I
Computers/Laptops (with Internet)	91 (60.66)	91	-	-	3.00	I

Figures in parenthesis shows percentages (Low: 1.00-1.66; Medium: 1.67-2.32 and High: 2.33-3.00)

Figure 2: Business profile of shopkeepers

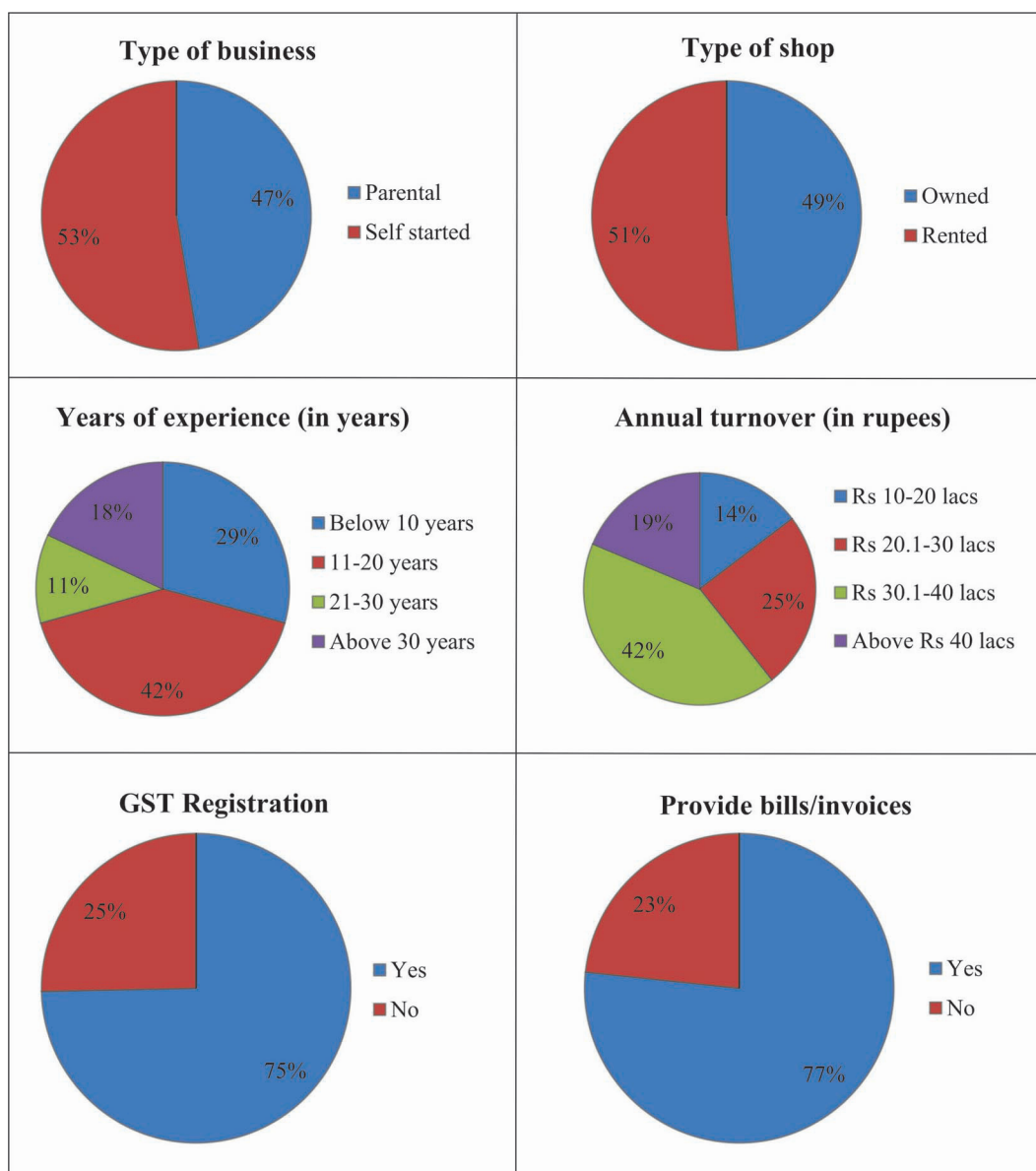


Table 2 reveals regarding the information source used by the respondents for obtaining the information. Regarding utilization of localite sources, it can be observed that the Ist rank was given to friends (with weighted mean score 2.54) which was the major source of obtaining information regarding GST, followed by other shopkeepers (IInd rank with weighted mean score 2.4), spouse (IIIrd rank with weighted mean score 1.5), neighbors (IVth rank with weighted mean score 1.1) and relatives (Vth rank with weighted mean score 1.09). For cosmopolite source, that shopkeeper meetings was given Ist rank which was followed by entrepreneurial workshops (rank IInd) respectively.

Data about information processing pattern in Table 3 reveals that how obtained information is evaluated before it is passed on to other people by the respondents. It is evident from that majority of them discuss it with elders and other shopkeepers (Ist rank with WMS 2.54) followed by self comparing and analyzing GST with previous taxes (IInd rank with WMS 2.43) was also highly practiced. Self assessment about suitability in terms of needs, economic gain and social values, etc. (IIIrd rank with WMS 2.37) while, exchange with other members of family (IVth rank with WMS 2.17) and Vth rank was scored by the respondents who discuss with friends and neighbors and was preferred by least for information processing pattern.

Table 2: Information input pattern of respondents about GST

Sources	Frequency of use			Weighted mean score	Rank
	Always (3)	Sometime (2)	Never (1)		
Localite					
Spouse	15	46	89	1.50	III
Friends	90	51	9	2.54	I
Relatives	-	14	136	1.09	V
Neighbors	-	21	129	1.14	IV
Other Shopkeepers	90	33	27	2.42	II
Cosmopolite					
Shopkeepers meetings	11	17	122	1.26	I
Entrepreneurial workshops	9	15	126	1.22	II

(Low: 1.00-1.66; Medium: 1.67-2.32 and High: 2.33-3.00)

Table 3: Information processing pattern of respondents about GST (N=150)

Sources	Frequency of use			Weighted mean score	Rank
	Always (3)	Sometime (2)	Never (1)		
Exchange with other members of family	43	90	17	2.17	IV
Discussing with friends and neighbors	3	49	98	1.36	V
Self assessment about suitability in terms of needs, economic gain, social values etc.	67	72	11	2.37	III
Discussing it with elders and other shopkeepers	90	51	9	2.54	I
Self comparing and analyzing GST with previous taxes	79	57	14	2.43	II

(Low: 1.00-1.66; Medium: 1.67-2.32 and High: 2.33-3.00)

Information output pattern show the channels used by respondents to disseminate information regarding GST. Table 4 shows the details that in individual category, other shopkeepers (Ist rank) were the major channel for information dissemination, followed by friends (IInd rank), spouse (IIIrd rank) and neighbors (IVth rank) respectively were utilized source for information dissemination. As far as group sources, meetings were the highest and only source of channel for information dissemination with (Ist rank with WMS 1.80). As regards of mass media sources, Ist rank was attained by newspaper/social media posts (WMS 1.20) were the major source for dissemination of information, which was followed by television (IInd rank with WMS 1.07) and radio (IIIrd rank with WMS 1.00) were the source for dissemination of information by the respondents.

The psychological pattern of the respondents was studied through three parameters viz. change proneness,

risk orientation and entrepreneurial motivation of respondents regarding the Goods and Services Tax. It was worthwhile to note that majority of the respondents (45.3%) had high change proneness towards GST followed by medium (37.3%) and low (17.3%) respectively. As far as risk orientation, it has slightly changed results as majority of them (64%) had medium risk orientation followed by high (23.3%) and low (12.6%) respectively. This depicts that they want to change but don't want to take risks in their ventures/businesses. Data regarding entrepreneurial motivation in terms of economic and achievement motivation, in case of economic motivation results reveals that more than half of the respondent (56.6%) has medium economic motivation which, was followed by high (30.6%) and low (13.3%) respectively. In achievement motivation, 64.4 per cent of respondent had medium (64.6%) to low (20.6%) motivation whereas 14.6 per cent of respondents had high achievement motivation. The similar findings had been

Table 4: Information output pattern of respondents about GST

Sources	Frequency of use			Weighted mean score	Rank
	Always (3)	Sometime (2)	Never (1)		
Individual					
Spouse	27	42	81	1.64	III
Friends	31	39	80	1.67	II
Neighbors	21	35	94	1.51	IV
Other shopkeepers	43	79	28	2.10	I
Group					
Meetings	38	44	68	1.80	I
Mass media					
Television	-	11	139	1.07	II
Radio	-	-	150	1.00	III
Newspaper/ social media posts	-	31	119	1.20	I

(Low: 1.00-1.66; Medium: 1.67-2.32 and High: 2.33-3.00)

Table 5: Psychological profile of respondents (N=150)

Variables	Categories	f (%)
Change proneness	Low (7-11)	26(17.33)
	Medium (12-16)	56(37.33)
	High (17-21)	68(45.33)
Risk orientation	Low (7-11)	19(12.66)
	Medium (12-16)	96(64.00)
	High (17-21)	35(23.33)
Entrepreneurial motivation		
Economic motivation	Low (6-13)	20(13.33)
	Medium (14-21)	84(56.66)
	High (22-30)	46(30.66)
Achievement motivation	Low (6-13)	31(20.66)
	Medium (14-21)	97(64.66)
	High (22-30)	22(14.68)

Figures in parenthesis shows percentages

concluded by Roy (2017) that the implementation risks remain due to the complexities of adopting the new system.

CONCLUSION

It provides a detailed insight into the short-term impact of GST implementation in the markets of Hisar with a detailed account of previous tax structure in India

and socio-personal status and business profile of respondents. It can be concluded that more than half of the respondents had self started their business with a rented type of shop having 11-20 years of experience with a annual turnover of Rs 30.1-Rs 40 lacs. Furthermore, majority of them was GST registered and do provide GST bills/invoices to their customers and increase in workers hiring capacity was noticed after GST implementation. Majority of the respondents had accessibility to newspapers, televisions and mobile phones to receive and share information regarding GST. Further, they used to obtain information regarding GST from their friends and the shopkeeper meetings held in their area; processing and its evaluation was done by discussing it with elders and other shopkeepers; and dissemination of information was done through the group meetings and newspaper articles/social media posts respectively. Results from the study also concluded that they had high change proneness with medium risk orientation and entrepreneurial motivation.

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Group Dynamics of Livestock based Self Help Groups (SHGs)

Akshita Chadda, Y.S. Jadoun*, S.K. Kansal, Jaswinder Singh and Bharti Deshmukh

ABSTRACT

The study was conducted in Ludhiana district of Punjab to observe the group dynamics of beneficiaries of livestock based Self Help Groups (SHGs) formed by different Self Help Group Promoting Institutions (SHGPIs). A total 120 SHG beneficiaries *i.e.*, 40 beneficiaries from each SHGPIs were subjected to structured interview schedule. Majority (91.67%) of the beneficiaries were involved solely in dairy farming practices. Homogeneity in standard of living was one of the major factors promoting SHG formation as stated by 87.50 per cent NGO promoted SHG beneficiaries and 75.00 per cent Government promoted SHG beneficiaries. Majority of the beneficiaries believed that they joined the group for 'family welfare & economic independence'. Decision making power, self confidence of the beneficiaries was reported improved after joining SHGs. Only 09.17 per cent of the beneficiaries had attended training regarding animal husbandry practices. The main objective of group meetings was reported as 'collecting savings' and 'inter-loaning among group beneficiaries' as key purpose for utilizing saving amount. Milk sale and savings were the major income generating activities among all the beneficiaries. The difference between group dynamics was found statistically significant among the beneficiaries of different SHGPIs ($P < 0.05$). Beneficiaries of Dairy Co-operative were having better followed by beneficiaries of NGO and Government promoted SHGs. It has been inferred that the efficient functioning of SHGs depends upon a large number of factors such as trust among the beneficiaries, motivation to join SHGs, record keeping, freedom of participation, decision-making, leadership, face-to-face communication, group homogeneity and conflict management.

Keywords: Group dynamics, Self help groups, Skill development, SHGPIs

INTRODUCTION

Women constitute 48.5 per cent (586.47 million) of total population (1210.19 million) in India (Govt. of India Census, 2011). In India, livestock production and processing is largely in the hands of women. Dairy enterprise has been regarded as an important socio-economic instrument to supplement the income and employment to the women (Ponnusamy *et al.*, 2017). The women dairy farmer has been credited with raising the country's milk production levels to among the highest in the world (Herath, 2007). Despite their considerable involvement and contribution, significant gender inequalities exist in access to technologies, credit,

information, inputs and services; probably because of inequities in ownership of productive assets including land and livestock, less involvement in decision making and lack of technical guidance (Nain and Kumar, 2010). The socio-political, decision making and educational empowerment level of dairy farm women ranges from low to medium level (Singh *et al.*, 2017) FAO's Report 2011 reveals that, if women farmers had the same access to productive resources as men, they could increase yields on their farms by 20 to 30 per cent, raising total agricultural output in developing countries by 2.5 to 4 per cent, in turn reducing the number of hungry people in the world by 12 to 17 per cent.

SHG approach has been recognized as an institutional innovation to organize poor, promote saving, channelize credit; encourage income generating programmes and then empowerment of rural poor. Rural women are engaged in small-scale entrepreneurship programme with the help of SHGs. SHGs have made an remarkable impact on adopted woman (72-97%) in terms of enhancement towards their general awareness to basic amenities, family decision making capabilities, personal security, equality of opportunity, freedom of expression, enhancement in standard of living, providing better education to their children and above all enhancement in employment and income generation (Slathia *et al.*, 2006). SHGs have an in-built mechanism where emphasis has been given over capacity building of women through developing their skills. Women through livestock based Self-help Groups have involved themselves in different types of income generating activities like dairy farming, poultry farming, piggery farming, goat farming etc. Self Help Groups enhance the equality of status of women as participants, decision-makers and beneficiaries in the democratic, economic, social and cultural spheres of life. Group approach provides a base for self-employment and income generation through group dynamics. Group dynamics is the internal nature of the group – how they are formed, what are their structures and process, how do they function and affect individual members and the other groups. As formation of SHGs is one of the most dominant approaches of women empowerment among rural people, thus, a study to investigate the status of group dynamics among the SHG beneficiaries of various Self Help Group Promoting Institutions (SHGPIs) viz; Dairy Co-operatives, Government organizations and NGOs ; and factors influencing group performance is the need of the hour. The study conducted to address the status of group dynamics of livestock-based SHGs and factors influencing group performance explores comparison between livestock-based SHGs promoted by various SHGPIs viz; Dairy Co-operatives, Government organizations and NGOs in terms of their group dynamics.

METHODOLOGY

The study was purposively carried out in Ludhiana district of Punjab based on the existence of large number of livestock based functional women Self Help Groups

(SHGs). A multistage random sampling procedure was applied to draw the sample for the study. Twenty four Self Help Groups were selected randomly from the list of Self Help Groups which are successfully functioning in livestock farming activities in various villages of different blocks of Ludhiana district of Punjab. Five SHG women beneficiaries were selected randomly from each Self help group, thereby making the sample size of 120 respondents for the study. The data were collected by face to face interview using pre-tested structured schedule and collected data were subjected to inferential statistics (frequency, mean, percentage, chi square test) to draw significant conclusions. The chi-square test was applied to test the association of group dynamics among the beneficiaries of dairy co-op., govt. and NGO promoted SHGs.

RESULTS AND DISCUSSION

The efficient functioning of SHGs depends upon a large number of factors such as trust across the members, motivation to join SHGs, attendance in SHG meetings and activities, record keeping, group formation criteria, freedom of participation, decision-making, leadership, face-to-face communication, group homogeneity and conflict management (Table 1).

Majority (91.67%) of the respondents were involved solely in dairy farming practices, while only 8.33 per cent were practicing allied farming enterprises (piggery and goatery). 'Homogeneity in standard of living' was one of the major factor promoting SHG formation as stated by 87.50 per cent beneficiaries of NGO promoted SHGs and 75.00 per cent beneficiaries of govt. promoted SHGs; whereas among 77.50 per cent beneficiaries of dairy co-op. promoted SHGs. It can be visualized from the Figure 1 that about 45.83 per cent of the beneficiaries had joined SHGs for 'availing loan', 65.00 per cent of them had joined for 'promoting saving habits', 82.50 per cent for 'family welfare and economic independence' and 25.00 per cent reported 'technical training and social security' as reason of joining SHG.

Communication in the SHG directly influences the overall performance of the group. Figure 2 shows that 'very good' and 'good' communication was reported

Table 1: Distribution of the beneficiaries of SHGs on the basis of various characteristics of SHGs

S. No.	Characteristics	Category	Beneficiaries			Total (n=120)
			Co-op. (n ₁ =40)	Govt. (n ₂ =40)	NGO (n ₃ =40)	
General structural activities						
1.	Nature of SHG	Dairy	40 (100.00)	40 (100.00)	30 (75.00)	110(91.67)
		Integrated	0 (0.00)	0(0.00)	10 25.00	10(8.33)
2.	Formation of SHG promotes	Homogeneity in standard of living	26 (65.00)	30 (75.00)	35 (87.50)	91 (75.83)
		Participation of group members	24 (60.00)	20 (50.00)	23 (57.50)	67 (55.83)
		Homogeneity in activity performed	31 (77.50)	25 (62.50)	26 (65.00)	82 (68.33)
Decision making ability						
1.	Participation in decision making	Yes	35(87.50)	32 (80.00)	36 (90.00)	103(85.83)
		No	5 (12.50)	8 (20.00)	4 (10.00)	17 (14.17)
Capacity building factors						
1.	Got training regarding animal husbandry practices after joining SHGs	Yes	3 (7.50)	3 (7.50)	5 (12.50)	11 (9.17)
		No	37 (92.50)	37 (92.50)	35 (87.50)	109(90.83)
Conduct and regularity of meetings						
1.	Objectives of the meeting : to discuss about	Savings	31 (77.50)	27 (67.50)	36 (90.00)	94 (78.33)
		Loan process	3 (7.50)	31 (77.50)	21 (52.50)	55 (45.83)
		Problem of the group members	19 (47.50)	25 (62.50)	33 (82.50)	77 (64.17)
Savings and inter-loaning activities						
1.	Regularity in contribution towards savings	Yes	4 (10.00)	24(60.00)	36(90.00)	64(53.33)
		No	36(90.00)	16(40.00)	4(10.00)	56(46.67)
	Chi square value			52.50**		
2.	Purpose of utilizing group saving	Making purchases for group	14(35.00)	13(32.50)	16(40.00)	43(35.83)
		Inter-loaning among group members	40(100.00)	37(92.50)	40(100.00)	117(97.50)
		Giving loan to outside group member	0(0.00)	0(0.00)	0(0.00)	0(0.00)
		Routine activities	23(57.50)	23(57.50)	24(60.00)	70(58.33)
		Health & education	23(57.50)	32(80.00)	32(80.00)	87(72.50)
Savings and inter-loaning activities of SHGs						
1	Amount contributed towards saving per month	Rs. 50	0 (0.00)	0 (0.00)	0(0.00)	0(0.00)
		Rs. 100	35(87.50)	35(87.50)	40(100.00)	110(91.67)
		Rs. 200	5(12.50)	0(0.00)	0(0.00)	5(4.17)
		Rs. 500	0(0.00)	5(12.50)	0(0.00)	5(4.17)
	Chi square value			20.45**		
Miscellaneous factors of group dynamics						
1.	Economic activities / Income Generating Activities (IGAs) of the SHG	Milk sale	40 (100.00)	40(100.00)	40(100.00)	120(100.00)
		Value addition	20(50.00)	10(25.00)	15(37.50)	45(37.50)
		Cow dung cake sale	15(37.50)	5(12.50)	10(25.00)	30(25.00)
		Savings/Inter-loaning	40(100.00)	40(100.00)	40(100.00)	120(100.00)
	Chi square value			9.42*		

Figures in parenthesis indicate percentage of the respondents, * significant at $P < 0.05$, ** significant at $P < 0.01$

among 56.67 per cent and 37.50 per cent of the respondents, respectively. These results are in line with Kerr and Kaufman's (1994) findings who reported that face-to-face communication enhances solidarity in the group and enhances better functioning through good cooperation. Majority of the beneficiaries; 90.00 percent from NGO, 87.50 percent from dairy co-op. and 80.00 percent from govt. promoted SHGs took part in decision making activities whereas it was found that 92.50 per cent dairy co-op., 77.50 per cent NGO and 72.50 per cent govt. beneficiaries; participate very actively in decision making as well as in SHG activities. Decision making power was improved among 81.67 per cent the beneficiaries (Figure 3). About 85.00 per cent, 82.50 per cent and 77.50 per cent of the beneficiaries from dairy co-op., NGO and govt. promoted SHGs, respectively reported that their decision making power was improved after joining SHGs. It can be inferred from the above findings that, communication among the members, extension contacts, participation in decision-making etc.

were the most important determinants of group performance and transparency in the group.

Capacity building of SHG beneficiaries plays a key role in empowering women and future sustainability of SHGs. Self confidence was increased among 72 per cent of the beneficiaries (Figure 4). As far as training is concerned, which is vital for skill development and capacity building, only 9.17 per cent of the beneficiaries had attended training. These findings are more or less in conformity with those of Prabhakara (2013), who reported that majority that nearly 71 per cent of the members of SHGs had not received any training.

Functioning of SHGs was studied in respect of parameters viz; regular meetings, savings and inter-lending. Regular meeting of SHG members is mandatory requirement to ensure smooth functioning of SHGs and effective participation of members. The main objective of group meetings was 'collecting savings' followed by 'discussing problem of the group members' and 'inter-

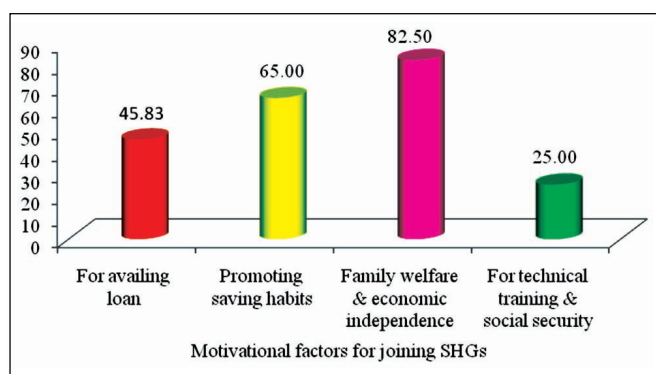


Figure 1: Motivational factors for joining the SHGs

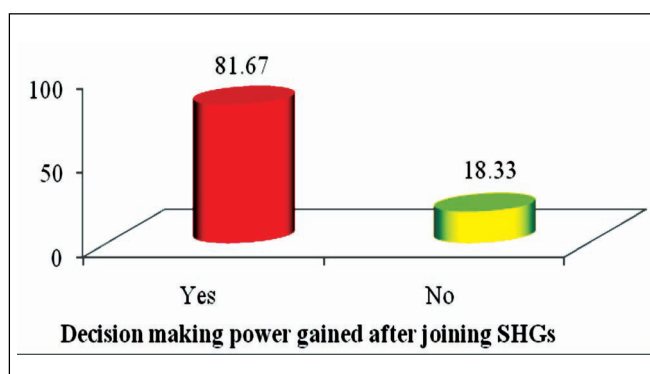


Figure 3: Decision making power gained after joining SHGs

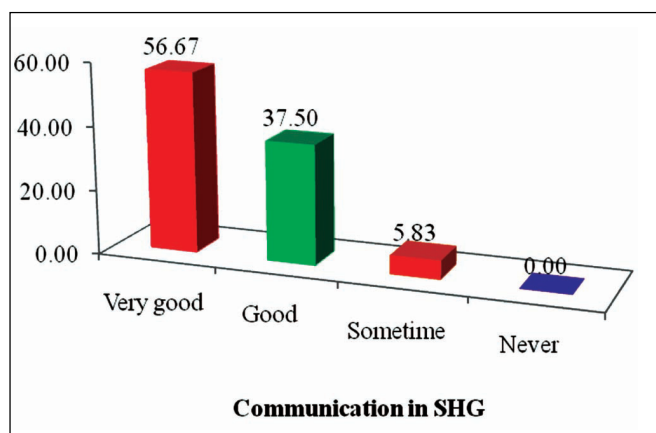


Figure 2: Communication among SHG members

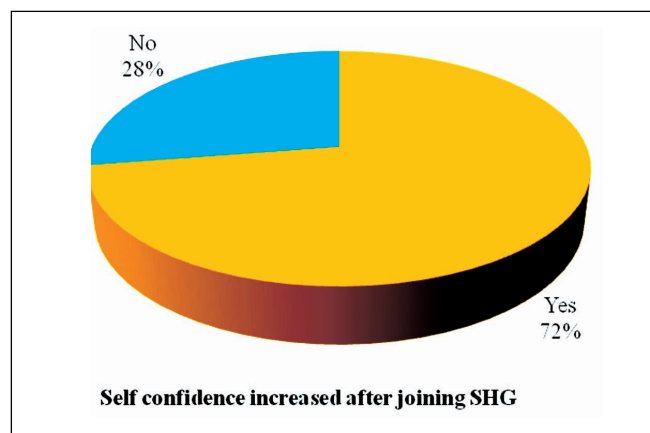


Figure 4: Increase in self-confidence after joining SHG

loaning related issues' as reported by the beneficiaries (78.33%, 64.17% and 45.83%, respectively). Findings related to the main objective of group meetings i.e. Collective savings are in line with the findings of Randhawa and Mann (2007). Regarding the frequency of meeting it can be observed (Figure 5) that meetings were attended on weekly basis by 38.33 per cent of the beneficiaries followed by; on monthly basis among 35.83 per cent of the beneficiaries and among 25.83 per cent of the beneficiaries, meetings were not attended regularly. These findings are in accordance with that of APMAS (2005) and Bora and Talukdar (2012).

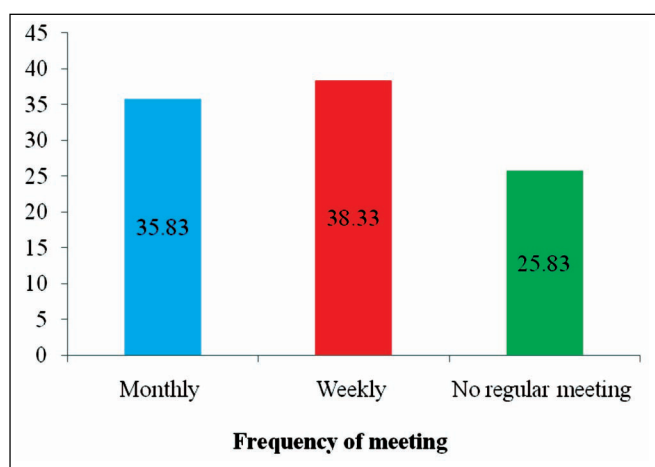


Figure 5: Frequency of meetings attended

Saving and inter-loaning activities of beneficiaries of different SHGs about basic objective of promoting SHGs among the poor women was to build up saving habit and using saving amount towards meeting the emergent needs of the SHG members. According to SHG rules amount of saving per month per member should be decided jointly by all members. It is revealed that amount of saving contributed by different SHGs were found in range of Rs 50 to Rs 500. Majority of the beneficiaries (91.67%) were contributing Rs 100 per month towards savings, 53.33 per cent of the beneficiaries in all the three groups were found to be regular in their contribution towards savings. 100 per cent of the beneficiaries each from NGO and dairy co-op. promoted SHGs and 92.50 per cent of the beneficiaries from govt. promoted SHGs were using the saving amount for inter-loaning among group members.

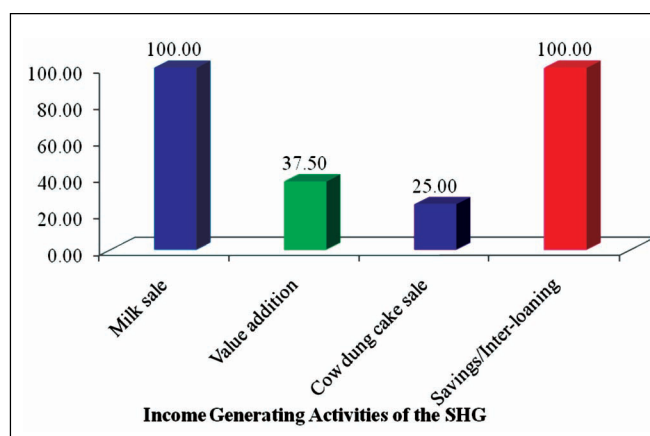


Figure 6: Income generating activities of the SHG

Regarding income generating activities of the SHGs, it was found (Figure 6) that income generating activities undertaken by SHGs were manifold viz. sale of milk, value added products (curd, ghee, pinni making), cow dung cake sale and savings/inter-loaning. Some of the beneficiaries (37.50% and 25.00%, respectively) also reported the sale of value added products and cow dung cake; as source of their income generation.

The chi-square test was applied to test the association of group dynamics among the beneficiaries of dairy co-op., govt. and NGO promoted SHGs. Components of savings and inter-loaning activities among the beneficiaries of different SHG promoting institutes (dairy co-op., govt. and NGO) such as saving per month and regularity in contribution towards savings were found to be significant at 1 per cent level. Chi square analysis for the beneficiaries of different SHG promoting institutes revealed that Income Generation Activities (IGAs) were found to be significant at 5% level among the beneficiaries of different SHG promoting institutes.

CONCLUSION

SHGs had made a significant positive impact on social participation, extension contact and mass media exposure, leading to improved socio-economic conditions of the rural women. Group dynamics have a key role in efficient functioning and performance of the SHGs. Performance of the dairy cooperative promoted SHGs was found highest as compared to NGO and government SHGs. This might be due to more active participation, enhanced decision making ability, trust in other members and very

good communication among the beneficiaries of dairy cooperative promoted SHGs as compared to NGO and government promoted SHGs. Majority of the beneficiaries have not undergone any kind of skill development training. Training is the vital component for skill development and capacity building. To achieve visible changes in rural women position within the household and the community; education, training and awareness-building programs need reorientation especially in government and NGO sponsored SHGs.

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Pulses for Nutritional Security and Ecological Sustainability

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ABSTRACT

The country is continuing striving for increasing genetic gains through novel technologies, like transgenic technology, incorporating photo-thermal insensitivity and breeding short-duration varieties for increasing cropping intensity, conservation agriculture and strategic practicable technologies, research on storage structures and minimizing post harvest losses, promoting participatory and demand driven research including value addition and appropriate policy support. All these again oriented towards reducing cost of production and enhancing income through scaling productivity so as to double the farm income by 2022.

Keywords: Ecological, Nutritional, Post harvest, Pulses, Sustainable

INTRODUCTION

In realizing self-sufficiency in pulses and Doubling farm income by 2022 A.D., the country has developed a roadmap to realize these national priorities. Following support of all our stakeholders including the farmers and policy backups, India has created a history by a record production of pulses of around 24.0 million tonnes (MT) from around 30 m ha (MH) with a productivity of more than 800 kg/ha during the last 3 years. It may be mentioned here that this incredible success was achieved through synergy in the diverse and strategic components of self-sufficiency that includes the outstanding achievements realized through scaling seed production (through 150 seed hubs and strengthening BSP), use of genomic resources, promotion/adoption of matching technologies, adequate policy support (MSP, market support, financial incentives, pulses buffer stock and good governance), value addition and processing, skill enhancing training and capacity development at diverse stake holders. It is because of these all-round strategies/success, our pulses production is also showing required stability over the last three years (2016-17 to 2018-19).

METHODOLOGY

The requirements for pulses in the country is projected at 32 MT by 2030 and 39 MT by 2050 at an annual growth rate of 2.2%. This requires strategic steps in research, generating innovations, its dissemination, and commercialization along with capacity building. Projections based on per capita availability of land, population growth rate and technological innovations shows that productivity has to be scaled up by an average of about 80 kg/ha during every 5-year interval to achieve average pulses yield of 950 kg/ha by 2025 and 1335 kg/ha by 2050 following expanding its acreage by about 4 MH. In pulses, it is also noteworthy to mention that ample number of HYVs of different pulse crops have been released and notified for their cultivation in the country recently. Marker assisted breeding & development and utilization of genomic tools are being given importance to develop multiple disease resistant cultivars for desired stability. Amalgamated with these are matching package of practices (POPs) which could have tremendous role in enhancing productivity and production in the country.

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RESULTS AND DISCUSSION

The constraints in pulses making it a profitable enterprise are many. Since actual productivities of different pulses are considerably low as compared to their potential yield as well as that realized under on-farm demonstrations (Figure 1), ample scope exists at scaling their realized productivity (under farmers' condition). Since pulses are generally grown in poor and marginal lands with minimal inputs and about 85 per cent of the pulses cultivation in the country is rainfed, productivity of pulses *per se* is low. Our farmers still use age-old varieties, grow their home-saved seeds year-after-year and that too through broadcasting instead of line sowing resulting in low plant population and yield. Farmers often don't use herbicides pre-emergence to weed to control the initial weed growth causing substantial yield loss due to these. In addition, decline in cost is not actually possible since farm mechanization is of low priority in pulses cultivation. In addition, studies showed that a few life saving irrigation/supplementary irrigation could do wonder in case rain fails at the critical stages of pulses (pick branching and reproductive stages).

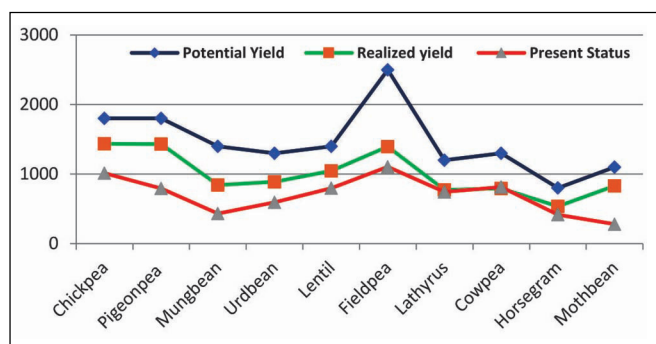


Figure 1: Yield gaps in different pulse crops

Source: IIPR, Pulse (FLDs); Present status as the national average yield

Among pests causing substantial loss in pulses output, gram pod borer in chickpea and pigeonpea, pod fly in pigeonpea, whitefly, jassids and thrips in dry beans cause severe damage to crops. And among diseases, fusarium wilt coupled with root rot complex, sterility mosaic and phytophthora blight in pigeonpea, yellow mosaic, cercospora leaf spot and powdery mildew in mungbean/urdbean, and the rust and wilt in lentil cause considerable losses. Besides biotic ones, abiotic stresses, like drought

and high/low temperature at terminal stage, and soil salinity/alkalinity cause havoc towards potential performance of crops and yield accrual. Socio-economic issues including inadequate VRR/SRR, policy incentives and poor-allocation of storage facilities to pulses again have their toll. All these have significant impact and bearing on scaling productivity in pulses. It has been demonstrated that improved HYVs of pulses have a positive impact to the tune of 15-20 per cent in increasing pulses production in all major pulse crops which can further be accelerated with improved agronomy (POPs) involving these.

Besides vertical expansion involving pulses, there is an ample scope for horizontal expansion of pulses (such as short duration Spring/Summer pulses like, greengram and blackgram in Indo-Gangetic plains and rice fallows of southern India). The geographical shift in pulses towards central and south India (around 4 MH) is an indication of their potentialities to acclimatize to diverse climatic conditions and enabling these to adapt in new niches. It is also estimated that about 11.695 m ha in India remains fallow after rice harvest, of which around 82 per cent lies in the Eastern India and the rest falls in 3 southern states viz., Tamil Nadu, Karnataka and Andhra Pradesh. These areas again have a vast potential for low input and low water requiring upland pulses such as *lentil*, *chickpea*, *lathyrus*, *mungbean* and *urdbean*. Besides this, large scope exists to grow pulses in inter-row space of wide row crops, like sugarcane, pearl millets, and sorghum that could brought at least 2-3 MH under pulses.

It is emphasized that all these efforts should complement and supplement to policy support which could possibly through linking pulses to welfare schemes (PDS, Mid Day Meal, and Integrated Child Development Services) where pulses could be a part, would address the issues of protein energy malnutrition among the vulnerable population. In this endeavor, the states of Andhra Pradesh, Tamil Nadu, Himachal Pradesh, Punjab and Chhattisgarh have diversified their PDS with pulses as a means to curb the nutritional deficiency among the poor. Besides these, building farmers' Associations, post-harvest processing through small scale pulse efficient milling units particularly at the village level, need based support in storage infrastructure, supporting with noble

Table 2: MSP (INR/100kg) of major Pulses in India during last 3 years (includes bonus)

Crop	2016-17	2017-18	2018-19
Pigeonpea	5050	5450	5675
Mungbean	5225	5575	6975
Urdbean	5000	5400	5600
Chickpea	4000	4400	4620
Lentil	3950	4250	4475

MSP and procurement policies (Table 2), necessary arrangements for scaling up skill development in processing are other key areas needed to be taken care of. Other avenues aimed at special niche segment like, Kabuli type chickpea and French bean offers new opportunities for tapping the untapped potential of these pulses through demand in international markets. Besides these, organic food production and its market in India (to grow at 25-30%) needs fillips. For all these, both knowledge and skill enhancement of farmers are handy for promotion of pulses both nationally and globally.

Generating and Promoting Technologies

During the last 3-5 years, ICAR-Indian Institute of Pulses Research, Kanpur and its AICRPs in association with its partners (SAUs & CG Centres) has pursued all its focus in scaling-up the productivity goals consistently on sustained basis through its multifarious efforts. During the last few years, many promising varieties of pulse crops have been released for cultivation in different parts of the country which include chickpea (IPC 2004-01, IPC 2004-98, IPC 2005-62 & IPC 2006-77), fieldpea (IPFD 10-12, IPFD 11-5, IPFD 12-2 & IPFD 6-3), lentil (IPL 316, IPL 526 & IPL 520), mungbean (IPM 410-3 & IPM 205-7), pigeonpea (IPA 203) and urdbean (IPU 07-3). R & D against diverse and dynamic biotic and abiotic stresses have been further strengthened with increasing crop productivity through protection of the pulse crops. Besides these, inheritance of important traits, such as *Fusarium* wilt resistance, double podding, seed size and earliness in chickpea, resistance to wilt, pod fly, sterility mosaic and *Phytophthora* stem blight in pigeonpea; and photo-thermo-insensitivity, seed colour, MYMV resistance, plant type and functional male sterility in urdbean has also been worked out.

Reinforcing the above efforts by our stake holders, we have also developed 4 land mark varieties of pulses with specific features and unique characteristics viz. IPL 220 (high Fe and Zn fortified lentil variety), IPH 09-5 (early duration pigeonpea hybrid), IPM 205-7 (Virat, a Super early mungbean variety), IPFD 10-12 (green seeded fieldpea varieties). Besides these, significant advancement was also made in development of transgenic chickpea and pigeonpea events for insect resistance (IR) trait through genetic engineering technology. This will definitely have long-term impact on the management of pod borer *per se* in pulses. The institute has also developed Diagnostic Kits “LYMVs PCR Diagnostic Kit” for identification of viruses causing yellow mosaic disease and Multiplex-PCR “LYMVs Mplex” for the accurate identification of the viruses causing YMV in pulses.

Sustained efforts are also made on improved Agronomy and Package Technologies through adoption/popularization. These include BBF/raised bed planting for kharif pulses, precision tillage using laser leveler, drip-fertigation in long duration pigeonpea, sprinkler irrigation in chickpea and lentils, popularization of most remunerative pigeonpea + soybean - lentil in Central India, appropriate lentil-seed priming under rainfed, zero till seed drill for resource poor farmers, improved post emergence herbicides (Imazethapyr and Quizalofop-ethyl at 80-100 g/ha POE at 20-25 days after sowing) for better weed control and supplementary irrigation using microirrigation and pond technology. Besides these, rice fallow technologies (like, unpuddled rice/direct seeded rice followed by foliar nutrition of micronutrients and 2% urea in chickpea, life saving irrigation and appropriate crop management practices such as retention of 30 cm rice stubbles, zero tillage and appropriate rice establishment method) have been refined for pulses.

Since economics is the major consideration for success of any crop husbandry practice, greater emphasis is made towards decreasing cost of cultivation and increasing farm output/income through conservation agriculture, farm mechanization and value addition/processing (higher dal recovery by IIPR Mini Dal Mill). Now mechanical harvesting of chickpea (like, GBM 2, NBeG 47 and HC 5 with >20 cm ground clearance) is possible. Besides these, new transfer of technology (TOT,

MGMG, Farmer FIRST) models are in vogue for rapid dissemination and adoption of suitable agro-technologies. On BSP, a total of >660 quintals of breeder seed was produced in chickpea, pigeonpea, mungbean, urdbean, lentil, fieldpea, rajmash and horsegram fulfilling the seed-indent fully.

CONCLUSION

Technology demonstration and promotion of pulses was made through diversified projects and activities that included Farmers' FIRST, Soil Health Cards (SHC), promotion of pulses in NEH Region, Seed Production, registering farmers under e portal 'Dalhan Sandesh' and voice based SMS advisory service and conduct of demonstrations, designing Commodity profile for pulses (CPP Portal), registering Copyright for software and filing Trademark of PulsExpert and developing farmers friendly website e-Dalhan Gyan Manch and Chana Mitra app, and organizing training programmes and exposure visits for farmers. The country is continuing striving for increasing genetic gains through novel technologies, like transgenic technology, incorporating photo-thermal insensitivity and breeding short-duration varieties for increasing cropping intensity, conservation agriculture and strategic practicable technologies, research on storage structures and minimizing post harvest losses, promoting participatory and demand driven research including value addition and appropriate policy support.

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Effectiveness of Kisan Mobile Advisory Service in Dissemination of Agricultural Information in Gandhinagar District of Gujarat

Bharat Hadiya

ABSTRACT

The revolution in ICT has made access to the information easy and cost effective to the rural masses in general and farming community in particular. Kisan Mobile Advisory (KMA) service is one among the several methods of ICTs working successfully for dissemination of latest information. KMA service was launched for sending information through mobile Short Message Service (SMS) in Gandhinagar District of the Gujarat State through Krishi Vigyan Kendra (KVK) during May 2014. The content of messages were typed in Gujarati language and information related to crop production, crop protection, vegetable and fruit production, dairy farming, weather forecasting, post harvest management, government Schemes and other enterprises sent to end users. Out of total registered 18750 users with us, 90 farmers, 25 Extension personnel and 15 input dealers were randomly selected for this study. After sending messages for two years (2017, 2018) feedback was sought during April-May 2019. Total 78 messages on different discipline were sent during study period. For collecting information, semi structured interview schedule was designed. The delivered messages were highly understandable for 80 per cent of extension personnel, 60 per cent of input dealers and 42.22 per cent of farmers. Messages were needful and timely as reported by 80 percent of farmers, 72 per cent of extension personnel and 66.66 per cent of Input dealers. The messages were fully applicable perceived by 51.11 per cent of farmers. It was found that 68 per cent messages were fully applicable for extension personnel and 46.66 per cent for input dealers. It was found that technology imposes high impact on 62.22 per cent of KMA members of farmer category, whereas 72 per cent and 60 per cent members of extension personnel and input dealers category reported technology impacted highly on them. Low impact was reported by 12.22 per cent by farmers, 8 per cent by extension personnel and 13.33 per cent by input dealers in Gandhinagar district of Gujarat state.

Keywords: Kisan mobile advisory (KMA), ICT, Short message service (SMS)

INTRODUCTION

Agriculture in our country is more than an occupation and considered as a tradition and a way of life as still around two-third of our population is actively practicing it. But, today in the era of information revolution, like other areas, the competitive agriculture also governed by access of information to the farmer's through various means. In past few years, the usefulness of Information Communication Technologies (ICTs) especially, Internet and cell phone has been realized in agriculture sector to

bridge the gap between scientific recommendations and its application by the farmers in relatively less time and cost. It is being discussed on various platforms that Information Communication Technologies (ICTs) are potential and promising tools for dissemination of technological information in the field of agriculture as well. The success of agricultural development programmes in country like India largely depends on the nature and extents of effective use of mass media to mobilize people and to disseminate newly evolved agricultural technologies (Birkenholtz and Maricle, 1991). The people living in 21st

century with the revolution of Information communication technology which is responsible for wide spread access of computer technology as well as mobile services in to the social structure. The technology is turn influenced the society, development and social environment (Manoj, 2006). In this age of information revolution, information technologies are being used in almost all walks of life. Today computer, internet and mobile are turning out to be extremely important, information and communication technologies (ICTs) are facilitating fast sharing of information and innovation and acting as a key agent for changing agrarian situation and farmers lives by improving access to agricultural information (Parganiha *et al.*, 2012).

The Kisan Mobile Advisory service through message is being used to deliver the needful agricultural information and specially to improve farmers' agricultural technical knowledge with decision making ability, so that, they may enable to increase their production and productivity to fulfill market demands with securing better quality life and income in present competitive agrarian economy. The advisory was sent to registered farmers covering the broad category of information like, crop production, crop protection, vegetable and fruit production, dairy farming, weather forecasting, extension activities, post harvest management and other agricultural and allied information.

METHODOLOGY

The present study was conducted in Gandhinagar District of Gujarat state in the year 2019-20. The majority farmers are come under small and marginal group. Kisan Mobile Advisory service was launched for sending information through Short Message Service (SMS) in Gandhinagar District by KVK during May 2014. The messages were sent related to crop production, crop protection, horticulture crop, dairy farming, weather, post harvest technology, value addition and other enterprises. After sending messages for two years (2017, 2018) feedback was sought during April-May 2019. Total 78 messages on different discipline were sent frequently during study period. For collecting information, semi structured interview schedule was designed on the basis of availability of literatures. Out of total registered 18750 users, 90 farmers, 25 extension personnel and 15 input

dealers were randomly selected for this study. To assess the overall impact of technology, semi structured interview schedule was developed and responses of the respondent were recorded on a four point continuum scale for each aspects and assigned a scores like; Understanding of the message (Highly-3, Medium-2, Low-1, Not-0), Need and time based information (Needful and timely-3, Needful but not timely-2, Not needful and timely-1, Not needful and not timely-0), Applicability of message (Fully-3, Medium-2, Partially-1, Not -0). Finally, an index was worked out to assess the overall impact of technology with the help of following equations.

$$TI = \frac{O}{S} \times 100$$

Where,

TI= Technology Impact index of a respondent

O= Total scored obtained by respondents

S= Total obtainable score

RESULTS AND DISCUSSION

Total 1 Mobile SMS was sent pertaining to agriculture and allied discipline during 2017 and 2018. Maximum 29.48 per cent SMS were sent in the field of plant protection followed by agronomy (crop production) 24.35 per cent and animal husbandry 20.51 per cent. Rest of 25.62 per cent SMS includes information on horticulture crops, extension, farm mechanization, weather forecast and other miscellanies.

Impact of Kisan Mobile Advisory (KMA) service on dissemination of transfer of agricultural technology was assessed. The results of Table 2 reveal that sent

Table 1: Number of SMS sent pertaining to different discipline

Discipline/Area	No. of SMS (%)
Agronomy (Crop production)	19 (24.35)
Plant protection	23 (29.48)
Horticulture	08 (10.25)
Animal Husbandry	16 (20.51)
Farm mechanization	03 (3.84)
Extension	05 (6.41)
Weather forecast	02 (2.56)
Miscellanies	02 (2.56)

Table 2: Distribution of the respondents according to understanding of the message

Category	Farmers (N=90)		Extension personnel (N=25)		Input dealers (N=15)	
	Number	Percentage	Number	Percentage	Number	Percentage
Highly Understandable	38	42.22	20	80.00	9	60.00
Medium Understandable	35	38.88	04	16.00	3	20.00
Low Understandable	09	10.00	01	4.00	2	13.33
Not Understandable	08	8.88	00	0.00	1	6.66
Total	90	100.00	25	100.00	15	100.00

advisory messages were medium understandable for maximum number (38.88%) of the farmers, it was highly understandable for 80 per cent and 60 per cent of extension personnel and input dealers respectively. Only 8.88 per cent farmers and 6.66 per cent input dealers reported that messages was not understandable for them.

The data presented in Table 3 indicate that advisory through messages was needful and timely for 80 per cent of the KMA received farmers and 72 and 66.66 per cent for extension personnel and input dealers respectively. Less numbers of farmers (8.8%), extension personnel (24%) and input dealers (20%) reported the messages were needful and not timely for them. Only 2.22 per cent farmers reported that advisory was not needful and not timely.

Table 4 reveals that advisory messages were fully applicable for 51.11 per cent farmers, 68 per cent for extension personnel and 46.66 per cent for input dealers, whereas medium applicable was reported by 37.77, 24.00 and 26.66 per cent farmers, extension personnel and input dealers respectively. Messages were partially applicable as reported by 7.77, 8.0 and 13.33 per cent of farmers, extension personnel and input dealers respectively. It was also found that messages were not applicable for 13.33 per cent of input dealers followed by 4.00 and 3.33 per cent of extension personnel and farmers respectively.

Table 5 indicates the overall impact of technology and it was found that technology imposed high impact on 62.22 per cent of KMA members of farmer category, whereas 72 per cent and 60 per cent members of

Table 3: Distribution of the respondents according to need and time based information

Category	Farmers (N=90)		Extension personnel (N=25)		Input dealers (N=15)	
	Number	Percentage	Number	Percentage	Number	Percentage
Needful and timely	72	80.00	18	72.00	10	66.66
Needful and not timely	08	8.80	06	24.00	03	20.00
Not needful and timely	08	8.80	01	4.00	02	13.33
Not needful and not timely	02	2.22	00	0.00	00	0.00
Total	90	100.00	25	100.00	15	100.00

Table 4: Distribution of the respondents according to applicability of message

Category	Farmers (N=90)		Extension personnel (N=25)		Input dealers (N=15)	
	Number	Percentage	Number	Percentage	Number	Percentage
Fully applicable	46	51.11	17	68.00	07	46.66
Medium applicable	34	37.77	06	24.00	04	26.66
Partially applicable	07	7.77	02	8.00	02	13.33
Not applicable	03	3.33	01	2.00	02	13.33
Total	90	100.00	25	100.00	15	100.00

Table 5: Distribution of the respondents according to overall impact of technology

Category	Farmers (N=90)		Extension personnel (N=25)		Input dealers (N=15)	
	Number	Percentage	Number	Percentage	Number	Percentage
Low (Score upto 1-3)	11	12.22	02	8.0	02	13.33
Medium (Score upto 3.1-6.0)	23	25.55	05	20.0	04	26.66
High (Score upto 6.1 to 9.0)	56	62.22	18	72.0	09	60.0
Total	90	100	25	100	15	100

extension personnel and input dealers category reported technology impacted highly on them.

CONCLUSION

Introduction of information and communication Technologies (ICTs) in the field of agriculture has brought many changes in traditional methods of extension. The study indicate that KMA service is one of the most useful tool for dissemination of agricultural technology and information to the farmers, extension personnel and also can play a major role in enhancing efficiency of extension service by reaching large number of peoples. Innovative information and improved communication are vital requirement for sustainable agriculture development in present scenario. Undoubtly, the ICT like KMA service offer great scope for dissemination of agricultural technology and information up to the farmers and extension personnel.

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Impact of Different Extension Teaching Methods for Adoption of Scientific Package of Practices of Chickpea

Diksha Patel^{1*}, Shyam Singh², Arjun Prasad Verma³, B.K. Gupta⁴ and Manvendra Singh⁵

ABSTRACT

Chickpea is the main *rabi* pulse crop under rainfed condition in Bundelkhand region of Uttar Pradesh. There is wide variation in the yield of chickpea across the 7 districts of Bundelkhand region of U.P. because of the low adoption of recommended package of practices of chickpea among the farming community. To accelerate adoption among farming community extension teaching methods plays a crucial role. Krishi Vigyan Kendra, Banda has initiated the on farm trial on impact assessment of different extension teaching methods for adoption of scientific package of practices of chickpea. The experimental research design pre and post with control group was used to conduct this study. In this study one control group (check) of 10 farmers was kept and one training on scientific package of practices of chickpea and demonstration (Cluster Frontline Demonstration) on chickpea was given to 10-10 farmers and their level of adoption of scientific package of practices of chickpea crop was assessed and it was found that the level of adoption has increased by 15.65 and 24.82 per cent after exposure to training and demonstration respectively to the farmers and both the methods were found to be significant at 0.01 level of significance for enhancing level of adoption among farmers. Therefore, potentialities of these methods could be best exploited by field extension functionaries and other stakeholders in enhancing level of adoption among farmers.

Keywords: Adoption, Chickpea, Cluster frontline demonstration, On farm trial, Scientific package of practices, Training

INTRODUCTION

Pulses are chief source of protein and integral part of vegetarian human diet. The per capita availability of pulses in India is @ 42 g per day against the recommended dose of pulses for adult male and female 60 g and 55 g per day respectively (Tiwari and Shivhare, 2016). India is the largest producer, importer and consumer of pulses in the world, accounting for 25 per cent of global production, 15 per cent trade and 27 per cent consumption. A variety of pulses are being grown in India including

Chickpea (40.00%), Pigeonpea (18.00%), Blackgram (11.00%), Greengram (9.00%), Lentil (8.00%), Field pea (5.00%) and others (9.00%) are grown on 22.00–24.00 million ha. of area, producing 13.00–15.00 Mt. of grain with an average productivity of 6.0–6.5 tons/ha (Kumar and Kumawat, 2019). In Uttar Pradesh, Bundelkhand region is well suited for pulses production due to its unique agro-climatic condition and this region is also known as bowl of pulses (Narain *et al.*, 2014). Chickpea is the major crop of *rabi* season in Banda District. In Banda district chickpea is grown in 57549 ha. area with average

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productivity of 8.38 q/ha. (Annual report 2018-19). As compared to cereals, most of the pulses still wait for significant breakthrough in terms of production and productivity (Kumar and Kumawat, 2019). To increase the production and productivity of pulse crop Government of India has launched several programmes like National Food Security Mission (NFSM) –Pulse under which training and Demonstration were given to farmers for better adoption of scientific technologies. Despite all the efforts made by Government to increase production and income of farmers by creating awareness of improved technologies, it was observed that many farmers still follow the old ways of farming, not adopting the improved practices/ technologies of crop production. Extension teaching methods are playing crucial role in imparting new knowledge and skills to the rural people by drawing their attention towards such technologies, thereby arousing their interest and helping them to have a successful experience of the new practice (Ray, 2015). On this background the present study was undertaken by Krishi Vigyan Kendra, Banda with the specific objective to assess the impact of different extension teaching methods for adoption of scientific package of practices of chickpea by the farmers of Banda district of Bundelkhand region.

METHODOLOGY

An experimental research design (pre and post with control group) was used. In this study one control group (check) of 10 farmers was kept and one training on scientific package of practices of Chickpea and Cluster Frontline Demonstration (CFLD) on Chick pea was given to 10-10 farmers and their level of adoption of scientific package of practices of chickpea crop was assessed. The difference in adoption level of the respondents was calculated by taking the pre exposure score and post exposure score. Difference in pre and post exposure score in percentage was taken as an indicator for impact of extension methods. The primary data on level of adoption were collected through pre-tested, semi-structured interview schedule method. The data analysis was done by descriptive statistic and paired 't' test.

RESULTS AND DISCUSSION

The extent of adoption of production technology of chickpea has been assessed by seventeen packages of

practices of Chickpea from seed treatment to post harvest management. It can be clearly seen in Table 1 that nearly two fifth of respondent (43.34%) belonged to medium category, followed by 33.33 per cent and 23.33 per cent in low and high categories respectively. This is due to the fact that farmers were having medium level of mass media exposure and majority had not received any training related to production technologies of chickpea crop.

Table 1: Level of adaptation of scientific package of practices of chickpea (N=30)

Category	Frequency	Percentage
Low (<0.3)	10	33.33
Medium (0.3-0.46)	13	43.34
High (>0.46)	7	23.33

The impact of different extension methods viz. training and demonstration (CFLD) was assessed on adoption of scientific package of practices of chickpea. It could be clearly seen from Table 2 that among two methods, demonstration followed by training emerged as most impactful method in communicating the scientific package of practices of chickpea. The mean difference in level of adoption was found to be 15.65 and 24.82 per cent after exposure of training and demonstration respectively. It might be due the fact that demonstration worked on the principle of seeing is believing. Farmers believe what they see and further they will adopt it (Devi *et al.*, 2017). No significant difference between pre and post scores of check was found. However, it was observed that effect of training and demonstration was significant at 0.0 level of significance for increasing level of adoption. This implied that the information provided by these methods is most likely to reach the farmers. Thus, the potentialities

Table 2: Impact of different extension methods in adoption of scientific package of practices of chickpea

Extension methods	Extent of adoption (%)			t-value
	Pre-test	Post-test	Difference	
Check (n=10)	35.29	37.06	1.76	1.83
Training (n=10)	38.59	54.24	15.65	7.15**
Demonstration (n=10)	40.53	65.35	24.82	14.33**

**Significant at 1 per cent level of significance

of these methods could be best exploited by field extension functionaries and other stakeholders to increase the adoption among the farmers regarding scientific package of practices of chickpea and other crops.

CONCLUSION

Nearly half of the respondents were in medium level of adoption of scientific package of practices of chickpea, thus, a series of awareness programmes, field visits, field days, other interaction meetings should be organized for better reach of scientific Package of practices of chickpea. Extension methods like training and demonstration were found impactful in terms enhancing level of adoption of scientific package of practices of chickpea. Thus these extension methods need to be popularized and used efficiently by extension organisations to obtain maximum productivity.

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Research Note

Knowledge, Adoption and Constraints of Soil Health Card based Fertilizer Application in Ratlam District, M.P.

Ramdhana Ghaswa¹, Sarvesh Tripathy² and Barkha Sharma³

ABSTRACT

Since inception of soil health card programme during 2015-16 in order to increase agricultural production and sustain soil health, a large number of soil health cards have been distributed to the farmers. In order to assess the knowledge, adoption and constraints of soil health card, the present study was carried out. The farmers who were issued soil health card were comparatively more aware about various soil health card aspects like major nutrients (N, P & K), soil pH, soil EC and micronutrients as compared to farmers without soil health card. Data shows that maximum number of respondents had medium knowledge score that is 56.95 per cent followed by respondents with low knowledge score (23.61%) and only 19.44 per cent respondents had high knowledge score about soil health card. Major constraints faced by the farmers in adoption according to soil health card were difficulty in having knowledge about the importance of micronutrients, the prices of fertilizers being too high and non-availability of organic manure.

Keywords: Adoption, Constraints, Farmer's, Knowledge, Soil health card

INTRODUCTION

Soil Health Card is a Government of India's scheme promoted by the Ministry of Agriculture and Farmers' Welfare. It is being implemented through the Department of Agriculture of all the States and Union Territories of India. A Soil Health Card is issued to have a data base of the current status of soil health and, when used over time, to determine changes in soil health that are affected by land management. A Soil Health Card (SHC) displays soil health indicators and associated descriptive terms. The indicators are typically based on farmers' practical experience and knowledge of local natural resources. The card lists soil health indicators that can be assessed without the aid of technical or laboratory equipment. It is a printed report that a farmer is handed over for each of his holdings. It contains the status of his soil with respect to 12 parameters, namely N, P, K (Macro-nutrients); S (Secondary- nutrient); Zn, Fe, Cu, Mn, Bo (Micro -

nutrients); and pH, EC, OC (Physical parameters). Based on this, the SHC also indicates fertilizer recommendations and soil amendment required for the farm. The card contains an advisory based on the soil nutrient status of a farmer's holding. It shows recommendations on dosage of different nutrients needed so as to realize optimal yields.

METHODOLOGY

The study was conducted in Ratlam district of M.P. The Soil Health Card prepared in all block of Ratlam district, out of which two Block were chosen for the study. For selection of villages, lists of villages were prepared from the selected block. There were 6 villages in the selected block where soil health card activities have been in operations in the last year 2017-18. Out of the list three villages were selected randomly from each selected block. This way a total of 6 villages were selected from the

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identified block. From the lists so prepared, 12 soil health card holders were selected randomly from each identified village. Thus, a total of 72 respondents were selected on the basis of random sampling method from the identified villages. An interview schedule was prepared consisting of tools to measure the variables. The reliability and validity of the schedule were ensured in order to record the authentic information from the respondents. Responses of the respondents were recorded by personal interview method. The responses were then converted in to scores and transferred in master table to analyze applying appropriate statistical tests.

RESULTS AND DISCUSSION

The data in Table 1 that maximum number of respondents had medium knowledge score that is 56.95 per cent followed by respondents with low knowledge score (23.61%) and only 19.44 per cent respondents had high knowledge score about soil health card. The findings are supported by Bhatt *et al.* (2010).

The data presented in Table 2 shows that maximum number of respondents had high adoption percent related

Table 1: Knowledge among farmers about soil health card

Item	Frequency	Percentage
Low Knowledge Level (Score upto 12.55)	17	23.61
Medium Knowledge Level (Score From 12.56 to 17.53)	41	56.95
High Knowledge Level (Score above 17.53)	14	19.44

Table 2: Extent of adoption of soil health card based nutrient management practices by the soil health card beneficiary farmer's

Nutrient	No. of Farmers finding soil nutrient deficient in SHC	No. of Farmers adopted according to SHC	
		Freq- uency	Perce- ntage
Major			
i. Nitrogen	41	40	97.56
ii. Phosphorus	55	49	89.09
iii. Potash	21	13	61.90
iv. Sulphur	18	15	83.33
Micro			
i. Zinc	39	29	74.36
ii. Iron	35	21	60.00
iii. Manganese	59	24	40.67
iv. Boron	48	19	39.58
v. Copper	51	18	35.29

to nutrient deficiency while 100 per cent Adoption percentage was found in application of nitrogen whereas lowest adoption percentage i.e. 12.50 and 66.66 per cent was found in application of copper, potash and boron.

The data in Table 3 illustrates that majority of farmers (72.22%) expressed difficulty in application of fertilizers as per recommendations due to having the prices of fertilizers too high. 69.44 per cent of them expressed difficulty due to their lack of knowledge about the importance of micronutrients. 65.27 per cent farmers expressed their view on non-availability of organic manure. Similar trend have been reported by Patel and Chauhan (2012).

Table 3: Constraints among farmers about utilization of soil health card

Item	Percent	Rank
Difficult to understand the information on SHC without the assistance of agricultural/extension officer	56.94	V
Difficulty in calculating fertilizer dose on the basis of nutrient status of soil	45.83	VII
Unavailability of micronutrient fertiliser in market	58.33	IV
Sometimes adequate quantity of fertilisers not available	47.22	VI
Prices of fertilisers are high	72.22	I
Lack of knowledge about the importance of micronutrients	69.44	II
Collection of soil sample was not done as per scientific equipment & technique	31.94	IX
Non-availability of NPK combination fertiliser	36.11	VIII
Non –availability of Organic Manure	65.27	III

CONCLUSION

It can be concluded that majority of the farmers had medium knowledge level about soil health card. Major constraints faced by the farmers in adoption according to soil health card were difficulty in calculating dosages, high prices of fertilisers are high, knowledge about the importance of micronutrients and on non-availability of organic manure. Therefore, it is suggested that the policy makers should make suitable programmes and train the farmers and change agents to use the soil health card to a maximum level.

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