Impact of Farmers' Profile Characteristics on their Knowledge Gain through Need-based Community Radio Programme

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Abstract— *Present study highlights an innovative media technology, Community radio, which has potential to be an effective tool to strengthen agricultural extension system. It also indicates that knowledge of an innovation or technology is the foremost requirement in the way of adoption of the technology by farmers. The pre-knowledge test assessment regarding Integrated Pest Management (IPM) technology of the farmers highlighted that they had significant knowledge gap about the concept and practices of the technology. However, it was also concluded that community radio programmes which are need based and participatory in design could lead to significant increase in knowledge of the listeners. Majorly, the study emphasizes the significant impact of various profile characteristics like education, achievement motivation, scientific orientation, information seeking behaviour and social participation on gain in knowledge of the respondents through community radio programme. This result of the study provides conclusive evidence that audience profile characteristics need to be kept in mind while designing community radio programmes. Moreover, few characteristics can also be modified in favour of knowledge gain of the respondents through appropriate training.*

Keywords— Community radio programme, profile characteristics, knowledge gain, farmers, integrated pest management.

I. INTRODUCTION

Agricultural Extension aims at bringing planned behavioral change in the people in terms of knowledge, skill and attitude so that they may live better life by learning the ways of improving their livelihood especially vocation and enterprises. Knowledge is also considered as the first step of Innovation diffusion process, as described by Everett Rogers. Moreover, Knowledge gained by farmers when followed by proper and effective persuasion may lead to adoption of an innovation or technology. Therefore, understanding the importance of knowledge in the process of innovation diffusion is important in Agricultural Extension for sharing agricultural technologies with farmers. Many times the farmers do not adopt agricultural technologies due to lack of knowledge regarding different aspects of the technology, usage and relative advantage which leads to a vast gap between source and sink. The Tenth Plan (2002-2007) document recognized the problems of the extension sector and stated, "The Agriculture extension machinery, an information support in most states, seems to have become outmoded. There is need to revamp the extension services in the country by using print and electronic media and information technology along with the involvement of the private sector, especially the input agencies and traders, which have emerged as one of the main sources of information for the farmers. Radio, television and the print media have become powerful means of education and technology dissemination." The scientific and technological advancement in the field of agriculture has resulted in the development of high yielding varieties, chemical fertilizers, plant protection measures, etc. However, the advantage of these scientific advancements will give fruitful results only when these are communicated properly and effectively to millions of farmers. Therefore, available communication media has to be utilized to pass on the need based agricultural information effectively. The earlier top-down approach of Agricultural extension has failed to cater the need of the people and faced challenges both in context of reaching and persuading mass of people. Therefore, it leads to the emergence of participatory approach which considers people as equal partners rather than mere passive recipients.

1.1 Community Radio: A participatory communication tool

Jean Servaes, the proponent of Dependency theory of Communication for development, criticized the broadcasting and other mass-media systems as they tend to support modernization and were anti-development; also they were inclined to promote the political agenda. Solution to underdevelopment of third world countries require major changes in media structure that were dominated by commercial principles & foreign interests into media structures which are self-reliant and community oriented (Servaes, 2002). According to UNESCO, the community can be territorial or geographical or a group of people with common interests, who are not necessarily living in one defined territory (Tabing, 2002). Over the time amid the mainstream media, an alternative media tool called community radio station (CRS) has emerged as the voice of community being people centered, development oriented and inclusive. People feel ownership of community radio as one can create, access, utilize, share information and knowledge. It helps people to achieve their full potential in promoting and improving their quality of

life. 'Participation' is often highlighted as a key characteristic, distinguishing community radio from most other kinds of media **(**Mtimde *et al*., 1998).

1.2 Community Radio in India: Development perspective

Community radio was legalised in India on February, 1995 after the declaration passed by Supreme Court that, "airwaves are public property". Initially, community radio stations started as educational (campus) radio stations under somewhat strict conditions. In 2006, the Government of India declared a set of new Community Radio Guidelines that allowed the non-profit organizations, State Agricultural Universities, Indian Council of Agricultural Research (ICAR) institutions, Krishi Vigyan Kendras, registered societies, autonomous bodies and registered public trusts to possess and operate community radio stations. According to Ministry of Information & Broadcasting, as on 31-03-2020 there are 289 operational community radio stations in India, of which total seventeen are under State Agricultural Universities, Agricultural Institutes and Krishi Vigyan Kendras. These seventeen community radios are specifically dedicated to the sharing of agricultural information with farmers and are working for the extension of technologies produced in these institutions (Table 1).

Among the various agriculture based community radio stations, CRS *Pantnagar Janvani* of G. B. Pant University of Agriculture and Technology, Pantnagar, is the first Campus-based Community Radio Service of Uttarakhand and third such service, initiated among agriculture universities of the country (Singh, 2014). The main objective of Pantnagar Janvani is to bridge the information gaps of all sections of the society, especially the farmers of the locality with latest and relevant information. It is working as a part of extension and communication effort of the university.

TABLE 1
LIST OF COMMUNITY RADIO STATIONS OPERATED BY SAUS AND KVKS

S. No.	Name of Organization	State
1.	Krishi Vigyan Kendra, Junagarh	Gujarat
2.	Krishi Vigyan Kendra, Baramati	Maharashtra
3.	Krishi Vigyan Kendra, Ahmednagar	Maharashtra
4.	Sadhana Krishi Vigyan Kendra, Amravati	Maharashtra
5.	Suvide Foundation's Krishi Vigyan Kendra, Washim	Maharashtra
6.	Krishi Vigyan Kendra, Barh	Bihar
7.	Krishi Vigyan Kendra, Sirsa	Haryana
8.	Krishi Vigyan Kendra, Saharanpur	Uttar-Pradesh
9.	Krishi Vigyan Kendra, Namakkal	Tamil-Nadu
10.	Junagarh Agricultural University, Junagarh	Gujarat
11.	Habbington Institute of Agriculture Technology, Allahbad	Uttar-Pradesh
12.	Tamilnadu Agricultural University, Coimbatore	Tamil-Nadu
13.	Bihar Agriculture University, Sabour	Bihar
14.	University of Agricultural Sciences, Dharwad	Karnataka
15.	CCS Haryana Agricultural University, Hisar	Haryana
16.	Indira Gandhi Krishi Vishwavidyalaya, Raipur	Chhattisgarh
17.	GB Pant University of Agriculture & Technology, Pantnagar	Uttarakhand

As reported by Sharma (2013), participatory and need based community radio programme effectively leads to significant gain in knowledge of the audience. Yelvattimath *et al.* (2014) also reported that radio brings significant change in the

knowledge level of the audience by providing useful and required knowledge to them Also, various previous researches studying the relationship of audience profile characteristics with their knowledge gain, indicate that profile characteristics bear significant relationship with gain in knowledge, but most of these researches are in context of print media, radio or mobile phones (Parthsarthy, 2004; Mahara, 2012; Sultana, 2015; and Kumar and Ahmed, 2018). These researches also indicate that various profile characteristics (socio-economic, communication and psychological characteristics) like occupation, income, extension agency contact, mass media exposure, social participation, innovativeness of farmers and risk orientation bear significantly positive relationship with gain in knowledge. Thus, if programmes are tailor-made according to the profile characteristics of the audience keeping in mind those characteristics which have significant relationship with knowledge gain; it will lead to the designing of more effective programmes. Moreover, those people could also be trained in specific characteristics like innovativeness, risk orientation, achievement motivation and scientific orientation so that they may be more positive about knowledge gain through community radio programmes.

However, many such studies have been conducted in relation to other media tools but there is a dearth of studies specifically focusing on studying relationship of the profile characteristics of audience with their gain in knowledge by listening community radio programmes. It becomes all the more important in context of gain in knowledge regarding specific and focussed new technologies like IPM, IPNM, Bio-fertilizers, Organic farming, new varieties etc. Therefore, it was found pertinent to study the impact of farmers' profile characteristics on their knowledge gain through need based community radio programme. The main objective of this study is to assess the relationship between socioeconomic, communication and psychological characteristics of the respondents with their gain in knowledge through community radio programme.

II. METHODOLOGY

2.1 Study area and sample selection

For this study Pantnagar Janvani, the community radio service of the first Agricultural University of the Nation, GB Pant University of Agriculture and Technology was purposively selected. Pantnagar Janvani acts as a medium of extension, of latest technologies and scientific methods to farmers and seeks to bridge the information gaps with the latest and relevant information shared by experts of various different subjects like agriculture, veterinary, animal sciences, etc. The study was conducted in the four randomly selected villages of the Haldwani block of Nainital district of Uttarakhand, which catches the efficient signals of community radio, Pantnagar Janvani. Total 120 respondents were selected through Probability proportionate to size (PPS) sampling method. Keeping the study objectives in mind, the study followed an action research design.

2.2 Selection of Topic

Integrated Pest Management was selected as a topic for this study based on pilot study and through review of secondary sources. It was found that due to severe deterioration of soil quality because of indiscriminate use of chemicals, harmful effects on human health as well as development of resistance in pests against pesticides, there has been a paradigm shift from chemical methods of controlling pest to Integrated Pest Management approach. According to FAO definition, Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disturbance to agro-ecosystems and encourages the natural methods of pest control.

Although IPM has been accepted in principle as the most attractive option for protection of agricultural crops from the destruction of pests, its implementation at farm level in India had been limited (Puri, 1998). Many researchers believe that participatory methods can be more effective in IPM technology adoption by farmers (Asiabaka, 2002). Therefore, a knowledge test was designed on Integrated Pest Management which was administered at two stages i.e., before making them listen to community radio programme on IPM and after listening to the IPM based programme.

2.3 Variables

Independent variables: Socio-economic variables (Age, Education, Occupation, Income, Landholding); Psychological variables (Achievement motivation, scientific orientation); Communication variables (Information seeking behaviour, mass media exposure and social participation).

Dependent variable: Knowledge Gain, operationalized as any pre-post test change in a person's cognitive learning behavior resulting from specific experience.

2.4 Effectiveness of community radio program in terms of gain in knowledge assessed through pre and post knowledge test

H_0 (Null hypothesis): There is no difference between the mean pre-test score (μ_1) of respondents and mean post-test score (μ_2) of respondents. (H_0: $\mu_1 = \mu_2$)

H_1 (Alternate hypothesis): Mean post-test score of respondents is significantly greater than mean pre-test score of respondents. (H_1: $\mu_1 < \mu_2$)

Total score obtained by the respondent at the pre and the post test was determined and the difference was calculated:

Where, Gain in Knowledge= $\overline{X2}$ - $\overline{X1}$

$\overline{X1}$ = Mean score for knowledge in pre-exposure test

$\overline{X2}$ =Mean score for knowledge in post-exposure test

To test the significance of the gain in knowledge score of the respondents Paired 't' test was used.

2.5 Relationship of Socio-economic, communication and psychological characteristics with Gain in Knowledge.

H_0 (Null Hypothesis) : Selected socio-economic, communication and psychological characteristics namely age, education, occupation, annual income, landholding, achievement motivation, scientific orientation, information seeking behaviour, mass media exposure and social participation of farmers have no significant relationship with level of knowledge gained by farmers due to community radio programme.

H_1 (Alternate hypothesis): Selected socio-economic, communication and psychological characteristics namely age, education, occupation, annual income, landholding, achievement motivation, scientific orientation, information seeking behaviour, mass media exposure and social participation of farmers have significant relationship with level of knowledge gained by farmers due to community radio programme.

2.6 Data collection tools and technique

A structured questionnaire was administered to study the profile characteristics of the respondents. A Knowledge test was constructed to assess the level of knowledge of respondents on various aspects of IPM. Questions were related to three broad categories i.e., IPM: a concept, Non-chemical methods of integrated pest management and chemical method of integrated pest management. Total number of 37 questions, which covered all possible aspects of the content related to IPM were selected for construction of Knowledge test. Responses were quantified by giving a score of 'one' for appropriate answer and 'zero' for wrong answer. Knowledge test was validated by experts of Agronomy, Entomology and Plant Pathology. Reliability of the knowledge test was assessed through split half method.

2.7 Data Analyses

Statistical technique such as frequency, percentage, mean, weighted mean score, standard deviation, t-test, correlation coefficient and paired t-test were used to analyze the data for meaningful interpretation.

III. FINDINGS AND DISCUSSION

3.1 Socio-economic, communication and psychological characteristics of farmers

The findings of the study revealed that majority of respondents (64.17 %) were of middle age group. None of the respondent was illiterate and maximum (36.67 %) were educated up to high school level. It was found that almost all the respondents (95%) were having marginal landholding yet majority of them (62.5 %) had medium annual income might be because most of them (62.15 %) were engaged in agriculture & other subsidiary occupation. Majority of respondents (62.5 % and 79.17 %) had medium achievement motivation and scientific orientation respectively. It was also found that majority of respondents (80 %) had medium mass-media exposure and 73.33 per cent had high information seeking behaviour. Among various information sources, personal localite sources were mostly preferred by most of the respondents and more than half of the respondents had no membership in any social organization (Table 2).

TABLE 2
DISTRIBUTION OF FARMERS BASED ON SOCIO-ECONOMIC, COMMUNICATION AND PSYCHOLOGICAL CHARACTERISTICS (n= 120)

S. No.	Independent variables	Percentage (%)
1.	**Age**	
	Young (less than 27 years)	17.50
	Middle (27 – 52 years)	64.17
	Old (more than 52 years)	18.33
2.	**Education**	
	Illiterate	-
	Primary education	15.83
	Education up to middle level	10.83
	Education up to High school	36.67
	Education up to Intermediate	23.33
	Graduate	10.83
	Post-Graduate	2.5
3.	**Occupation**	
	Agriculture	40.83
	Agriculture with other subsidiary occupation	59.17
4.	**Annual Income**	
	Low (Less than Rs. 45,720)	20
	Medium (Rs. 45,720 – Rs. 74,815)	62.5
	High (More than Rs. 74,815)	17.5
5.	**Landholding**	
	Marginal (less than 1 hectare)	95
	Small (1 – 2 hectare)	4.17
	Semi-Medium (2 – 4 hectare)	0.83
6.	**Achievement Motivation**	
	Low (< 23.08)	20
	Medium(23.08 to 29.9)	62.5
	High (> 29.9)	17.5
7.	**Scientific Orientation**	
	Low (<20.89)	20.83
	Medium (20.89 to 24.11)	79.17
	High (>24.11)	-
8.	**Mass Media Exposure**	
	Low (<8.95)	-
	Medium (8.95 to 11.79)	80
	High (>11.79)	20
9.	**Information Seeking Behaviour**	
	Low (<20.655)	10
	Medium (20.655-24.727)	73.33
	High (>20.655)	16.67
10.	**Social Participation**	
	No membership	58.33
	Member	41.67
	Office bearer	3.33

3.2 Effectiveness of community radio program in terms of gain in knowledge assessed through pre and post knowledge test

Effectiveness of community radio programme was measured in terms of gain in knowledge of the respondents. Primarily, a knowledge test was given to respondents before the intervention of community radio programme that was called pre-test. Result of pre-test indicated that an overwhelming majority of the people had least knowledge of Integrated Pest Management concept and practices. Pre-test was followed by intervention of need based community radio programme on Integrated Pest Management . IPM programme was designed in local dialect i.e., Kumaoni. Target audience was gathered in a common place in small groups at a pre-decided day and time. Audience collectively listened the community radio programmme on IPM. After the intervention of community radio programme, Post knowledge test was administered on the respondents.

Paired 't' test was calculated to test the significant difference in pre and post knowledge level of respondents. Data presented in Table 3 depicts the relevant values for driving conclusion from paired 't' test.

TABLE 3
PAIRED 'T' TEST FOR RELATIVE EFFECTIVENESS OF COMMUNITY RADIO PROGRAMME (n=120)

Mean of pre-test score $\overline{X1}$	Mean of post-test score $\overline{X2}$	Mean of difference $\overline{d}$	Standard deviation of difference S_d	't' cal	't' tab
9.29	24.1	14.81	3.77	43.02**	-2.36

***** Indicate that value is significant at 1% level of significance***

't' tab (left sided) = - $t_{(n-1,\ a)}$ = - 2.36

It is evident from the above table that value of 't' cal is higher than value of 't' tab at 1% level of significance. Thus, null hypothesis that respondents have same knowledge in pre and post knowledge test was rejected and we accepted alternate hypothesis that mean knowledge score was significantly higher in post-test than pre-test. Hence, it can be concluded that the intervention of community radio programme led to significant gain in knowledge of respondents.

Initially farmers had low knowledge regarding integrated pest management concept and practices as indicated by low score in pre-test (=9.29). Significant increase in knowledge was observed after the intervention of community radio programme as their post-test score increased from 9.29 to 24.1. The gain in knowledge was 14.81. Thus, community radio programme was found to be effective in terms of gain in knowledge of respondents (Figure 1).

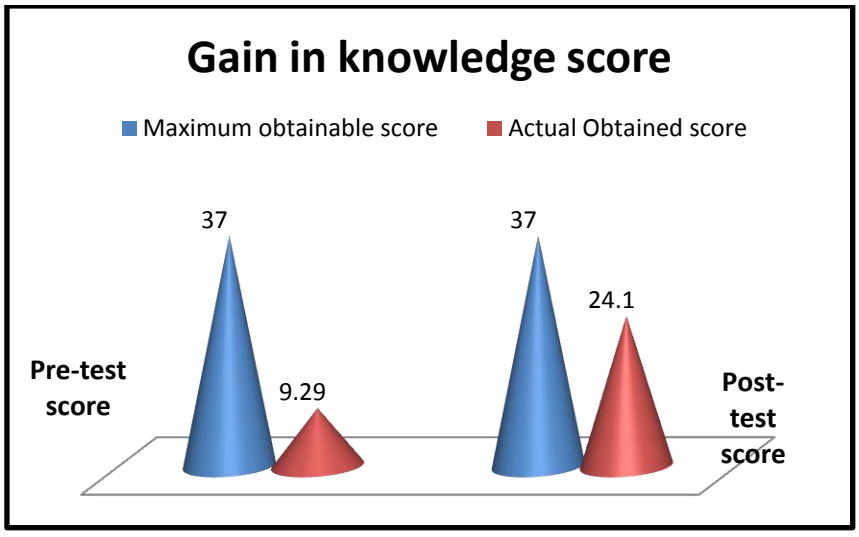


FIGURE 1: Representation of gain in knowledge score of respondents after listening community radio programme.

3.3 Relationship of socio-economic, communication and psychological characteristics of listeners with gain in knowledge

The coefficient of correlation was calculated to find out the relationship between socio-economic, communication and psychological characteristics of farmers with gain in knowledge and the significance of correlation was tested by using test of significance. Table 4 depicts the relationship between independent and dependent variables.

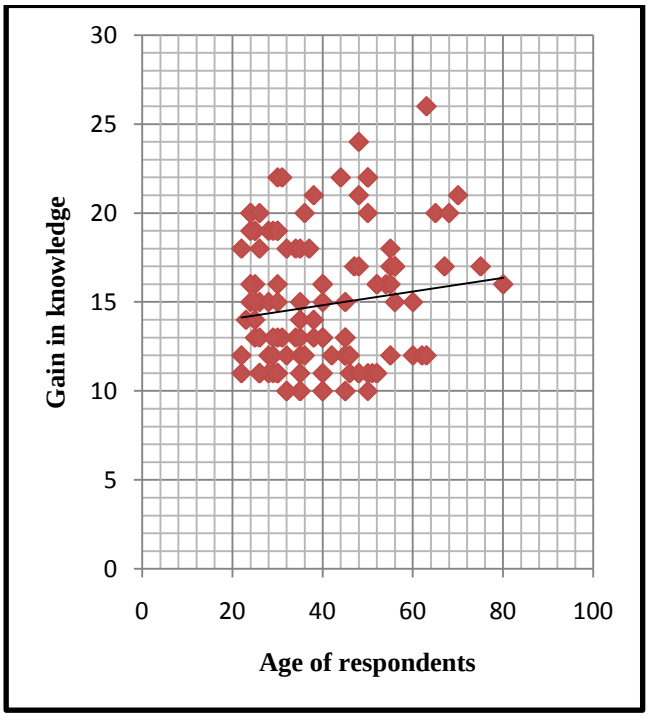
TABLE 4
RELATIONSHIP BETWEEN INDEPENDENT VARIABLES AND DEPENDENT VARIABLE

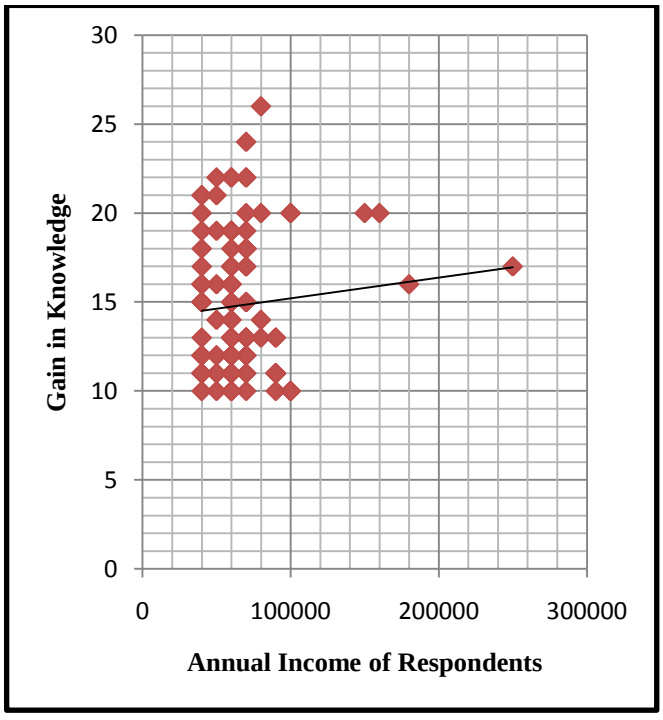
S. No.	Independent variable	Dependent variable (Gain in Knowledge)	t calculated	Null Hypotheses
		r		
1	Age	0.133	1.46	Accepted
2	Education	0.841**	16.88	Rejected
3	Annual Income	0.087	0.95	Accepted
4	Occupation	-0.0104	-1.12	Accepted
5	Landholding	0.115	1.26	Accepted
6	Achievement Motivation	0.888**	21.01	Rejected
7	Scientific Orientation	0.782**	13.63	Rejected
8	Mass media exposure	0.128	1.41	Accepted
9	Information seeking behaviour	0.803**	14.63	Rejected
10	Social participation	0.841**	13.75	Rejected

**** Indicate that value is significant at 1% level of significance**
t tab @ 5% = 1.98 ; t tab @ 1% = 2.62
(**'r'**= coefficient of correlation, **'t' cal** is calculated value of t statistic, **'t' tab** is table value of t statistic for two tailed test at 5% or 1% level of significance and (n-2) df.)

It is indicated in Table 4 that Null Hypotheses stating Education, Achievement Motivation, Scientific Orientation, Information seeking behaviour and Social participation have no significant relationship with level of knowledge gained by farmers due to community radio programme was rejected. Hence, alternate hypotheses stating Education, Achievement Motivation, Scientific Orientation, Information seeking behaviour and Social participation have significant relationship with level of knowledge gained by farmers due to community radio programme was accepted. Thus, it can be concluded that Farmers' profile characteristics like Education, Achievement Motivation, Scientific Orientation, Information seeking behaviour and Social participation have significantly positive impact on their knowledge gain through need based community radio programme.

It is also evident from the above table that there is some extent of positive or negative correlation between independent and dependent variables but to understand the strength of their relationship, visual representation of the relationship on scatter plot is depicted in Figure 2(a & b).





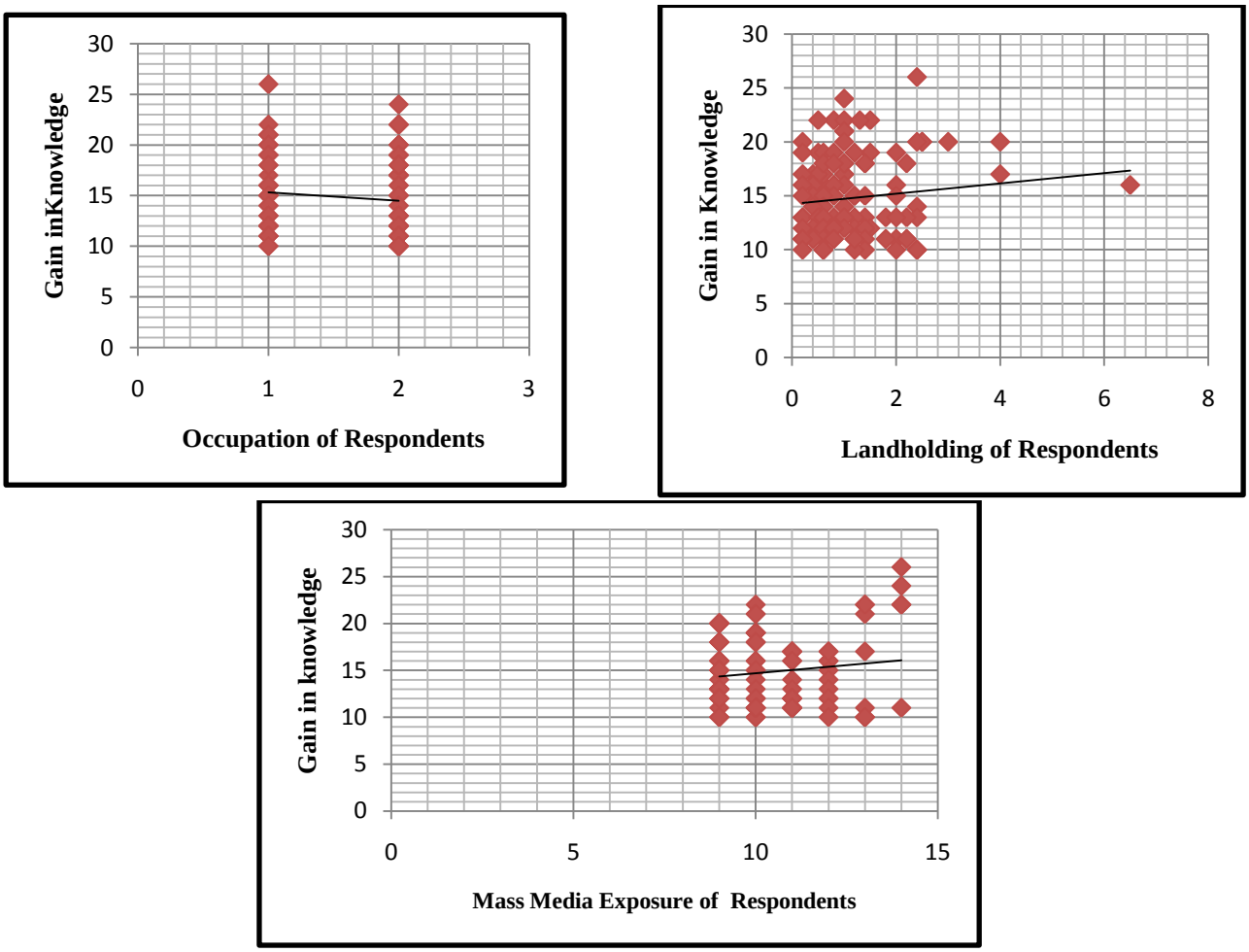
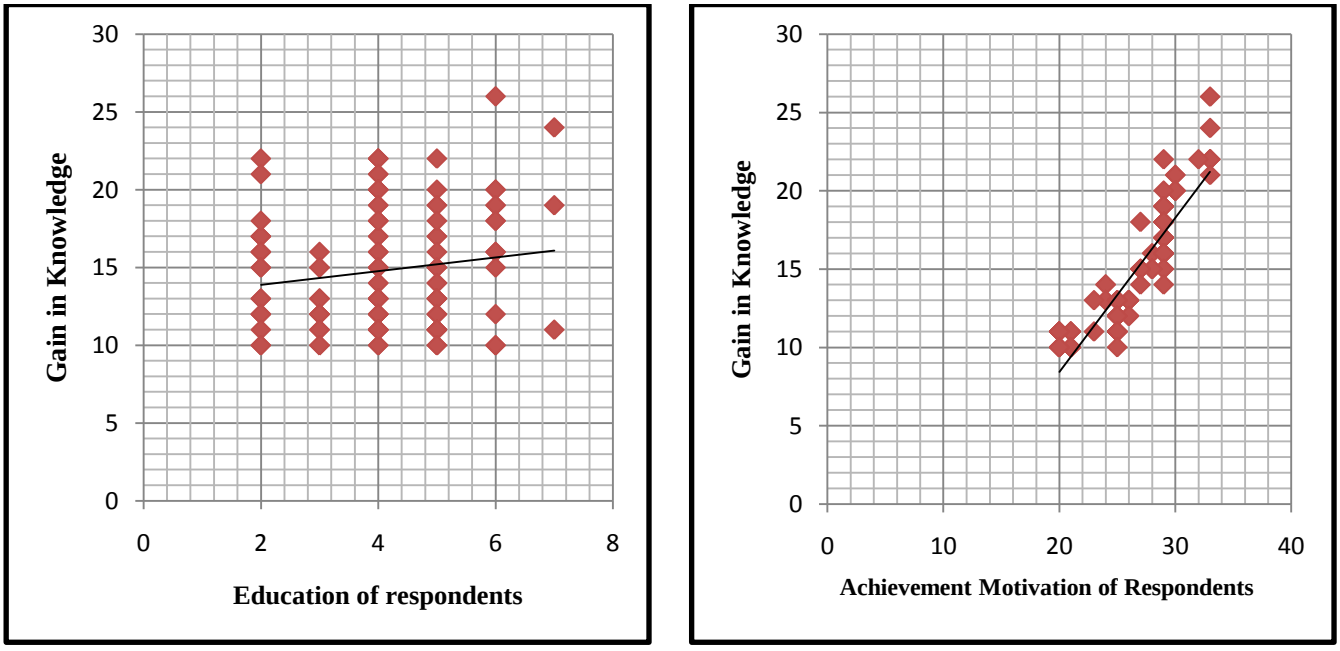


FIGURE 2(a): Representation of Weak relationship between independent and dependent variables

It is clear from Fig. 2(a) that Age, Annual Income, Landholding and Mass Media Exposure have positive correlation with gain in knowledge while Occupation has negative correlation with gain in knowledge. However, as showed by scatter plot the relationship is weak in strength.



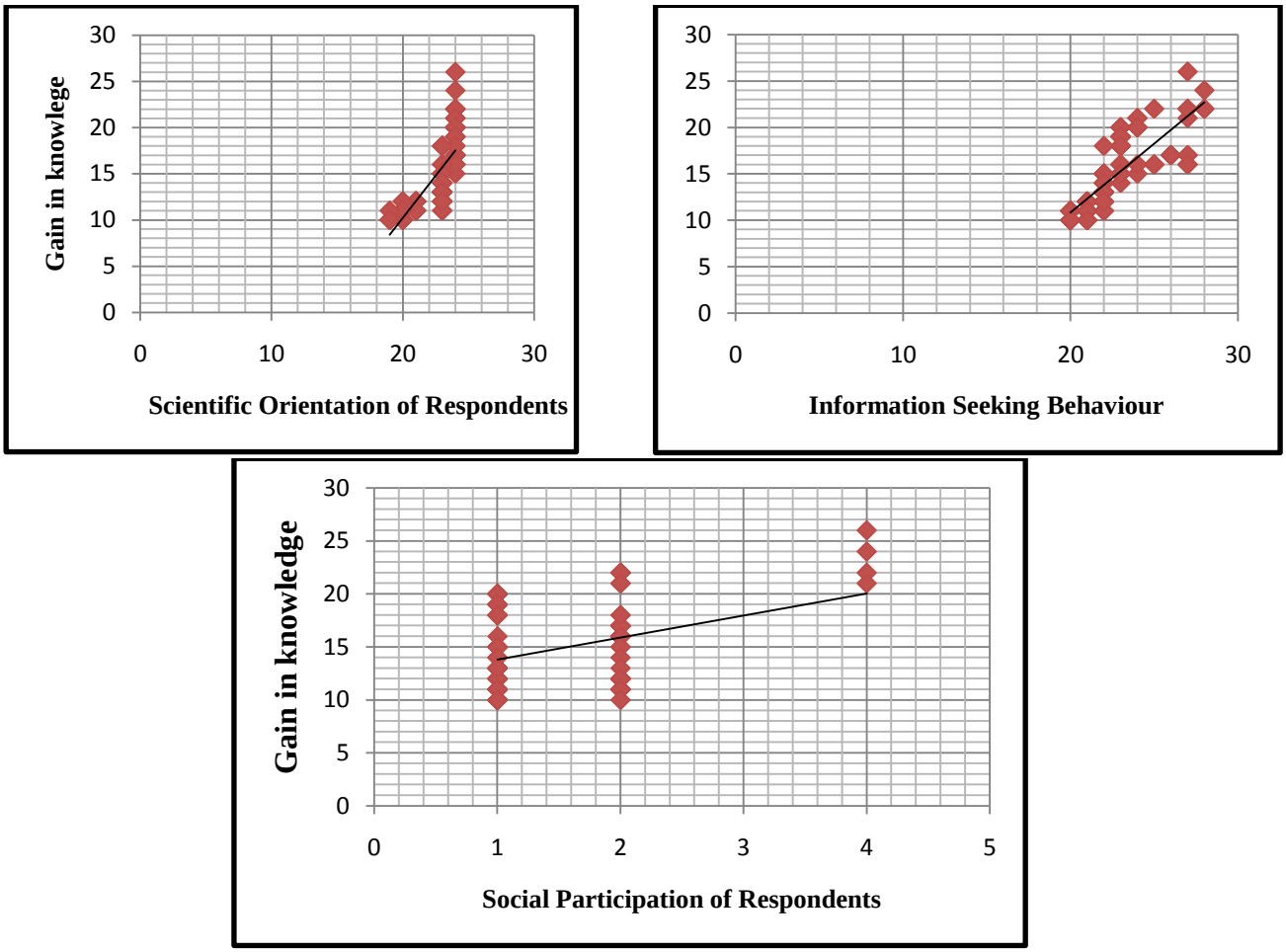


FIGURE 2(b): Representation of Strong relationship between independent and dependent variables

It is visible from the scatter plot representation in Figure 2(b) that there is positive, linear and strong correlation between education, achievement motivation, scientific orientation, information seeking behaviour and social participation with gain in knowledge. From these results it can be inferred that, the significant relationship between education and gain in knowledge might be due to the reason that respondents with higher education level were able to grasp the things readily and quickly. As people with higher achievement motivation are always eager and motivated to know more to achieve something, due to which it might be possible that it has significant impact on knowledge gain. The significant relationship between scientific orientation and gain in knowledge may be because respondents with scientific bent of mind seek to gain knowledge regarding new agricultural practices and technology. Farmers with high information seeking behaviour would have high intent to seek information and knowledge. Therefore, due to their quest for new information and knowledge there would be significant increase in their knowledge score before and after the intervention. Moreover, it can also be concluded that higher the extent of social participation of respondents, higher will be their gain in knowledge.

IV. CONCLUSION

For agricultural development, it is important that dissemination of agricultural information and technologies through planned media intervention like community radio programme must be need based and according to audience profile. Initially, it was found that there was significant gap in farmers' knowledge and awareness level regarding IPM technology and concepts. The study indicated that a planned and strategized media intervention could significantly enhance the knowledge level of the farmers as in case of the present study. Also, the present study brings to light various profile factors like education, achievement motivation, scientific orientation, information seeking behaviour and social participation of respondents, which positively and significantly affect their gain in knowledge. Hence, studying these audience profile characteristics and keeping them in mind before any intervention is most important for the success of that intervention. Moreover, these profile characteristics of audience can also be made favorable according to gain in knowledge, by providing proper training.

Therefore, keeping the above points in mind community radio programme can play a crucial role in effective communication of agricultural technologies and also being a tool of Information and Communication technology it has potential to overcome the challenge of Agricultural extension system by covering wider audience and with a participatory methodology. The study also suggests establishing a strong network between State Agriculture Universities, Krish Vigyan Kendras and Community Radio Stations in the whole country which can together lead to agricultural transformation.

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