



## **Extension Needs of Vegetable Growers: A Study in Kumaon Region of Uttarakhand**

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### **Authors' contributions**

*This research work was carried out by the author JR under the supervision and guidance of the second author. Both the authors jointly designed the study. However, the author JR undertook field data collection. Both authors managed the statistical analysis and wrote the protocol. Further, first draft was prepared by the first author, which was checked and finalized by the author MAA. Both authors read and approved the final manuscript.*

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### **ABSTRACT**

Information needs to be expressed by farmers have often been understood as extension needs. However, the mandate of extension services is more than just providing information about agri-inputs and its supply chain. The present study was undertaken to determine the extension needs of vegetable growers. The study sample comprised of 160 vegetable growers spread across four villages in two districts of Kumaon region of Uttarakhand. The data was collected through personal interviews using a pre-tested structured interview schedule. The study findings revealed that a large majority of the vegetable growers expressed high extension needs. Certain attributes of farmers such as age, education, farming experience, information-seeking behaviour, media exposure and income were found to have a significant relationship with the extension needs of vegetable growers. The study findings will help policymakers, technology developers, extension scientists and field extension agents learn about the extension needs of the vegetable growers and help in designing and developing appropriate extension strategies according to their extension need and convenience of the farmers so that they could get the maximum benefit out of it.

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## 1. INTRODUCTION

Agriculture has been and continues to be the principal engine of economic growth in India as it sustains over 70% of its population and contributes around 20% to its GDP. It employs about 70% of the workforce and contributes about 18% to the national GDP. Indian agriculture has witnessed a green revolution (relating to the significant increase in the production of foodgrains), a white revolution (relating to milk and milk products), a yellow revolution (relating to oilseeds and pulses), and a blue revolution (relating to fishery sector). In the post-green revolution era, the focus has now shifted from foodgrains to horticultural crops which include fruits and vegetable crops.

Vegetable cultivation in the state of Uttarakhand has been identified as the financially rewarding practice and could replace subsistence farming in the rain-fed hills, arid, dry land and coastal agro-ecosystem. Fruits and vegetables account for nearly 90 per cent of the total horticulture production in the country which stands at 311.7 million tonnes [1], 3.7% higher than last year's, and more than 10% increase in the last five years. Farmers have adopted the production of vegetables due to the changing food habits of people and the increasing awareness of people towards a balanced diet and concept of nutritional security [2]. Vegetables play a vital role in providing the essential nutrients, vitamins, minerals and fibre, which is not present in good quantities in starchy staple foods [3]. Of late, the country has witnessed tremendous progress in vegetable production, especially after the green revolution period. The major vegetable growing states in India are West Bengal, Uttar Pradesh, Bihar, Andhra Pradesh, Gujarat, Karnataka and Tamil Nadu. During the last decade, it has been noticed that among all horticultural crops (fruits & vegetables) there has been a significant increase in productivities of vegetable crops.

To feed the billion-plus population, India has to find ways to accelerate the vegetable production by developing hybrids, high yielding improved varieties, resistant to pests and diseases and production technologies. Still, there is a need to attain the target to supply a minimum of 200 grams (and Optimum 300 grams) vegetable per capita per day. According to Indian Horticulture [4], the estimated demand for vegetable crops

would be 170-180 million tonnes but the actual production will only be 150-160 million tonnes. So, there is a big gap between the demand and production of vegetable crops.

### 1.1 Extension Needs of Vegetable Growers

Farmers' access to accurate, timely and reliable information plays a crucial role in technology adoption [5]. The agricultural extension means the transfer of agricultural-related knowledge from one point (the Source) to the other (the receiver) to increase farm income and agricultural productivity [6]. Many countries established their agricultural extension systems to realize their national food security goals [7-9]. Agriculture extension services, therefore, represent professional communication interventions to motivate and persuade the farmers to adopt the latest agriculture technology to improve crop productivity and production efficiency.

Many researchers have studied the extension needs of farmers by determining their information needs, training needs or needs for agri-inputs [10-12]. However, Extension agencies, agents and functionaries are believed to influence the farmers to adopt latest agriculture technology and can also change their attitude and practices. For an extension agent/ agency to effectively persuade the farmers to adopt a particular idea/ practise, the focus has been on the entire domain of extension services which includes the person who provides information, where, through which method, when and how frequently. Merely providing the information about desired agri-inputs or the knowledge and skills required will not lead to technology adoption. It entails a lot of persuasion, motivation and advocacy to bring about the desired change in the behaviour of farmers, which is the ultimate goal of agriculture extension services. Public agriculture extension systems often fail due to inadequate consultation with farmers about their information needs or poor understanding of their information search behaviour [13]. Besides, the time, place, source or the method used by extension agents do not suit the timing or preferences of the farmers, and that could be one of the reasons why people hold a negative attitude towards extension agent, system and the services. Therefore, the extension strategies and approaches are

supposed to be designed and developed keeping in view the desired extension needs of the farmers in mind.

Hence, this study was carried out to find out the extension needs of vegetable growers in a Kumaon region of Uttarakhand, a North Himalayan state of India. For the present study, the extension needs of vegetable growers were conceptualised as comprising of the following six components – (i). Information needs (relating to the main subject domain), (ii). Desired source of information, (iii). Desired frequency of information, (iv). Gender preference of extension agent, (v). The desired place where information is provided, and (vi). Desire extension method. Subsequently, a composite “Extension Needs Index” was developed by the researcher for measuring extension needs of the target respondents.

## 2. MATERIALS AND METHODS

The study was conducted in the Kumaon region of Uttarakhand, a North Himalayan state of India. The state's economy largely depends on agriculture besides tourism. The major crops grown in Uttarakhand are fruits and Vegetables in the hilly areas although in the plains, Rice-Wheat cultivation is quite common which feeds the population of the state. The study locale chosen were two purposively selected districts - Nainital and Pithoragarh- the highest vegetable producing districts in the state of Uttarakhand, India [14]. Further, two blocks were selected from each district and each block, two villages were selected purposively. A representative sample of 160 farmers, who were engaged in vegetable cultivation, was selected randomly from each village. The analytical research design was adopted for this study. Then, a comprehensive and detailed interview schedule was developed for collecting relevant information from the respondents. Data collected was coded, classified, tabulated and was analysed using Statistical Package for the Social Sciences (SPSS) by the study objectives. Descriptive and inferential analytical techniques were used to achieve the study objectives

## 3. RESULTS AND DISCUSSION

### 3.1 Socioeconomic Characteristics of Vegetable Growers

Findings of Socioeconomic characteristics of vegetable growers was one of the study

objectives and the results obtained are given in Table 1.

**Table 1. Distribution of vegetable growers based on socio-economic characteristics (n=160)**

Sl. no.	Variables	Frequency	Percentage
1.	<b>Age</b>		
	Young (<34 years)	27	16.87
	Middle (34-50 years)	103	64.38
	Old(>50 years)	30	18.75
	<b>Gender</b>		
	Male	78	48.75
	Female	82	51.25
3.	<b>Caste</b>		
	General	108	67.50
	OBC	29	18.12
	SC/ST	23	14.38
4.	<b>Education</b>		
	Illiterate	23	14.37
	Primary school	32	20.00
	High school	54	33.75
	Intermediate	37	23.13
	Graduation	14	8.75
	Post-graduation	0	0.00
5.	<b>Family type</b>		
	Nuclear	48	30.00
	Joint	100	62.50
	Extended	12	7.50
6.	<b>Family size</b>		
	Small (<4 members)	23	14.38
	Middle(4-8 members)	110	68.75
	Large (>8 members)	27	16.87
7.	<b>Landholding</b>		
	Less than 1 Acre	114	71.25
	1 to 5 Acre	37	23.13
	5 to 10 Acre	9	5.62
	More than 10 acre	0	0.00
8.	<b>Farming experience</b>		
	Low (<10 years)	32	20.00
	Medium (10-32 years)	105	65.63
	High (>32 years)	23	14.37

A careful perusal of the above table reveals that majority of the respondents (64.38%) belonged to middle age group followed by 18.75 per cent

who belonged to old age category and 16.87 per cent belonged to young category. Majority of the respondents belonged to the General caste (67.50%) followed by OBC (18.12%) and SC/ST only 14.38. Jantwal [15] also found that in the Kumaon region of Uttarakhand the majority of the respondents belonged to the General caste (89.16%) followed by SC (10.8%).

Further, most of the respondents (33.75 %) were educated up to high school followed by 23.13 per cent who had studied up to intermediate; 20 per cent of vegetable growers were educated up to primary level, 14.37 per cent were illiterate and only 8.75 per cent had studied up to intermediate level and none of the respondents had studied till post-graduation. As regards family type, the majority of the respondents (62.5 %) were from a joint family, 30 per cent belonged to nuclear family whereas only 7.5 per cent of them were from extended families. About 68.75 per cent of the respondents had medium family size whereas 14.38 per cent of respondents had a small family and remaining 16.87 per cent were having large-sized families. Chayal and Dhaka [16] stated that majority (65%) of respondents were illiterate whereas 35 per cent were literate, majority of respondents (42.5%) had medium size of landholding followed by 37.5 per cent having small and 20 per cent with large landholding. As regards the farming experience of the respondents, the majority (65.63%) of them had medium farming experience whereas

20 per cent had low farming experience and remaining 14.37 per cent had high farming experience.

### 3.2 Extension Needs of Vegetable Growers

The major focus of the study was to determine the extension needs of the vegetable growers as they are not usually addressed by the existing extension system. Moreover, in many studies, information needs have often been referred to as extension needs. In this study, it was conceptualized as a multi-modal framework which comprised of six different components, viz. (i) Desired information needs (related to agriculture and livestock), (ii) Preferred source of information, (iii) Desired frequency of contact, (iv) Desired place of contact, (v) Desired Extension Teaching Method and (vii) Gender preference of Extension Agent.

#### 3.2.1 Overall Extension Needs of Vegetable growers

It refers to the information required by vegetable growers while doing farming. As stated earlier, a composite 'Extension needs index' was specially developed for the study. The respondents expressed their extension related to their overall extension needs as well as in respect of individual components also. The results obtained are given below (Fig. 1).

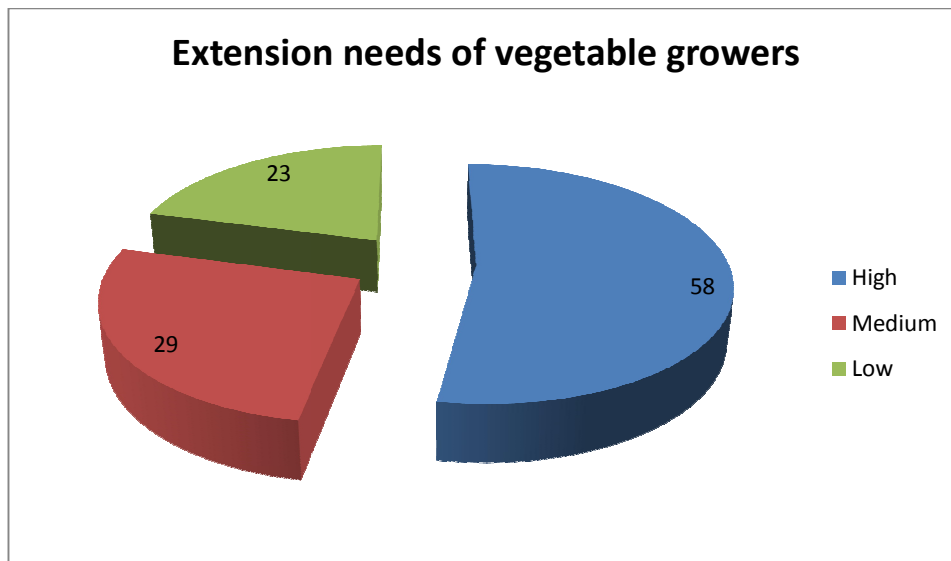


Fig. 1. Extension needs of vegetable growers (Data labels represent percentages)

As is evident from the above Figure, 58 per cent of respondents have expressed 'high' extension needs' followed by medium (29%) and low (23%). Further analysis of the data (Mean score for each sub-component) was done to find out as to which component is perceived by the respondents as more important than others. The results are given in the following Fig. 2.

A careful perusal of the above results regarding component-wise extension needs of the respondents indicate that 'desired extension teaching method' was accorded as the most important component of extension needs expressed by the respondents followed 'Desired place of contact', 'desired information needs', 'preferred source of information', 'desired frequency of contact', and 'gender preference of

extension agent' (in that order). Interestingly, for the respondents, the gender of the extension agent was given the least importance indicating that other components are far more important than the gender of the extension agent. This is against the usual belief among the extension professionals that women farmers may be hesitant while interacting with a male extension agent. Moreover, 'desired extension teaching method' and desired a place of contact being given the most importance (first and second-order) indicates that farmers are looking for better learning outcomes and conducive environment for effective learning. It is therefore imperative on all change agents to take note of this while formulating appropriate extension strategies.

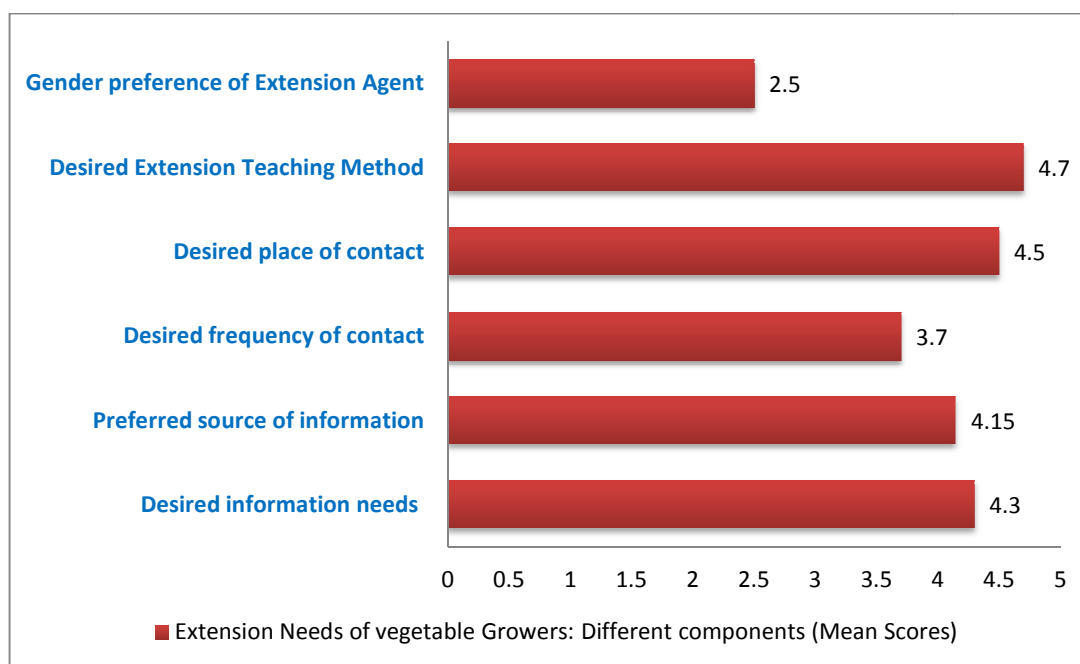


Fig. 2. Component-wise extension needs of vegetable growers

Table 2. Distribution of vegetable growers based on information needs (N=160)

Sl. no.	Areas (information needed about)	Most needed		Needed		Not needed	
		No. of respondents	%	No. of respondents	%	No. of respondents	%
1	Pre-sowing stage	91	56.87	37	23.13	32	20.00
2	Sowing stage	49	30.63	66	41.25	45	28.12
3	Growing stage	83	51.87	53	33.13	24	15.0
4	Harvesting stage	27	16.87	49	30.63	84	52.50
5	Post-Harvest stage	79	49.37	68	42.50	24	15.00
6	Government policies and schemes	160	100.0	00	0.00	00	0.00

### 3.2.2 Desired information needs of vegetable growers

Information asymmetry at farm level has been identified as one of the critical factor affecting agriculture productivity and production efficiency. Farmers' require information at different stages of farming, and the researcher intended to find out at which stage of farming, they require more information than at other stages. Information needs related to agriculture were classified under six sub-heads (stages), i.e. information needs related to (a) Pre-sowing stage (b) Sowing stage (c) Growing stage (d) Harvesting stage (e) Post Harvest stage (f) Government policies and schemes. The results obtained are given in the following Table 7.

It is evident from the above table that majority of the respondents i.e. 56.87 per cent expressed the need for information related to pre-sowing stage, which was perceived as 'most needed' followed by 'growing stage' with 51.87 per cent and 'post-harvesting stage' by 49.37 per cent of the respondents. Significantly, all the respondents expressed that they needed information about government policies and schemes related to agriculture. Further, about 52.5 per cent of the respondent considered information related to harvesting stage as 'not much needed' and 30.63 per cent considered it as "needed" and only 16.87% of the respondents considered it as "most needed".

Ayanwuyi and Zaka [17] found that 78.0 per cent of the total respondents needed information about right planting time, 69.20 per cent of them needed information on planting spacing, 60 per cent needed information on pesticides, 49.20 per cent on herbicides while 12.50 per cent needed information on the use of fertilizer.

### 3.2.3 Preferred source of information

It indicates the preferences of vegetable growers about various sources of information, i.e. how/ from whom they would like to receive the information about agriculture. The findings regarding vegetable growers' preference of source of information have been presented in Table 3.

A large majority of vegetable growers (36.88%) expressed their preference for 'friends and relatives' to receive agriculture-related information followed by 'progressive/fellow farmers' (26.87%), mass media (16.25%), local

leader (12.5%), elderly person (5.63%) and extension personnel (1.87%). The findings are supported by Sunetha [18] who found that 88.33 per cent of vegetable growers seek information from their friends and relatives.

**Table 3. Distribution of vegetable growers based on the desired source of information (N=160)**

S.n.	Desired source	Frequency	Percentage
1	Friends and relatives	59	36.88
2	Progressive/fellow farmers	43	26.87
3	Local/opinion leaders	20	12.50
4	Elderly people	9	5.63
5	Extension personnel	3	1.87
6	Mass media	26	16.25

### 3.2.4 Desired frequency of contact

The researcher wanted to find out how frequently vegetable growers would like to receive information about agriculture. The findings are presented in Table 4.

**Table 4. Distribution of vegetable growers based on the desired frequency of contact (n=160)**

S.n.	Frequency of contact	Frequency	Percentage
1	Daily	13	8.12
2	Weekly	17	10.63
3	Fortnightly	30	18.75
4	Monthly	85	53.13
5	Yearly	15	9.37

A perusal of the results presented in Table 4 reiterates that majority of the respondents (53.13%) expressed their desire to have contact with information providers (i.e. extension agents) on 'monthly' basis and 18.75 per cent wanted to have it on 'fortnightly' basis; however, only 8.12 per cent of the vegetable growers desired to have contact with extension agent(s) on 'daily' basis.

### 3.2.5 Desired place of contact

As vegetable growers are overburdened with work, place of contact with extension agent also

matters a lot to them. Results obtained are given in Table 5.

**Table 5. Distribution of vegetable growers based on the desired place of contact (n=160)**

S.n.	Desired place	Frequency	Percentage
1	Farm	97	60.63
2	Home	49	30.62
3	Other places	14	8.75

A large majority of vegetable growers (60.63%) considered their farm/ field as the desired place of contact, followed by 30.62 per cent of respondents who told that their home as the desired place whereas 8.75 per cent of them talked about 'other places' than Farm and Home as the desired place of contact. Barbercheck et al. [19] found that the formats that most respondents reported as best for them were: On-farm demonstrations (80%), and Learning from home (74%).

### 3.2.6 Desired extension teaching methods

The results obtained in respect of vegetable growers' preference about extension teaching methods are given in the following Table 6.

**Table 6. Distribution of vegetable growers based on desired extension teaching methods (n=160)**

S.n.	Desired method	Frequency	Percentage
1	Farm and Home visit	89	55.63
2	Demonstration	33	20.63
3	Training	15	9.37
4	Field trips	23	14.37

Majority of the respondents (55.63%) considered 'Farm and Home visit' as the desired extension method for receiving information from extension agents whereas 20.63 per cent preferred 'demonstrations'. 'Field trips' were considered by the respondents as the desired method only by 14.37 per cent. The findings are supported by Idowu [20] who reported that the farm visit was the most preferred extension teaching method (50%).

### 3.2.7 Gender preference of extension agent

It was in this context that the present research intended to find out the preference of vegetable

growers about the gender of extension agents. The results obtained are given in Table 7.

**Table 7. Distribution of vegetable growers based on gender preference of extension agent (N=160)**

S.n.	Gender preference	Frequency	Percentage
1	Male	49	30.63
2	Female	47	29.37
3	Gender of extension agent doesn't matter	64	40.00

**Table 8. Relationship between characteristics of vegetable growers and their extension needs**

Sl. no.	Characteristics of vegetable growers (Independent variables)	r-value
1	Age	0.191*
2	Gender	-0.064
3	Caste	0.038
4	Landholding	0.267**
4	Education	0.270**
5	Farming experience	0.302**
6	Contact with extension agency	-0.046
7	Information seeking behaviour	0.183*
8	Information sharing behaviour	0.026
9	Media Exposure	0.274**
10	Income	0.297**

\*Significant at P < 0.01% level; \*\* Significant at P = 0.05% level; NS- non significant

About 40 per cent of the respondents expressed that it doesn't matter if the extension agent is either male or female. However, 30.63 respondents preferred male extension agent for receiving information while 29.37 per cent preferred female extension agents. The study findings are similar to Jantwal [18] who found that to the majority of the respondent's gender of the extension functionaries didn't matter.

### 3.3 Relationship between Selected Socio-Economic Characteristics of Vegetable Growers and Their Extension Needs

The study also examined the relationship between selected socio personal characteristics

of vegetable growers and their extension needs. The variables included were: Age, Education, Caste, Income, Gender, Farming experience, Information seeking behaviour, Information sharing behaviour and Extension agency contact. The findings are presented in Table 8.

It is evident from the above table that age, landholding, education, farming experience, information-seeking behaviour, media exposure and income were found to have a significant relationship with the extension needs of vegetable growers. But, gender, caste and information sharing behaviour were found to be not related to the extension needs of vegetable growers. Further, gender and contact with extension agency displayed a negative (but not significant) correlation with extension needs of vegetable growers.

The findings are supported by Rehman et al. [21] who stated that education and size of landholding had a highly significant positive relationship with access to agricultural information while age and farming experience had a non-significant relationship. Farayola et al. [22] also reported that there was a significant relationship in education and marital status of the respondents and their training needs but there was no influence of sex on their training needs. Dshmukh et al. [23] observed that variables like social participation, extension contact, scientific and risk orientation had negative significance, whereas family size was observed positively

significant with the information needs of the respondents.

Further, multiple correlation analysis was also done to find out the contribution of profile characteristics of vegetable growers in determining their extension needs. The results obtained are given in the following Table 9.

The results of multiple regression analysis revealed that ten independent variables contributed differentially towards extension needs of vegetable growers. It is evident that age, gender, income, media exposure, extension agency contact, and information-seeking behaviour were found to be negatively related whereas caste, education, farming experience and information sharing behaviour were positively related with extension needs of the vegetable growers (dependent variable).

The value of the coefficient of determination ( $R^2$ ) was 0.617 which means that 61% of the variation in the dependent variable was contributed by all the independent variables put together. The remaining variations in the dependent variable may be due to other variables not included in the study or by extraneous or intervening variables. Nevertheless, the high value of  $R^2$  indicates that the researcher has accounted for the major components/ factors which determines the extension needs of the vegetable growers.

**Table 9. Multiple regression analysis of extension needs of the vegetable growers**

S.n.	Independent variable	Regression coefficient values ( $\beta$ )	Standard error	"t" Value
1	Age	-0.66	0.164	-0.402
2	Gender	-0.894	1.711	-0.522
3	Caste	0.564	1.141	0.494
4	Income	-0.198	0.869	-0.227
5	Education	0.760	0.956	0.796
6	Farming experience	0.107	0.194	0.552
7	Media exposure	-0.204	0.948	-0.216
8	Contact with extension agency	-0.136	0.295	-0.461
9.	Information seeking behaviour	-0.274	0.445	-0.307
10.	Information sharing behaviour	0.238	1.154	-0.207

$R^2 = 0.617$ ;  $\beta_1 = 50.334$ ;  $f_{cal} = 0.250$ ; Dependent Variable: Extension needs of vegetable growers



#### 4. CONCLUSION

The study was conducted to determine the extension needs of vegetable growers in Kumaon region of Uttarakhand. The study findings indicated that the majority of the respondents expressed 'high' extension needs signifying that the extension system has not been able to meet the expectations of vegetable growers. Although elaborate extension system exists but farmers' extension needs are not being met properly and adequately. Of the six components of extension needs as conceptualized by the researcher, 'desired teaching method' and desired a place of extension contact' were given relatively more important than other components such as the preferred source of information, desired frequency of contact, gender preference of extension agent, and desired information needs. This means that extension scientists and researchers must give due importance to the learning environment more importance than other factors.

The study findings may help the extension scientists, extension workers, government administrators and policymakers to develop a policy framework for establishing an appropriate extension system which also caters to the hitherto ignored extension needs of vegetable growers whose contribution in agriculture is significant and critical for enhancing agriculture productivity and production efficiency. It will also help policymakers develop appropriate extension services delivery system as per the requirements of target respondents. The study will act as a reference point for providing extension services in hilly areas that have vegetable growers in plenty.

Hill agriculture is characterized by small and fragmented landholdings, and the hilly terrain makes the farming more challenging and difficult. Besides, the density of population in the hills of Uttarakhand is quite low, and farmers in villages are quite dispersed and unreachable due to difficult terrain in some places. Consequently, farmers can grow cash crops such as vegetable crops which become a profitable option. About two-third area of the state of Uttarakhand comprises of hills with varied topography ranging from 1000 feet to more than 10,000 feet. Therefore, the extension system for a hilly state needs to evolve, keeping in view the specific extension needs of the farming community as highlighted by the present study.

#### CONSENT

Informed consent of the respondents was taken before conducting their personal interview.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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