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Adoption of improved cultivation practices among potato growers in Udham Singh Nagar district of Uttarakhand

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Abstract

Agriculture plays a vital role in the Indian economy. The present study was conducted in Udham Singh Nagar district of Uttarakhand to assess the extent of adoption of improved cultivation practices among potato growers. Two blocks, Kashipur and Gadarpur, were selected purposively, and a total of 120 respondents were selected using Probability Proportionate to Size sampling. The findings revealed that the majority of respondents belonged to the middle-age group (70%) and had education up to high school level (31.6%). Most respondents (66.66%) belonged to the general category and 52.5% had a medium level of annual income. A significant proportion (54.16%) had small landholdings (up to 1 acre), while 91.66% had no membership in any organization. The majority (80%) exhibited medium scientific orientation. Regarding adoption, 71.66% of respondents had a medium level of adoption of improved cultivation practices. The study suggests strengthening extension services through Krishi Vigyan Kendras and other institutions to enhance adoption levels. The findings will be useful for extension workers, planners, and policymakers.

Keywords: Potato, adoption behaviour, extension, Uttarakhand, farmers

1. Introduction

Agriculture remains a cornerstone of the Indian economy, contributing significantly to national income and employment generation. It accounts for approximately 17.5% of the Gross Domestic Product (GDP) and provides livelihood support to nearly half of the country's workforce. Over the decades, Indian agriculture has undergone substantial transformation, particularly after the establishment of the Planning Commission in 1950, leading to increased productivity and diversification.

Among horticultural crops, potato (*Solanum tuberosum* L.), belonging to the family Solanaceae, holds a prominent position due to its high productivity and nutritional value. It is one of the most efficient crops in terms of food production per unit area and time, making it an essential component of food security. Globally, potato ranks among the most widely consumed crops, with a significant share of production concentrated in Asian countries.

India is the third-largest producer of potato in the world, with an estimated production of about 48 million tonnes and an average productivity of approximately 23 tonnes per hectare. Major potato-producing states include Uttar Pradesh, West Bengal, and Bihar. In Uttarakhand, potato cultivation plays a crucial role in the agricultural economy, particularly in districts like Udham Singh Nagar, where favorable agro-climatic conditions support its production.

Despite advancements in agricultural research and the

availability of improved cultivation practices, the level of adoption among farmers varies significantly. Factors such as socio-economic conditions, access to information, and institutional support influence adoption behavior. Therefore, understanding the extent of adoption of improved potato cultivation practices is essential for designing effective extension strategies. There seems no other alternative to improve production other than adopting the improved cultivation practices of potato. There had been always a gap between recommended innovations and their adoption by the ultimate users of the technology (Pottappa, K. 2005) [5]. In this context, the present study aims to assess the adoption level of improved cultivation practices among potato growers in Udham Singh Nagar district of Uttarakhand.

Objectives of the study

1. To study the socio personal, economic, psychological and communication characteristics of potato growers.
2. To study the extent of adoption of improved cultivation practices by potato growers.

2. Materials and Methods

2.1 Universe of the study

Universe of the study is Uttarakhand state, situated in the lap of mountains. Uttarakhand formerly known as Uttaranchal, is the state in the northern part of India. State consists of total 13 districts, from which seven are grouped

into Garhwal region and six are grouped into Kumaon region. Kumaon region is rich in flora and fauna and has mixed topography i.e. plains as well as hills. The six districts of Kumaon region are Nainital, Almora, Pithoragarh, Bageshwar, Champawat and Udham Singh Nagar.

2.2 Locale of study

U.S. Nagar district is situated in plains of Uttarakhand and it has maximum production of potato among all the districts of Kumaon. U.S. Nagar district of Kumaon is selected purposively as the locale of the study because it has maximum production of potato.

2.3 Selection of blocks

Udham Singh Nagar district has seven blocks. Out of these seven blocks, two blocks i.e. Kashipur and Gadarpur were selected purposively as these blocks have maximum area and production under potato cultivation in U.S. Nagar district of Uttarakhand.

2.4 Selection of villages

Four villages out of 77 villages of Kashipur block and four villages out of 69 villages of Gadarpur block were selected purposively on the basis of maximum production of potato crop in consultation with Block Development Officers of the selected blocks.

2.5 Selection of Respondents

Table 1 below shows a list of potato growers from each selected village was prepared in consultation with Block Development Officers. Total 120 potato growers were selected for the study by Probability Proportionate to Size sampling method.

Table 1: Name of selected villages and number of respondents in each village

S. No.	Blocks	Villages	Population of potato growers	Number of respondents
1.	Gadarpur	Missarwala	40	14
2.		Madanpur	44	16
3.		Girdharnagar	48	17
4.		Khera	35	13
5.	Kashipur	Barkheri	33	12
6.		Chanakpur	49	18
7.		Dhanauri	35	13
8.		Ranirajpura	48	17
Total			332	120

2.6 Research Design

The research design adopted for the study was descriptive research design as the main goal of this type of research is to describe the data and the characteristics about what is being studied.

2.7 Calculation of Extent of Adoption of Improved cultivation practices

To know the extent of adoption, fifteen cultivation practices like cultivation of improved varieties, soil testing, time of sowing, mulching of crop, dehauling before harvesting, spraying of agrochemicals, cutting and burning of plant debris, seed plot technique and true potato seed were

selected for the study. Scoring was done by assigning “0” for non adoption, “1” for partial adoption and “2” for full adoption. Total scores were calculated by summing up the scores of all fifteen statements.

2.8 Tools used for data collection

A pretested interview schedule was developed and used for collecting the information from potato growers by personal interview and telephonic interview. The interview schedule was particularly designed so as to cover all the objectives set for the research.

3. Results and Discussion

3.1 Socio- economic characteristics of sample farmers

Table 2 depicts the socio economic variables that combine social and economic aspects, such as income, education and employment that describe an individuals social and economic position.

Here, out of 120 potato growers, 70 per cent respondents belonged to middle age group followed by 17.5 per cent respondents from young age group and only 12.5 per cent respondents were found in old age group. Thus, it may be inferred from the data that majority of the potato growers belonged to middle age group. The findings are in line with the results reported by Pandey (1998) ^[2] with reference to the age of farmers. While, with respect to educational level, majority of respondents i.e. 31.6 per cent were having education up to high school followed by 15.83 per cent respondents who were illiterate, 4.16 per cent respondents can read only, 9.16 per cent can read and write, 11.66 per cent potato growers had received education up to primary level and 10.8 per cent potato growers were educated up to middle school, and only 16.66 per cent were graduates. Thus, it can be concluded that majority of potato growers i.e. 31.6 per cent were educated up to high school. The findings of this study were in line with the findings reported by Rawal (2017) ^[3]. Maximum potato growers, i.e. 66.66 per cent belonged to general category. While, 16.6 per cent belonged to other backward classes and 15.83 per cent belonged to scheduled castes and scheduled tribes category.

Among the total potato growers, 7.5 per cent were landless while majority i.e. 54.16 per cent potato growers were having small size of land holding up to 1 acre, followed by 33.33 per cent respondents were having landholding between 1 to 5 acres, 4.16 per cent potato growers were having landholding between 5 to 10 acres and only 0.83 per cent potato growers were having more than 10 acres land holding. Hence, it can be concluded that maximum percentage (54.16%) of potato growers belonged to the group having land holding up to 1 acre. However, 5.83 per cent potato growers were landless and they were growing potato on hired land while majority of respondents (60%) were growing potato in about 1 acres area.

With respect to the annual income of the potato growers, 35.83 per cent were found in low-income group, whereas 52.5 per cent were found in medium income group and only 11.66 per cent were found in high income group. Thus, it can be concluded that majority of potato growers (52.5%) belonged to medium income group.

Data regarding the media sources used to seek information showed that majority of respondents occasionally seek the information from poster (51.66%) and pamphlets (51.66%).

Less than half of the respondents had regular information from Radio (47.5%), Television (39.16%) and about less than half of the respondents (20.83%) had never used computer to seek information.

Respondents with 18.33 percent had high information seeking behavior followed by 68.33 per cent potato growers possessed medium and only 13.33 per cent potato growers were utilizing low information seeking behavior. The findings are in line with the outcome reported by Ahmad *et al.* (2012) [1].

Majority (91.66%) of the potato growers were not having membership in any organization, while 8.33 per cent potato growers were having membership in only one organization.

Thus, it is evident from the above data that majority of the potato growers (52.50%) had no social participation. The findings of the present study are in line with the outcome reported by Saini (2017) [6]. Majority (80%) of the potato growers were having medium scientific orientation, while 12.5 per cent potato growers were having low scientific orientation and only 7.5 per cent potato growers were highly scientifically oriented. Thus, it is evident from the above data that majority of the potato growers i.e. 80 per cent were having medium level of scientific orientation. The findings of the present study are in line with the outcome reported by Kushwaha (2008) [4].

Table 2: Socio economic characteristics of sample farmers

S. No.	Particulars	Frequency	Percentage
I.	Age		
a.	Young age (< 37)	21	17.5
b.	Middle age (37-60)	84	70
c.	Old age (> 60)	15	12.5
II.	Education level		
a.	Illiterate	19	15.83
b.	Can read only	05	4.16
c.	Can read and write	11	9.16
d.	Up to primary school	14	11.66
e.	Up to middle school	13	10.8
f.	Up to high school	38	31.6
g.	Graduated	20	16.66
III.	Caste		
a.	General	81	66.66
b.	Other backward class	20	16.6
c.	Schedule caste / Schedule tribe	19	15.83
IV.	Landholding		
a.	No land	9	7.5
b.	Up to 1 acre	65	54.16
c.	1.00-5.00 acre	40	33.33
d.	5.00-10.00 acre	5	4.16
e.	More than 10 acre	1	0.83
V.	Area under potato cultivation		
a.	No land	7	5.83
b.	Up to 1 acre	72	60
c.	1-5 acre	34	29.16
d.	5-10 acre	5	4.16
e.	More than 10 acre	1	0.83
VI.	Annual income		
a.	Low income (< Rs 197532.75)	43	35.83
b.	Medium income (Rs 197532.75 –Rs 553566.09)	63	52.5
c.	High income (> Rs 553566.09)	14	11.66
VII.	Extent of information seeking		
a.	Low (< 12.45)	16	13.33
b.	Medium (12.45- 15.59)	82	68.33
c.	High (> 15.59)	22	18.33
VIII.	Social participation		
a.	No membership	110	91.66
b.	Member of one organization	10	8.33
c.	Member of more than one organization	0	0
IX.	Scientific orientation		
a.	Low (< 22.94)	15	12.5
b.	Medium (22.94-27.07)	96	80
c.	High (> 27.07)	9	7.5

3.2 Practice wise adoption of improved cultivation practices by potato growers

The extent of adoption of improved cultivation practices by

potato growers was measured for the fifteen cultivation practices. Efforts were made to include only those practices which can be adopted by farmers practically in the field.

The results exhibit practice wise adoption level of the respondents in which cultivation of improved varieties (83.33%) followed by burning of plant debris (74.16%) had highest adoption. Use of agro chemicals (74.16%) followed by the use of weedicides (72.5%), earthing up (72.5%), recommended spacing (70.83%), timely sowing (66.66%),

irrigation practices (65.83%), true potato seed (65%), storage under proper condition (63.33%) and breaking seed dormancy (55.83%) were found to be major practices adopted by potato growers. Soil testing (20%), seed plot technique (10.83%) and mulching in potato crop (10%) were also adopted by some of the potato growers.

Table 3: Improved cultivation practices adopted by farmers

S. No.	Practices	Frequency and percentage of respondents following improved cultivation practices (multiple responses)					
		Adopted		Partially adopted		Not adopted	
		f	%	F	%	f	%
1.	Cultivation of improved varieties	100	83.33	16	13.33	4	3.33
2.	Soil testing	24	20	51	42.50	45	37.50
3.	Timely sowing	80	66.66	35	29.16	5	4.16
4.	Mulching in potato crop	12	10.00	40	33.33	68	56.66
5.	Earthing up	87	72.5	29	24.16	4	3.33
6.	Dehauling	80	66.66	37	30.83	3	2.5
7.	Spacing	85	70.83	24	20.00	11	9.16
8.	Irrigation practices	79	65.83	33	27.5	8	6.66
9.	Use of weedicides	87	72.5	29	24.16	4	3.33
10.	Burning of plant debris	89	74.16	23	19.16	8	6.66
11.	Use of agrochemicals	89	74.16	24	20.00	7	5.83
12.	Storage under proper conditions	76	63.33	34	28.33	10	8.33
13.	Breaking seed dormancy	67	55.83	48	40.00	05	4.16
14.	True potato seed	78	65	32	26.60	10	8.33
15.	Seed plot technique	13	10.83	32	26.66	75	62.5

3.3 Extent of adoption of improved cultivation practices by potato growers

Data represented in table 4 reveals that out of the total 120 potato growers, 14.16 per cent had low extent of adoption, whereas 71.66 per cent of potato growers had medium extent of adoption and only 14.16 per cent were found having high extent of adoption. Thus, it can be concluded that majority (71.66%) of the potato growers were having medium extent of adoption of improved cultivation practices of potato crop.

Table 4: Distribution of potato growers according to their extent of adoption

S. No.	Categories	Frequency	Percentage
1.	Low (< 19.5)	17	14.16
2.	Medium (19.5- 23.53)	86	71.66
3.	High (> 23.53)	17	14.16

4. Conclusion

The study conducted on the extent of adoption of improved cultivation practices by potato growers revealed that medium extent of adoption of improved cultivation practices was exhibited by majority of the potato growers. The detailed analysis related to the extent of adoption of improved cultivation practices by potato growers revealed that level of adoption of improved cultivation practices was less due to socio economic conditions of potato growers. They were mostly having small landholdings up to 1 acre in which True Potato Seed and Seed Plot Technique was difficult to be adopted. Potato growers were also found to be demotivated towards adoption of improved cultivation practices due to low market price of potato. It is suggested that local bodies responsible for transfer of technology like KVK should put special emphasis on dissemination of improved cultivation practices of potato among potato

growers to acquaint them towards the profitability and relative advantage of these practices.

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