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AGRICULTURE EXTENSION

Extent and Correlates of Knowledge of Farmers regarding Scientific Potato Production Technologies in Himachal Pradesh

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Abstract

The productivity of potato in hilly state of Himachal Pradesh is far below than the national average. Major reason is low adoption rate of improved varieties and technologies due to lack of knowledge. Present study was conducted in Shimla, Mandi and Kangra district of HP during year 2011-12 to find out the extent of knowledge of potato farmers about scientific potato production technology and knowledge gap in relation to different package of practices for potato cultivation. A total of 90 respondents, (30 from each district) constituted the sample of the present study. Data was collected by interview method using structured interview schedule and subjected to appropriate statistical analysis. The findings revealed that a majority of the respondents (78.8%) had medium to low knowledge level about scientific potato production technology. Maximum knowledge gap was found in practices like weed management (73.3%) followed by seed treatment before storage (70%) and insect-pest management (68.8%). Majority of farmers were having knowledge about improved varieties, method of fertilizer application, row to row and plant to plant spacing and planting operations. Socio-personal-economic variables like education, land holding and annual income were significantly and positively correlated with knowledge level of farmers.

Highlights

- Knowledge gap of the potato growers was 49.9 per cent and education, land holding and annual income were significantly correlated with knowledge level.

Keywords: Knowledge index, knowledge gap, potato, Himachal Pradesh

Vegetables are important source of essential nutrients to the Indian population which is largely vegetarian. It plays important role in economic and social spheres of the country by enhancing income of vegetable growers and providing nutritional security to the people. Potato is the most popular vegetable of India. It contributes almost 21.6 per cent of total area and 28 per cent of total production of vegetable in the country (Indian Horticulture Database 2013). India is the second largest producer of potato in world after China. During the year 2012-2013, India produced 45.34 million tones of potato from an area of 1.99 million ha with an average productivity of 22.7 t/ha (Agricultural Statistics at a Glance, 2014). There is a large variation in productivity of potato in different regions of the country. Generally the productivity

of potato in plain areas like Gujrat, Uttar Pradesh, West Bengal, Bihar etc is higher than hilly states like Himachal, Jammu-Kashmir and North-Eastern states.

The hilly state of Himachal Pradesh (HP) known as fruit bowl of the country has a vast potential for vegetable cultivation also. Potato is mostly produced in Shimla, Mandi, Kangra, Sirmour, Lahaul-Spiti and Una districts of HP. Summer crop of potato is grown from March/April to September under rainfed conditions in high hills *i.e.* 2700 meter above mean sea level (Pandey *et al.* 2008). The climatic condition in higher hills of HP *viz.* Shimla and Mandi district, is very suitable for seed potato production and there is a vast opportunities to increase production as well as productivity. Moreover, there is a high demand of table potato from HP because of its off season nature. The harvested fresh potato of this area is sold as *Pahari Aloo* in various parts of the country at a higher price (Arun Pandit *et al*. 2010). Potato was produced on 19,199 ha area in HP with a production of 2,05,283 metric tones (Statistical Outline of HP, 2014). Thus, average productivity of potato in HP was only 12.9 tones/ha which is far below national average productivity. The reason of low productivity may be lack of knowledge of improved potato varieties and scientific techniques of potato cultivation among farmers. The productivity of potato has also declined probably because of more interest towards apple, cauliflower and pea cultivation in the recent years. Productivity of potato can be increased by increasing the knowledge level of farmers regarding improved varieties and recommended technologies which in turn will increase adoption rate. Keeping in view above scenario, the present study was carried out to find out the knowledge level of potato growers and its correlates regarding scientific methods of potato cultivation.

Materials and Methods

This study was conducted during 2011-12 in three districts of Himachal Pradesh namely Shimla, Mandi and Kangra. These districts were selected purposively since they together contribute almost half of total potato production in the state (Table 1). Two blocks from each district namely Mashobara and Theog from Shimla, Sundernagar and Drang from Mandi and Nagrota Bagwan and Bhawarna blocks from Kangra were selected and 15 farmers from each block were selected using multistage random sampling techniques making a total sample size of 90 farmers. The data was collected through personal interview method using a structured interview schedule. The collected data was properly coded, tabulated and analyzed using appropriate statistical tools.

Table 1: Potato production in different districts of HP during 2010-11

Sl. No.	Name of District	Production (MT)	% contribution to state
1	Bilaspur	1000	0.48
2	Chamba	6250	3.03
3	Hamirpur	250	0.08
4	Kangra	47700	15.58
5	Kinnaur	2600	0.85
6	Kullu	9080	2.97
7	Lahaul-Spiti	9500	4.61
8	Mandi	21500	7.02
9	Shimla	78240	25.57
10	Sirmour	18000	8.73
11	Solan	5850	2.84
12	Una	6000	2.91
	Total	**205970**	**100**

The following device was developed to measure the extent of knowledge of farmers regarding scientific potato production technology.

$$KI = \frac{Obtained\ knowledge\ score}{Total\ Obtainable\ knowledge\ score} \times 100$$

Where,

KI= Knowledge Index of a respondent

The KI in relation to scientific potato production technologies was calculated by the formula mentioned earlier. The mean and Standard Deviation (S.D.) of the individual KI regarding scientific

methods of potato production of all the respondents were calculated, which were found to be 50.18 and 19.82 respectively. Then the respondents were categorized into three categories whose respective KI were High *i.e* More than (Mean + S.D.), Medium *i.e* (Mean – S.D.) to (Mean + S.D.) and Low *i.e* Less than (Mean – S.D.). Correlation analysis was applied to find out the association between knowledge of the respondents and socio-personal-economic variables of the respondents using Pearson correlation coefficient. Other descriptive statistics such as frequency, percentage, arithmetic mean etc. were applied as and when necessary.

Results and Discussion

Socio-personal-economic profile of the respondents

The Socio-personal-economic characteristics of the potato growers were analyzed and results are presented in Table 2.

Table 2. Socio-personal-economic characteristics of potato growers

N=90

Sl. No.	Socio-economic attributes	Categories	Frequency	Percentage
1	Age (Years)	Young (Below 36 years)	19	21.1
		Middle (36-50 years)	44	48.9
		Old (More than 50 years)	27	30.0
2	Education	Illiterate	6	6.6
		Primary school	22	24.4
		High School (matric)	40	44.4
		Intermediate (10+2)	15	16.6
		Graduate and above	7	7.7
3	Family labour availability	Low (Upto 2 members)	21	23.3
		Medium (2-6 members)	60	66.7
		High (more than 6 members)	9	10.0
4	Experience in potato cultivation	Low (Upto 11 years)	18	20.0
		Medium (11-36 years)	53	58.9
		High (>36 years)	19	21.1
5	Main Occupation	Agriculture	73	81.1
		Service	9	10.0
		Business	8	8.9
6	Land holding (acre)	Small (0-3 acres)	69	76.7
		Medium (3-5 acres)	15	16.6
		Large (>5 acres)	6	6.7
7	Annual income	Low (upto Rs 15000)	8	8.9
		Medium (Rs 15000-160000)	70	77.8
		High (> Rs 160000)	12	13.3

Data revealed that a majority of respondents (48.9%) belonged to middle age group (36-50 years) were involved in potato cultivation, followed by old (30%) and young (21.1%) age group farmers. Highest percentage of respondents *i.e.* 44.4 per cent were educated up to high school level where as 24.4 per cent were educated up to Primary school level. Only 7.7 per cent of respondents were Graduate. Further analysis of data showed that more than two third of farm families involved in potato cultivation were having medium to high family labour availability. This may be because potato cultivation requires more labour. The data further revealed that a majority of farmers (80%) were having more than 11 years of experience in potato cultivation which shows that potato is a traditional crop in these area. Agriculture was found to be the primary occupation of more than 81 per cent of farmers which indicated the importance of agriculture in providing livelihood to farmers. The profile clearly tells us that a vast majority (93.3%) of the respondents were having small to medium land holding (upto 5 acres) and only 6.6 per cent of farmers having more than 5 acres of land holding. Thus, it clearly indicated that mostly farmers have small land holding in selected districts of Himachal Pradesh. This is because of hilly terrain of the state. Annual income of majority (77.8%) of farmers was between Rs 15,000 to Rs 1,60,000/.

Knowledge level and Knowledge gap regarding scientific potato production technology

Knowledge level of farmers regarding scientific potato production technology was assessed and results are presented in Table 3.

Table 3. Distribution of farmers on level of knowledge about potato production technology

Knowledge level based on KI	Frequency (f)	Percentage (%)
Low (Upto 33.33%)	26	28.89
Medium (33.34-66.66%)	45	50.00
High (above 66.66%)	19	21.11

Mean= 50.18, SD=19.82, Range=75.00, Max. =91.67, Min. =16.67

It is evident from the data that half of the farmers had medium knowledge level of potato production technology, while 28.9 per cent and 21.1 per cent of the farmers had low and high knowledge level, respectively. The average knowledge level of potato farmers was found to be 50.10 per cent. This showed that most of the farmers had low to medium level of knowledge. This may be due to lack of efforts of village and block level extension workers in transfer of new potato technologies to farming communities. Srivastava *et al.* (2012) studied the knowledge level of potato growers of Meghalaya and found the similar result that majority (65.3%) of farmers were having medium level of knowledge about recommended practices of potato cultivation.

Table 4. Knowledge gap of potato farmers regarding improved cultivation practices of potato

Sl. No.	Practices	Maximum obtainable score	Total knowledge score obtained	Knowlege gap obtained (%)	Rank
1	Improved varieties	90	75	16.67	XII
2	Seed rate	90	44	51.11	VI
3	Spacing	90	55	38.88	X
4	Planting operations	90	54	40.00	IX
5	Method of fertilizer application	90	57	36.66	XI
6	Fertilizer dose	90	37	58.88	IV
7	Water management	90	44	51.11	VII
8	Weed management	90	24	73.33	I
9	Disease management	90	42	53.33	V
10	Insect-pest management	90	28	68.89	III
11	Harvesting operations	90	53	41.11	VIII
12	Seed treatment before storage	90	27	70.00	II

Overall knowledge gap=49.90

The data presented in Table 4 reveals that overall knowledge gap of the potato growers in relation to the selected practices of scientific potato production technology was 49.9 per cent. The knowledge gap was highest in case of knowledge regarding weed management (73.3%) followed by seed treatment before storage (70%) and insect-pest management (68.8%). Moreover, farmers were found to be having lack of knowledge regarding recommended fertilizer dose and disease management as evident from data. Almost similar findings were reported by Kirar and Mehta (2009) in their study of knowledge gap in rice production. Majority of farmers were well aware of improved varieties of potato, method of fertilizer application, row to row and plant to plant spacing and planting operations since knowledge gap regarding these practices were minimum. Thus, it can be said that most important contributing factors for low level of knowledge were lack of knowledge regarding control of weeds, seed treatment, plant protection and fertilizer doses. This may be because these practices require knowledge of chemicals along with correct doses. Thus, there is need to enhance the knowledge level of farmers in identified area by way of organizing training programmes for farmers by Government agencies located in respective area such as Krishi Vigyan Kendra, Agricultural Universities etc. Further, village and block level extension functionaries should provide the agricultural advisories to farmers.

Relationship between personal and socio-economic characteristics of the farmers and their level of knowledge

The socio-economic status of a farmer influences the knowledge level. Farmers having better

socio-economic status may have more access to sources of scientific agricultural information. The Pearson's correlation coefficient between the six independent socio-personal-economic variables and the dependent variable Knowledge level regarding scientific potato cultivation technology was worked out and presented in Table 5.

Table 5: Correlation between knowledge level of potato farmers and their selected socio-economic variables

Sl. No.	Socio-economic variable	Pearson Correlation coefficient(r)
1	Age	0.029
2	Education	0.265*
3	Family labour availability	0.159
4	Experience in potato cultivation	0.019
5	Land holding	0.244*
6	Annual income	0.312**

*Significant at p=0.05
** Significant at p=0.01

The personal and socio-economic variables viz., education and land holding were found to have significant positive correlation with the knowledge level of the potato growers at 0.05 level of probability. Thus, a progressive farmer with better education and more land holding usually have higher knowledge level regarding scientific potato production technology. Results also revealed that independent variable annual income of farmer was significantly and positively correlated with knowledge level at 0.01 level of probability. This implies that higher the income of farmer, more the knowledge level regarding improved practices of potato cultivation. The independent variables like age, experience in potato cultivation and family labour availability were not correlated with knowledge level of farmers. Similar findings have also been reported by Chowdhury and Ray (2010) in their study of knowledge and adoption of IPM techniques among vegetable growers of Bardhman district of West Bengal. They found that educational status and monthly income were significantly correlated with knowledge level of vegetable growers.

Conclusion

It can be inferred from present study that most of the farmers had medium to low level of knowledge regarding scientific potato production technology. Knowledge gap with respect to package of practices was of medium level. Farmers of these area require knowledge in case of weed management, seed treatment, fertilizer doses and in the areas of plant protection i.e. disease and insect-pest management. Therefore training in these areas should be provided to farmers by Government agencies. Farmer with lesser land holding and low annual income should be targeted first.

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