

Knowledge and Adoption Level of Potato Growers and their Constraints Related to Potato Production Technology

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ABSTRACT

Potato (*Solanum tuberosum* L.) is a herbaceous perennial plant in the family Solanaceae which is grown for its edible tubers. The importance of potato as a food crop was duly recognized soon after its introduction in Europe in the 16th century. Potato (*Solanum tuberosum* L.) is one of mankind's most valuable food crops (FAO, 2004). It is the most important vegetable crop in terms of quantities produced and consumed worldwide (FAO, 2005). In volume of production it ranks fourth in the world after wheat (*Triticum aestivum* L.), rice (*Oryza sativa* L.), and maize (*Zea mays* L.) (Bowen, 2003). The present study was carried out in Maharajganj district of Uttar Pradesh to assess the knowledge and adoption level of potato growers and their constraints regarding potato production technologies. Out of twelve blocks two blocks i.e. Siswa and Mithaura were selected for this study. From each block three villages were selected purposively. From these villages 20 potato growers were selected. Hence total sample size was 120. The data were collected from each respondent through personal interview method with the help of structured schedule. The findings of this study revealed that majority of farmers (61.66 %) were under medium overall knowledge category whereas, 22.50 and 15.83 per cent of them belonged to low and high overall knowledge category, respectively. Maximum 95.00 percent of the potato growers had correct knowledge about the practices like Seed rate per acre, Duration of recommended varieties followed by Row to row spacing (93.33%) and Chemicals used for controlling termites (92.50%). It also shows that majority (58.33 %) of the respondents belonged to medium adoption category. More than 80.0 percent of the potato growers were fully adopted the practices like use of Organic manure and seed treatment in potato cultivation. The major constraints were high wages of labour and socio-economic constraints. Unavailability of newly released variety was first ranked in technological constraints, high cost of irrigation was first ranked in water management, the higher price of manures and fertilizers was first ranked in relation to fertilizers constraints, lack of knowledge about plant protection chemicals was first ranked in plant protection constraints and the marketing facilities was first ranked in post harvesting technology constraints.

Key words: Knowledge, Adoption, Constraints and Potato Production Technology.

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INTRODUCTION

Vegetables are being grown in India in 6.23 million ha accounting for production of 66.58 million tonnes which is second highest in the world next to China. Among the major vegetable crops grown potato occupied 1.4 million hectares with a net production of 24 million tonnes.

Potato (*solanum tuberosum* L.) is one of the important vegetable crops in India and is regarded as the “poor man’s food”. It is quite a cheap food providing wholesome diet for human beings. This crop plays an important role in the world’s food economy. It contains important nutritive constituent’s viz. carbohydrates, proteins, minerals and vitamins. The potato crop gives more yields per unit area than cereals and that too in a much shorter period. The potato grown in almost of all the states. The major potato growing states in the country are Uttar Pradesh, West Bengal and Bihar.

Uttar Pradesh is accounted for 9.53 million tonnes of country’s production realizing the important of potato cultivation in India. The Government of India set up Central Potato Research Institute (CPRI) at Patna in 1949. Since then, CPRI had been conducting and coordinating the research and acting as a clearing home for information on all aspects of the crop in the country. Apart from this, the State Agricultural Universities and the other state and central government organizations have been contributing to the research and extension education aspects of the crop.

In India, the *aloo* is not primarily a staple food but a cash crop that provides significant income for farmers. Potato is high yielding short duration crop. Due to high protein – calories ratio and short vegetative cycle, potatoes yield substantially more. Potato has high flexibility for adjusting planting and harvesting times. The Indo-Gangetic plains account for nearly 90 percent potato production in India. Depending on the market rate and arrivals, harvest can be well before

crop maturity or even delayed. Yield keeps on increasing though slowly if the crop retained in field after maturity. Potato is labour oriented crop, it generates employment and also food security. Nearly 250 man days required for one hector cultivation of potato. In our country Potato is cultivated nearly in 1.4million hectares and production of 23.91million tonnes. There is enormous potential for employment in processing industry, and also in storage, transportation, retailing and marketing of fresh and processed potatoes. Potato considered as balanced and nutritive food. As per CPRI’s projection, India shall achieve 49 million tonnes potato production from 2 million ha potato area by 2020. Keeping this in view the present study was under taken to know the knowledge and adoption level of potato growers and their constraints related to potato production technology.

MATERIAL AND METHODS

The present study was conducted in Maharajganj district of Uttar Pradesh state. The district comprises of 12 blocks out of them two blocks i.e. Siswa and Mithaura were selected based on cropped area and the crop productivity, from each block three villages i.e. Gopala, Barwakala, Hewati from Siswa block and Deurwa, Parsaraja and Karauta from Mithaura block were selected purposively for the study. Among each village 20 potato growers were selected randomly. Hence total sample size was 120 the data were collected through personal interview method. The interview schedule was prepared by keeping the objectives of the study in mind. The necessary care was taken to collect the unbiased and correct data. The data were collected, tabulated and analyzed to find out the findings and drawing the conclusion. The statistical tools like frequency, percentage and rank were employed to analyze the data.

RESULTS AND DISCUSSION**Table 1: Overall Knowledge level of potato growers with respect to recommended potato cultivation practices (n=120)**

Category	Score	Frequency	Per cent (%)
Low	<15	19	15.83
Medium	15-20	74	61.66
High	> 20	27	22.50

The data presented in Table 1 indicate that majority of farmers (61.66 %) were under medium overall knowledge category whereas,

22.50 and 15.83 per cent of them belonged to low and high overall knowledge category, respectively.

Table 2 : Knowledge of the potato Growers with respect to recommended cultivation practices (n=120)

Sl. No.	Recommended cultivation practices	Correct knowledge	Percent	Incorrect knowledge	Percent
1.	Number of pre sowing ploughings	111	92.50	9	7.50
2.	Appropriate weight of seed size tubers	95	79.16	25	20.83
3.	Number of eyes in cut tubers	102	85.00	18	15.00
4.	Chemical used for seed treatment	94	78.33	26	21.66
5.	Suitable month for sowing	91	75.83	29	24.16
6.	Recommended variety	105	87.50	15	12.50
7.	Duration of recommended varieties	114	95.00	6	5.00
8.	Seed rate in kgs	114	95.00	6	5.00
9.	FYM	85	70.83	35	29.16
10.	Nitrogen dose	81	67.50	39	32.50
11.	Phosphorus dose	97	80.83	23	19.16
12.	Potash dose	93	77.50	27	22.50
13.	Chemicals used for controlling termites	90	75.00	30	25.00
14.	Height of ridges	103	85.83	17	14.16
15.	Plant to plant spacing	96	80.00	24	20.00
16.	Row to row spacing	112	93.33	8	6.66
17.	Irrigation potential	107	89.16	13	10.83
18.	Earthing up after planting	101	84.16	19	15.83
19.	Nitrogen Top dressing after planting	76	63.33	44	36.00
20.	Name of the Pest or Disease attacked	84	70.00	36	30.00
21.	Bio-control agents used for controlling pest and disease	88	73.33	32	26.66
22.	Chemicals used for controlling pest and disease	92	76.66	28	23.33
23.	Appropriate time of Harvesting	102	85.00	18	15.00
24.	Post harvest practices	100	83.33	20	16.66
25.	Yield	109	90.83	11	9.16

The data regarding specific knowledge of improved practices of potato are presented in Table 2 reveals that 95.00 percent of the potato growers had correct knowledge about the practices like Seed rate per acre, Duration of recommended varieties followed by Row to row spacing (93.33%) and Chemicals used for

controlling termites (92.50%). Further 83.33 to 90.83 percent of potato growers had correct knowledge about the practices like Post harvest practices, Earthing up after planting, Appropriate time of Harvesting, Number of eyes in cut tubers, Height of ridges, Recommended potato variety, Irrigation

potential and Yield More than 70.0 percent of the potato growers had correct knowledge about practices like Phosphorus dose, Plant to plant spacing, Appropriate weight of seed size tubers, Potash dose, chemicals used for seed treatment, Chemicals used for controlling pest and disease, Suitable month for sowing, Chemicals used for controlling termites, Bio-

control agents used for controlling pest and disease, FYM and Name of the Pest or Disease attacked. About 67.50 percent of potato growers had correct knowledge of nitrogen dose and irrigation potential. 63.33 percent of the farmers had correct knowledge of nitrogen top dressing after planting.

Table 3: Overall adoption level of potato growers with respect to recommended potato cultivation practices (n=120)

Category	Score	Frequency	Per cent (%)
Low	<10	21	17.50
Medium	10-15	70	58.33
High	> 15	29	24.16

The result presented in Table 3 showed that majority (58.33 %) of the respondents belonged to medium adoption

category. Whereas, 24.16 and 17.50 per cent of the respondents belonged to high and low adoption categories, respectively.

Table 4: Adoption of recommended cultivation practices by the potato growers (n=120)

Sl. No.	Recommended cultivation practices	Full Adoption		Partial Adoption		Non-Adoption	
		Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
1.	Improved seed	78	65.00	42	35.00	-	-
2.	Seed rate	82	68.33	38	31.66	-	-
3.	Seed treatment	103	85.83	10	8.33	7	5.83
4.	Spacing	86	71.66	23	19.16	11	9.16
5.	Organic manure	107	89.16	9	7.50	4	3.33
6.	Chemical fertilizers	71	59.16	39	32.50	10	8.33
7.	Bio-pesticides / Bio-Extracts	9	7.50	18	15.00	93	77.50
8.	Plant protection against pests	66	55.00	40	33.33	14	11.66
9.	Plant protection against diseases	68	56.66	44	36.66	8	6.66

The result of Table 4 presents different level of adoption behavior such as full adoption, partial adoption and non-adoption, as per recommended potato cultivation practices. More than 80.0 percent of the potato growers were fully adopted the practices like use of Organic manure and seed treatment in potato cultivation. More than 60.0 percent of potato growers were fully adopted the practices like Following, spacing between Row to Row Spacing between the Plant to Plant, Seed rate

per acre and Using of Improved seed varieties. 59.16 percent of potato growers were fully adopted application of Chemical fertilizers, 56.66 percent of Plant protection against diseases, 55.00 percent of Plant protection against pests and only 7.50 percent of were fully adopted Bio-pesticides /Bio-Extracts, respectively. More than thirty percent of the potato growers were partially adopted practices like plant protection against pests and disease, Improved seed and chemical

fertilizers application adopted partially about 32.50 percent about 31.66 percent of potato growers were partially adopted the Seed rate.

The practice like improved seed and seed rate were not adopted by cent percent of the potato growers.

Table 5: Socio-economic constraints in adoption of potato production

S.No.	Constraints	Total Score	Rank Order
1.	High labour wages	48	I
2.	Small size of land holding	39	II
3.	Lack of knowledge	33	III

The data presented in table 5 indicate that high wages of labour was found to be the most important constraint. Small size of holding was the second constraint as expressed by the

respondents. The third important constraint expressed by the farmers was lack of knowledge.

Table- 6: Technological constraints in adoption of potato production technology

S. No.	Constraints	Total Score	Rank Order
(i)	Related to varieties		
1.	Unavailability of newly release varieties	68	I
2.	Lack of knowledge about innovation	52	II
(ii)	Related to water management		
1.	High cost of irrigation	71	I
2.	Govt. tube well are not available	49	II
(iii)	Related to fertilizers		
1.	Lack of knowledge about fertilizers doses	56	I
2.	Untimely availability of fertilizers	41	II
3.	High price of manure and fertilizers	23	III
(iv)	Related to plant protection		
1.	Lack of knowledge about plant protection chemical	40	I
2.	Cost of chemicals are very high	33	II
3.	Plant protection chemicals are not satisfactory	28	III
4.	Selected chemicals are not available in govt.	19	IV
(v)	Related to post harvest technology		
1.	Storage charges are very high	51	I
2.	Lack of storage facility	44	II
3.	Poor transportation facility	25	III

The data presented in Table 6 indicate that constraints of potato growers i.e. unavailability of newly released varieties was ranked first and lack of knowledge about innovations ranked second with respect to constraints related to varieties. In case of water management constraints, high cost of irrigation charges ranked first and non availability of government tube well ranked second. While high price of manures and fertilizers was ranked third, lack of knowledge about fertilizers doses was ranked first and untimely availability of fertilizers was ranked second

with respect to constraints related to fertilizers. Lack of knowledge about plant protections chemicals was ranked first, high cost of chemicals ranked second, quality of plant protection chemicals not being satisfactory ranked third and non availability of some chemicals ranked fourth with respect to plant protection measures. Constraints high storage charges was ranked first, lack of storage facilities was ranked second and poor transportation facilities was ranked third in case of constraints related to post harvesting technology.

CONCLUSION

It may be concluded that that majority of the potato growers had medium level of Knowledge followed by low and high levels. More than 90.00 percent of the potato growers had correct knowledge about the practices like Seed rate per acre, Duration of recommended varieties, Row to row spacing and Chemicals used for controlling termites. Majority 58.33 percent of respondents had medium level of overall adoption, followed by high (24.16 %) and low (17.50 %) level of overall adoption. More than 80.0 percent of the potato growers were fully adopted the practices like use of Organic manure and seed treatment in potato cultivation. More than 60.0 percent of potato growers were fully adopted the practices like Following, spacing between Row to Row Spacing between the Plant to Plant, Seed rate per acre and Using of Improved seed varieties. 59.16 percent of potato growers were fully adopted application of Chemical fertilizers, 56.66 percent of Plant protection against diseases, 55.00 percent of Plant protection against pests and only 7.50 percent of were fully adopted Bio-pesticides /Bio-Extracts, respectively. It could be visualized that the simple technologies are relatively adapted to a greater extent as compared to complex technologies. These findings are in conformity with the findings of Kumar *et al.*³, Ravishankar, and Ramachandra⁸. The major constraints were high wages of labour, unavailability of newly released varieties, high cost of irrigation, high price of manures and fertilizers and lack of knowledge about plant protection chemicals.

REFERENCES

1. Kang, G.S., Kumar, R. and Pandey, S.K., Evaluation of potato cultivators and lines

- for frost tolerance. *Potato Journal*. **34**: 47-48 (2007).
2. Kumar, A., Farmer's perception of the attributes of selected potato technology. *Potato Journal*. **34**: 141- 142 (2007).
3. Kumar, S., Singh, D. and Singh, R.P., Assessment of Knowledge Level of Potato Growers and Their Constraints Related to Potato Production Technology. *Technofame- A Journal of Multidisciplinary Advance Research*, **5(2)**: 107- 111 (2016).
4. Kumar, A., Farmer's perception of the attributes of selected potato of the attributes of selected potato technology. *Potato Journal*. **34**: 141-142 (2007).
5. Kumar, V. C., A study on knowledge and adoption of improved cultivation practices among rose growers. *M.Sc. (Agri.) Thesis (Unpub), University of Agricultural Sciences, Bangalore* (1997).
6. Lal, B., Sinha, T. K., Kumar, A., Pandit, A. and Pandey, N. K., Constraints perceived by the farmers in adoption of potato technology. *Potato J.* **38(1)**: 73-77 (2011).
7. Patel, V.T., Prajapati, M.R., Joshi, K.M. and Patel., Potato cultivation technologies as Perceived by potato growers of Gujarat. *Potato Journal*. **31**: 195-99 (2004).
8. Ramchandra, K.V., Farmer's knowledge level and adoption behavior about the nutrient management in cabbage-potato cropping system in kolar district of Karnataka. *M.Sc Thesis, University of Agricultural Sciences, Bangalore*. (2002).
9. Singh, D., Kumar, S. and Kumar, A., Assessment of Knowledge Levels and Constraints of Potato Growers. *Indian Journal of Extension Education*. **45(3)**: & **4**: 113-117 (2009).