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Research Article

ASSESSMENT OF KNOWLEDGE GAP AND CONSTRAINTS OF POTATO GROWERS IN TAWANG DISTRICT OF ARUNACHAL PRADESH

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Abstract- Potato is grown as cash crop in North East Hill (NEH) region of India. The current study was planned in Tawang district of Arunachal Pradesh to study the knowledge level, gap in knowledge of farmers and constraints in potato cultivation and marketing. A total of 120 farmers from five villages of Tawang were randomly selected as respondents for this study. Data was collected through survey method using a structured interview schedule. Suitable statistical tools like frequency, mean and percentage were used for analysis of data. Results revealed that a majority of farmers (80-90%) had good knowledge in areas like 'land preparation', 'time and method of sowing & harvesting', 'spacing' and 'earthing up' operations followed in potato. The highest gap in knowledge was observed in the field of 'plant protection' (52.5%) followed by 'correct doses of fertilizer and chemical' (46.6%), 'method of fertilizer application' (42.5%) and 'water management' (40%). Radio was found to be the most important source of agricultural information for farmers. This gap should be bridged through organization of trainings, demonstrations, awareness camp and mass media programmes on potato cultivation in the selected region. Among production constraints, 'small size of land holding', 'unavailability of sufficient labour', 'unavailability of quality seed of improved variety' and 'lack of technical knowledge' were identified as major constraints for farmers. Among marketing constraints, 'Lack of regulated market' and 'lack of storage facility for potato' were major constraints.

Keywords- Knowledge gap, Constraint analysis, Potato cultivation.

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Introduction

Potato was identified as "food of the future" by Food and Agriculture Organization (FAO), Rome during the International Year of Potato in 2008. However, it is the most popular vegetable crop of India contributing almost 21.0 per cent of total area and 25.5 per cent of total production of vegetables in the country. India is the second largest potato producing country in world after China. During the year 2013-2014, India produced 41.55 million tonnes of potato from an area of 1.97 million ha with an average productivity of 21.1 t/ha [1]. Potato is an important crop in the North Eastern Region in India especially the hilly tracts, where rainfed agriculture conditions prevail. The crop is grown throughout the year in one or the other part of the North Eastern region, which contribute about 10 per cent of the area under potato in the country [6].

Arunachal Pradesh comes under the North Eastern Hill (NEH) regions of India. Potato is grown as cash crop in this state. During the year 2012-13, potato production in Arunachal Pradesh was 38,872 tonnes from an area of 4817 ha with an average productivity of only 8.07 t/ha. Among all districts, three districts namely Lohit, East Siang and Tawang together contributed nearly 45% of total area and production of potato in the state.

Productivity of potato is very low in Arunachal Pradesh as compared to national average productivity of 21.1 t/ha. A gap in knowledge level of farmers may lower the rate of adoption of technology. Knowledge is one of the most important components of human behavior [4]. Lack of knowledge about improved varieties and technologies of potato cultivation can be a major reason for low productivity of potato in the state. There are several other constraints in potato cultivation in the state, which may be the reasons of low yield. Analysis of these constraints is essential to undertake an appropriate measure, which is needed to enhance the potato production as well as productivity in the state [3]. In view of the facts stated, the present study was undertaken in Tawang district of Arunachal Pradesh to find out the knowledge level of farmers and constraints faced in potato production.

Materials and Methods

The study was conducted in Tawang district of Arunachal Pradesh during the year 2013-14. This district contributes nearly 10% of area and 11.7 % of total production in Arunachal Pradesh. Five villages namely Surbhi, Tsaigarh, Seru, Pamagarh and Chongprong were selected randomly from Tawang district and 24 farmers were selected randomly from each village for survey. Thus, the sample size for this study comprised of 120 farmers. The data was collected using a well structured interview schedule. Knowledge level of farmers was measured using a list of practices of improved potato cultivation. Gap in Knowledge was calculated in terms of percentage using the following formula:

Knowledge Gap (KG) = 100 – (Knowledge score obtained/Maximum knowledge score*100)

Perceived constraints in potato cultivation were measured using open ended question and multiple responses were collected from respondent farmers. The

collected data were tabulated and analyzed using suitable statistical methods like frequency, percentage and mean.

Table-1 *District wise contribution of production and area covered (%) for potato in Arunachal Pradesh during 2012-13*

Name of district	Area (ha)	% of area contribution	Production (t)	% of production contribution	Yield (t/ha)
Tawang	**455**	**9.45**	**4550**	**11.71**	**5.5**
West Kameng	403	8.37	3260	8.39	9.0
East Kameng	103	2.14	710	1.83	5.85
Lower Subansiri	333	6.91	3159	8.13	9.98
Upper Subansiri	220	4.57	2081	5.35	8.15
Papum Pare	271	5.63	2540	6.53	9.24
West Siang	395	8.20	2621	6.74	6.08
East Siang	875	18.16	5675	14.60	8.21
Upper Siang	125	2.59	1063	2.73	4.72
Lohit	860	17.85	7740	19.91	8.20
Dibang Valley	110	2.28	645	1.66	7.0
Lower Dibang Valley	375	7.78	3000	7.72	8.0
Triap	40	0.83	100	0.26	5.9
Changlang	105	2.18	683	1.76	5.5
Kurung Kumey	27	0.56	23	0.06	5.1
Anjaw	120	2.49	1022	2.63	8.5
Total	**4817**	**100.00**	**38872**	**100.00**	**8.07**

*Source: Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India

Results

Knowledge Level and Gap in Knowledge of Farmers about Potato Production Practices

Knowledge level of farmers on different aspects of potato production practices was assessed and results are presented in [Table-2]. It can be observed that a majority of farmers (92.5%) had knowledge about 'land preparation' followed by 'time of sowing' (90.83%), harvesting time (87.50%), hoeing and earthing up (85.83 %), method of sowing (84.17%) and spacing (82.50%). Thus, farmers were found to be more aware about agronomic practices followed during planting and therefore gap in knowledge for these practices was very less. Moreover, it is evident from the results that farmers had medium level of gap in knowledge in the area of 'use of Farm Yard Manure (FYM) & fertilizer (34.17%)', 'seed treatment (31.66%)' and 'variety selection' (30.83%). The highest gap in knowledge was found among farmers in case of practices like 'plant protection measures (52.5%)' followed by 'correct doses of fertilizer and chemicals (46.67%)', 'method of application of fertilizer (42.5%)', 'water management (40.00%)' and 'weed management (37.50%)'. Almost similar findings were reported in the study of knowledge gap in rice production [5]. This large gap in knowledge might be one of the factors for low productivity of potato in the state. It calls for interventions from both public as well as private sector extension agencies in the region to organize various trainings, demonstrations, *Kisan mela* and use of mass media like Radio and TV for creating awareness and increasing knowledge of potato production technologies among farming community.

Table-2 *Practice wise knowledge level and Gap in knowledge of farmers about potato production technologies N=120*

Sl. No	Practices	Knowledge score obtained		Knowledge Gap (%)	Ranking based on Knowledge gap
		Frequency	Percentage		
1.	Land preparation	111	92.5	7.5	XVI
2.	Varieties selection	83	69.17	30.83	VIII
3.	Seed rate	90	75.00	25.00	IX
4.	Seed treatment	82	68.33	31.66	VII
5.	Time of sowing	109	90.83	9.17	XV
6.	Spacing	99	82.5	17.5	XI
7.	Method of sowing	101	84.17	15.83	XII
8.	Weed management	75	62.5	37.50	V
9.	Hoeing and earthing up	103	85.83	14.17	XIII
10.	Water management	72	60.00	40.00	IV
11.	Use of Farm Yard Manure and fertilizer	79	65.83	34.17	VI
12.	Correct doses of fertilizer and chemical	64	53.33	46.67	II
13.	Method of application of fertilizer	69	57.50	42.5	III
14.	Plant protection measures	57	47.5	52.5	I
15.	Harvesting time	105	87.5	12.5	XIV
16.	Storage and transportation	91	75.83	24.17	X

*Maximum possible score = 120

Information Channels Used by Potato Farmers

Many times, awareness and knowledge about agricultural technologies depends on extent of use of available information channels by the farmers. In this study, frequency of use of various sources of information was obtained from farmers using multiple responses and results are presented in [Table-3]. It was observed that Radio was used as an important source of agricultural information by a majority of the farmers (89.17%). This was followed by information from Agriculture Field Assistant (AFA)/Village Level Workers (VLW) (83.33%) and Relatives (77.5%). Short Message Services (72.5%), Neighbours (66.67), Non Government Organizations (58.33%) and Television (57.5%) were comparatively less used channels of information by potato farmers in the district. Thus, it can be said that farmers were using inter personal as well as mass media sources equally to get the latest agricultural information. Hindrance in agricultural technology transfer due to lack of possession of electronic equipments *viz.* radio, Television, mobile etc. by farm families have been reported by Muhammad *et al.* [2].

Constraints Analysis of Farmers in Production and Marketing of Potato

Production Constraints

Constraints faced by farmers in adoption of recommended potato production technologies were studied using an open ended question. Farmers were told to list out their perceived constraints and collected data was arranged in terms of

frequency and percentage based on multiple responses.

Table-3 *Source of information used by the potato farmers N=120*

S. No	Particular	Frequency	Percentage	Rank
1.	Agriculture Field Assistant (AFA) /Village Level Worker (VLW)	100	83.33	II
2.	Neighbour	80	66.67	V
3.	Relatives	93	77.5	III
4.	Non Government Organizations (NGOs)	70	58.33	VI
5.	Short Message Services (SMS)	87	72.5	IV
6.	Radio	107	89.17	I
7.	Television	69	57.5	VII

*Multiple responses

Results presented in [Table-4] clearly showed that the most serious constraint perceived by the potato farmers in Tawang district was 'small size of land holding' (93.33%) as it was ranked first among all constraints faced by farmers. Smaller land holding is a disadvantage in potato as mechanization is very difficult to follow in such case. This may be one of the reasons for low productivity of potato in the state. 'Non availability of sufficient labour' (87.5%) and 'unavailability of quality seed of improved varieties' (85.00%) were other major constraints. 'Lack of technical knowledge about new techniques', 'unavailability of fertilizer', 'non availability of irrigation facilities' etc were some other important constraints faced by potato growers of the district. Thus, there is a need to address these constraints by supplying quality potato seed to farmers by state agriculture department and other agencies. More training programmes should be organized to upgrade the knowledge and skills of farmers so that farmers can get more benefit from potato cultivation.

Table-4 *Constraints perceived by farmer in adoption of potato production practices N=120*

Sl. No	Constraints	Frequency	Percentage	Rank
1	Unavailability of quality seed of improved varieties	102	85.00	III
2	Lack of technical knowledge of Potato cultivation	90	75.00	IV
3	Small size of land holding	112	93.33	I
4	Non availability of sufficient labour	105	87.5	II
5	Non availability of irrigation facilities	87	72.5	VI
6	Lack of knowledge about fertilizer doses	78	65.00	VII
7	Unavailability of fertilizer	89	74.17	V
8	High cost of impact	75	62.5	VIII
9	Inadequate supply of input	67	55.83	X
10	Lack of skills for application of insecticide and other	70	58.33	IX

*Multiple responses

Marketing Constraints

Marketing constraints faced by the potato farmers are presented in [Table-5]. Lack of regulated market (80.83%) was the first ranking in perceived constraints in marketing of potato followed by lack of storage facilities (77.5%), lack of transportation facilities (72.5%), price fluctuation (60.83%) and low price of Potato (51.67%). These constraints need to be addressed in order to provide efficient marketing facilities to farmers so that they can earn higher profit from potato crop.

Table-5 *Marketing constraints faced by Potato farmers N=120*

Sl. No.	Marketing Constraints	Frequency	Percentage	Rank
1	Price fluctuation	73	60.83	IV
2	Lack of regulated market	97	80.83	I
3	Lack of storage facilities	93	77.5	II
4	Lack of transportation facilities	87	72.5	III
5	Low price of Potato	62	51.67	V

*Multiple responses

Conclusion

It may be concluded from this study that higher knowledge gap (40-50%) was observed among farmers in many aspects of potato cultivation *viz*. plant protection measures, correct method and doses of fertilizer & chemical application, water management and weed management. Therefore, knowledge of farmers in these selected areas need to be enhanced by way of organizing a large number of demonstrations, training programmes and awareness camps. Highest percentage of farmers perceived 'Small size of land holding' as most important constraint in adoption of potato production practices followed by 'unavailability of sufficient labour' and 'unavailability of quality seed of improved varieties'. Hence, quality seed should be supplied through both public as well as private sector organizations. Similarly, potato storage facility should be created in the studied area in order to provide higher price of the potato to farmers.

Abbreviations: FAO (Food and Agriculture Organization), NHB (National Horticulture Board), NEH (North East Hill), AFA (Agriculture Field Assistant), VLW (Village Level Worker), SMS (Short Message Service), NGOs (Non-Government Organizations).

Conflict of Interest: None declared

References

[1] National Horticulture Board (2014) Indian Horticulture Database, Ministry of Agriculture, Government of India.

[2] Muhammad S., Lodhi T. and Khan G.A. (2012) *Pak. J. Agri. Sci*., 49, 221-227.

[3] Lal B., Sinha T.K., Kumar Anil, Pandit A.K. and Pandey N.K. (2011) *Potato J*., 38(1), 73-77.

[4] Pandey N.K. and Kushwaha R.K. (2010) *Indian Res. J. Ext. Edu.,*10(1), 69-73.

[5] Kirar B.S. and Mehta B.K. (2009) *Indian Res. J. Ext. Edu.,* 9(1), 32-35.

[6] Gupta V.K., Thakur K.C., Kumar S., Pandey S.K. and Sah U. (2004) True Potato Seed- An alternative technology for potato production in North eastern hill region. Technical Bulletin no 64, Central Potato Research Institute, Shimla. Pp. 1.