RESEARCH **A**RTICLE :

Impact of adoption startup scenario of recommended potato production technology by the potato growers in Gujarat

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SUMMARY : Potato is an important vegetable crop of the Sabarkantha district of the Gujarat state occupying about 18.46 per cent of total potato cropped area of the state. It ranks second in area and production of potato after Banaskantha district. While it ranks fourth with average productivity 31.04 MT/ha after Gandhinagar (33.75 MT/ha), Anand (32.00 MT/ha) and Banaskantha (31.05 MT/ha).The following objectives were studied that are to find out the extent of adoption of potato production technology by the potato growers and to know the marketing management by the potato growers, to ascertain the association between   the extent of adoption of recommended potato production technology by the potato growers and their selected characteristics.The following conclusions were, A great majority (61.67%) of the potato growers had medium level of knowledge regarding recommended practices of potato. The findings regards to the practice-wise knowledge of the respondents about recommended potato production technology are presented. It reveals that 'sowing time and method' and 'irrigation management' were the most important practices of potato cultivation and found having maximum mean knowledge score (93.33 mean score each).Majority (70.83 %) of the respondents had medium extent of adoption of recommended production technology of potato. The practice-wise adoptions of recommended production technology of potato concluded that among the different recommended potato production technologies, (86.57mean score) of the respondents had adopted irrigation management technology.Majority (70.83%) of the respondents had medium marketing management by the farmers. The data about various aspect of marketing management concluded that it was portray that majority respondent (48.33%) were selling their produce through the commission agent, while 30.83 per cent of the respondents selling their produced to the wholesaler in the market yard. Further, it was found that 51.66 per cent of the respondents sold their produce when the prices are favorable, while 30.83 per cent of the respondents sold their produce immediately after the harvest. In case of grading it was found that 60.00 per cent of the respondents followed grading on the basis of the size of potato and 40.00 per cent of the respondents followed grading on the basis of quality of potato. The responses regarding storage facility revealed that 43.33 per cent of the respondents stored the potato in gunny bags, followed cold storage 40.84 per cent. The independent variables like age, education, annual income, extension participation, method of irrigation, innovative proneness, risk orientation and level of knowledge had positive and significant correlation with adoption of recommended crop production technology by farmers. While, the variables like size of family, social participation, land holding and cropping pattern had positive and non- significant relationship with adoption of recommended crop production technology by the farmers.

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BACKGROUND AND OBJECTIVES

Potato is an important vegetable crop of the Sabarkantha district of the Gujarat state occupying about 18.46 per cent of total potato cropped area of the state. It ranks second in area and production of potato after Banaskantha district. While it ranks fourth with average productivity 31.04 MT/ha after Gandhinagar (33.75 MT/ha), Anand (32.00 MT/ha) and Banaskantha (31.05 MT/ha). Therefore, there is a wide gap between highest productivity in the state and productivity of Sabarkantha. The low yield (productivity) of potato in Sabarkantha district could be attributed to the fact that the farmers have not still adopted the recommended production technology of the crop upto the extent. The knowledge about the new production technology plays vital role in their adoption by farmers. Further, several constraints in adoption of technology and marketing of the production also play a significant role in adoption of recommended technologies. Taking all this in view, the present study was under taken with following specific objectives :

Objectives :
– To find out the extent of adoption of potato production technology by the potato growers.
– To know the marketing management by the potato growers.
– To ascertain the association between the extent of adoption of recommended potato production technology by the potato growers and their selected characteristics.

RESOURCES AND METHODS

The present study was undertaken in Sabarkantha district of Gujarat state. Using purposive random sampling, two taluka *viz.*, Dhansura and Bayad were selected purposively as these talukas were having high area under potato production. Three villages from each taluka were selected by using simple random sampling technique. Thus, six villages were selected randomly. From each village, twenty respondents were selected randomly making a sample of 120 respondents.

The present study was confined to ex-post-facto research design, the independent variables were measured by using suitable scale and procedure adopted by various researchers in past with due modification.

The data were collected with the help of structured pre-tested interview schedule. The data collected were analyzed, tabulated and interpreted in the light of objectives for arriving at meaningful interpretation.

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Knowledge level of the potato growers about potato production technology :
In the present study knowledge refers to know-how about different potato cultivation technologies possessed by the potato growers. Adequate knowledge is essential to potato growers for the successful and profitable cultivation. It was therefore, thought necessary to obtain information from the potato growers about the knowledge they possessed about potato cultivation practices.

It is observed from the Table 1 that, majority (61.67%) of the potato growers had medium level of

Table 1 : Distribution of the respondents according to their level of knowledge			
Sr. No.	Level of knowledge	Number	Per cent
1.	Low	19	15.83
2.	Medium	74	61.67
3.	High	27	22.50
	Total	120	100.00
Mean= 79.10		S.D. = 6.05	

knowledge regarding recommended practices of potato, while 22.50 per cent and 15.83per cent of the potato growers had high and low level of knowledge, respectively. Thus, it can be concluded that majority of the respondents had medium level of knowledge regarding recommended potato production technology.

The probable reason might be that majority of the potato growers had good literacy status and medium level of social participation and extension participation. This finding is in the line with findings of Mate (2005); Kadu and Saiyad (2009) and Rathod (2009).

It is clear from Table 2 that majority of the respondents (70.83 %) had medium extent of adoption regarding recommended production technology of potato, followed by 15.83 per cent and 13.44 per cent of the respondents who had low and high extent of overall adoption, respectively. From the above results, it can be concluded that majority of the respondents had medium extent of adoption regarding recommended potato production technology. The possible reason for having medium adoption among the majority of respondents

might be their medium knowledge. Further, due to limited resources with the farmers and the constraints they faced in potato cultivation, they might have not adopted all the recommended practices and hence, very few farmers were found having high adoption of recommended potato cultivation technology. This finding is in the line with the findings reported by Patel *et al.* (2000) and Parakash *et al.* (2003).

The practice-wise adoption of recommended production technology of potato is depicted :

Table 3 shows that among the different recommended potato production technologies, (86.57 mean score) of the respondents had adopted irrigation management technology and ranked first. The other practices in which respondents had higher adoption (mean score greater than overall mean score) were earthing up (85.23 mean score), spacing (81.19 mean score), sowing time and method (80.17 mean score), recommended variety (76.15 mean score), harvesting (75.51 mean score), seed rate (75.17 mean score), basal fertilizers

Table 2 : Distribution of potato growers according to their extent of adoption regarding recommended production technology of potato crop

Sr. No.	Extent of adoption quotient	Number	Per cent
1.	Low	19	15.83
2.	Medium	85	70.83
3.	High	16	13.44
	Total	120	100.00

Mean= 70.97   S.D. = 5.99

Table 3 : Practice-wise adoption of recommended potato production technology by potato growers (n=120)

Sr. No	Recommended practices	Mean score	Rank
1.	Recommended variety	76.15	V
2.	Land preparation	69.27	X
3.	Seed rate	75.17	VII
4.	Seed treatment	72.27	IX
5.	Sowing time and method	80.17	IV
6.	Spacing	81.19	III
7.	F.Y.M.	66.24	XI
8.	Basal application of chemical fertilizers	73.15	VIII
9.	Top dressing of chemical fertilizers	64.23	XII
10.	Earthing up	85.23	II
11.	Weed management	60.10	XIV
12.	Irrigation management	86.57	I
13.	Insect -pest control	61.19	XIII
14.	Disease control	56.80	XV
15.	Crop rotation	52.19	XVI
16.	Harvesting	75.51	VI

Overall mean score   =   70.97

(73.15 mean score) and seed treatment (72.27 mean score) were also adopted by maximum respondents and ranked second, third, fourth, fifth, sixth, seventh, eighth, ninth, respectively.

While low extent of adoption of technology was observed in remaining practices having score below overall mean score were land preparation (69.27 mean score), F.Y.M. (66.24 mean score), top dressing of fertilizers (64.23 mean score), insect-pest control (61.19 mean score), weed management (60.19 mean score), disease control (56.80 mean score), crop rotation (52.19 mean score), the adoption mean score was below overall adoption score (70.97 mean score) in ascending order. From the above results, it can be concluded that considering the no-cost low cost inputs in the package of practices the extent of adoption was observed among the respondents. The recommended varieties were adopted higher due to the product choice of consumers in particular area of Sabarkantha district.

Data in Table 4 reveal that majority of the respondents (70.83 %) had medium marketing management, followed by 17.50 per cent and 11.67 per cent of the respondents who had high and low marketing management by the farmers, respectively.

Aspect of marketing management of the potato :

The data about various aspects of marketing management have been presented in Table 5.

The data presented in Table 5 portray that, majority respondent (48.33%) were selling their produce through the commission agent, while 30.83 per cent of the respondents were selling their produced to the wholesaler

Table 4 : Distribution of the respondents according to their marketing management of potato growers

Sr. No.	Marketing management	Number	Per cent
1.	Low	14	11.67
2.	Medium	85	70.83
3.	High	21	17.50
	Total	120	100.00
Mean= 28.73		S.D. = 2.95	

Table 5 : Distributions of the respondents according to the marketing management aspects of potato

Sr. No.	Particular	Frequency	Per cent
1.	**Marketing channel**		
	Wholesaler	37	30.83
	Commission agent	58	48.33
	Village merchant	9	07.50
	Retailer	4	03.33
	Processor	12	10.00
	Total	120	100.00
2.	**Time of sale**		
	Immediately after harvest	37	30.83
	After one or two months of harvest	21	17.50
	At favourable price	62	51.66
	Total	120	100.00
3.	**Grading**		
	On size base	72	60
	On quality base	48	40
	Total	120	100.00
4.	**Method of storage**		
	Heap method	07	05.43
	Country storage on farm	12	10.00
	Cold storage	43	35.83
	Gunny bags	58	48.34
	Total	120	100.00

in the market yard followed by 10.00 per cent to processors and 7.50 per cent to village merchant and 3.33 per cent to the retailer. Hence, it can be concluded that nearly half (48.33%) of the respondent sold their produce through commission agent.

Further it was found that 51.66 per cent of the respondents sold their produce when the prices were favorable, while 30.83 per cent of the respondents sold their produce immediately after the harvest and 17.50 per cent of the respondents sold their produce after one or two month of harvest. Hence, it can concluded that nearly half (51.66%) of the respondents sold their produce when the prices are favourable.

In case of grading it was found that 60.00 per cent of the respondents followed grading on the basis of the size of potato and 40.00 per cent of the respondents followed grading on the basis of quality of potato. Hence, it can be concluded that three fifth (60.00%) of the respondents had done grading based on the potato size.

The responses regarding storage facility revealed that 48.34 per cent of the respondents stored the potato in gunny bags, followed cold storage (35.83%), country storage (10.00%) on the farm, and heap method (05.43%). Hence, it can be concluded that nearly half (48.34%) of the respondents stored their produce in the gunny bags.

Association between the extent of adoption of recommended potato production technology by the potato growers and their selected characteristics:

The adoption or acceptance of recommended agricultural technology is a unit act but a complex process involving sequence and thought of action. The action of individual farmers is governed by personal, socio-economical, situational, and psychological variables with their level of knowledge and extent of adoption of improved potato production technology were worked out by calculating co-efficient of correlation. The results in this regard are depicted as under.

Age and extent of adoption :

It is apparent from the data presented in the Table 6 that the age of the potato growers had positive and significant correlation (0.2149*) with their extent the adoption of recommended production technology of potato. Thus, the Null hypothesis $H_{.1}$ was rejected.

Positive correlation was found in case of age and extent of adoption might be due to the fact that the self experience is one of the important sources of information so, experienced farmers adopted more than young aged farmers. This finding is in the contrast with the results of Patel *et al.* (2000).

Education and extent of adoption:

The data presented in Table 6 reflect that the extent of adoption of the potato growers regarding recommended production technology had positive and significant (0.2091*) correlation with their level of education, which indicate that education play an important role in influencing the adoption of new technology by potato growers. Thus the Null hypothesis $H_{.2}$ was rejected. This finding has been supported by the findings of Patel *et al.* (2000);

Table 6 : Association between the extent of adoption of recommended potato production technology by the potato growers and their selected characteristics (n=120)

Sr. No.	Independent variables	Correlation co-efficient ('r' value)
1.	Age	0.2149*
2.	Education	0.2091*
3.	Size of family	0.1498(NS)
4.	Social participation	0.1433(NS)
5.	Land holding	0.1004(NS)
6.	Annual income	0.2166*
7.	Extension participation	0.2435**
8.	Method of irrigation	0.1868*
9.	Cropping pattern	0.1009(NS)
10.	Innovative proneness	0.2483**
11.	Risk orientation	0.2041*
12.	Level of knowledge	0.8476**

* and ** indicate significance of values at P=0.05 and 0.01, respectively   NS = Non-significant

Rangari *et al.* (2000) and Patel (2004).

Size of family and the extent of adoption :

The data presented in Table 6 reveal that there was not-significant association (0.1498^{NS}) between size of family and extent of adoption of recommended production technology of potato. This shows that size of family is not an important variable which influence on adoption level of potato growers regarding potato production technology. Thus, the Null hypothesis H$_{.3}$ is accepted. This might be due to that in large size family, decision for adoption of new technology was taken jointly and it took some time hence, adoption level was found low in the case of size of family but it was upto the mark. This finding supports the findings of Jadhav (2001).

Social participation and the extent of adoption :

The data presented in Table 6 clearly indicate that social participation by the potato growers had positive but non-significant correlation (0.1433^{NS}) with their extent of adoption of recommended production technology of potato. Thus, the Null hypothesis H$_{.4}$ is accepted *i.e.,* there is no association between social participation of the respondents and their extent of adoption of recommended potato production technology. It can be thus concluded that there was no relationship between social participation and extent of adoption of recommended potato production technology. It mean that extent of adoption of recommended potato production technology by the potato grower did not increase significantly with an increase in social participation. This finding is in the line with the finding of Chavda (1998).

Size of land holding and the extent of adoption :

The data presented in Table 6 clearly indicate that size of land holding of the potato grower's had positive and non-significant association (0.1564^{NS}) with their extent of adoption of recommended production technology of potato. Thus, the Null hypothesis H$_{.5}$ is accepted.

The probable reason for having non-significant relationship between sine of land holding and adoption may be due to reason that potato was found cultivated only by the medium and big farmers. The finding derives support from the findings of Chavda (1998) and Patel *et al.* (2000).

Annual income and the extent adoption :

It is apparent from the data presented in the Table 6

that annual income of the potato growers had positive and significant correlation (0.2166*) with their extent of adoption of recommended production technology of potato. Thus the Null hypothesis H$_{.6}$ is rejected. The probable reason might be that the sufficient income availed the freedom for purchasing equipment, manure, fertilizer, insecticides, weedicides etc. which leads them to adopt new potato technology. This finding was supported by the findings of Rangari *et al.* (2000) and Patel (2004).

Extension participation and extent of adoption :

The data presented in Table 6 clearly indicate that extension contact of the potato growers had positive and highly significant correlation (0.2435**) with their extent of adoption of recommended production technology of potato. This result provides sufficient ground to reject the Null hypothesis H$_{.7}$. The reason for above situation might be that the greater extension participation seemed to be associated with higher adoption of potato production technology. This finding is in line with the findings of Chaudhari (2009).

Method of irrigation and extent of adoption :

It is apparent from the data presented in Table 6 that method of irrigation of potato growers had positive and significant correlation (0.1868*) with their adoption of recommended potato production technology. Thus, it can be said that method of irrigation affected the adoption positively. Thus, the Null hypothesis H$_{.8}$ was rejected.

Cropping pattern and extent of adoption :

It is apparent from the data presented in Table 6 that cropping pattern of potato growers had positive and non-significant correlation (0.1009^{NS}) with their adoption of recommended potato production technology. Thus, the Null hypothesis H$_{.9}$ was accepted.

Innovative proneness and extent of adoption :

The data depicted in Table 6 show that the innovative proneness of the potato growers had positive and highly significant correlation (0.2483**) with their extent of adoption of recommended production technology of potato. Thus, the Null hypothesis H$_{.10}$ is rejected. The reason for above situation might be that greater innovative proneness seemed to be associated with higher adoption of recommended production technology of potato. The findings are in line with the finding of Jadhao (2001).

Risk orientation and extent of adoption :

It is apparent from the data presented in Table 6 that risk orientation of potato growers had positive and significant correlation (0.2041*) with their adoption of recommended potato technology. Thus, the Null hypothesis H_{11} is rejected. It is obvious that higher risk oriented farmers were oriented toward maximization of profits from farming. This resulted into favourable perception towards progressive change and this might have led them towards high level of adoption. This finding is in conformity with the findings of Dongardive (2002).

Knowledge and extent of adoption :

It is obvious from the data presented in Table 6 that the extent of adoption of potato growers regarding recommended production technology of potato had positive and highly significant correlation (0.8476**) with their level of knowledge. It indicates that as knowledge level of potato growers increased, the adoption level also increased. Thus, the Null hypothesis H_{12} "there is no relationship between the level of knowledge of potato growers and their extent of adoption of recommended production technology of potato" is rejected.

Thus, it can be concluded that the level of knowledge should be considered as non-monitoring input for profitable crop production as it is directly encourage the farmers for promotion and use of recent agricultural technology which leads them towards profit maximization ultimately resulted in to adoption. This finding is in line with the findings of Dongardive (2002) and Badhe *et al.* (2008).

Thus, it can be concluded that the independent variables studied *viz.,* age, education, land holding, annual income, extension participation, innovative proneness, risk orientation and the level of knowledge had positive and significant correlation with the adoption behavior of potato growers, whereas size of family and social participation of the potato growers had not established any type of correlation with adoption behaviour.

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