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Constraints causing technological gap in Potato production technology in Kannauj district of U.P.

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Abstract
Keeping in the view of Constraints causing technological gap in Potato Production Technology, total 125 farmers from five villages of the Chhibramau block in the Kannauj district of Uttar Pradesh. Using a pre-structured interview schedule, a study was carried out with a sample of 25 respondents from each village. The results of the study depicted that according to degree of seriousness of constraints, the constraint under socio-psychological was found most important constraints, i.e. 'Skilled farm workers are hardly available'. Under economic constraints the most important constraints i.e. 'Costly diesel charges, and 'Corruption of credit sanctions,. Under technological constraints, the most important constraints was 'Non-availability of quality HYV seeds,Under transportation constraints, the most important constraints, was 'Indigenous transport-means viz., Bullock cart, Dunlop, Tonga take much time and causes more inconveniences in transporting the products, Under post-harvest technological constraints, the most improvement constraints was 'Lack of space in house of potato farmers for storing the products. The suggestive measures to overcome the constraints in potato production technology as perceived by the respondents were "suitable approach for the safeguard of the crop against the animal (blue calf) (73.33%). Most of the remedial suggestion being made in the view of the expressed opinion of the respondents, observation of the investigator, appropriate farm field fencing.

Keywords: Potato growers, technological gap, constraints, garrett'sranking

1. Introduction
Potato (*Solanum tuberosum* L.) is fourth most important food crop after rice, wheat and maize. It occupies a pro-eminent place amongst the crops and acknowledge as the "king of vegetables" due to its great utility. It provides considerable dry matter (20 g/ 100g) per unit. It is a rich source of carbohydrates (22.6 g/ 100g), starch (16.3 g/ 100 g) and proteins (1.6 g/ 100g). Potato also provides raw material for processing industries. It can fulfil the requirement of food for human consumption to a greater extent and consumed by majority of the people of the world. It is one of the most remunerative and profitable crop for the farmers due to its higher yield potential within a limited time. We have different potato varieties such as Kufri Jyoti, Kufri Chipsona-1,2, Kufri Louvkar, Kufri Sinduriare cultivated by farmers. However, Kufri Chandramukhi, Kufri Jyoti, Kufri LavkarKufri Sinduri Kufri Chipsona-1, Kufri Chipsona-2, Kufri Chipsona-3 varieties has been recommended for cultivation.
The new technology developed by Agricultural Universities and research institutes; it has been observed that either the same has not reached to the farmers' field or farmers are reluctant to use this technology. The technological gap is a major problem of increasing production in the country (Uikey *et al.* 2018).
The wide flexibility in its planting and harvesting dates makes the crop most suitable for inclusion in intensive cropping system although potato is a temperate crop but it can also be grown successfully in subtropical region and can be grown during winter season in different parts of India Depending upon the climatic condition. However, this crop can be grown in rainy season also, but in limited area in India including Chhibramau block of Kannauj District. Potato is important crop of the world and is grown in around 18.62 million hectare with production of 232 million tones. In India, potato is cultivated in an area of about 1.86 million ha with a production of 47 million tones and productivity is22.7 tonnes per ha. In India, it is grown in almost all the states and the highest areas as well as the production are in Uttar Pradesh followed by West Bengal and Bihar (Anonymous, 2017). Potato occupies about 60376 hectares area in Uttar Pradesh with total production of 1443028 tonnes. The highest area (6820 ha) and production (105369tonnes) is recorded in Kannauj district followed by.

Farrukhabad district with an area of 5084 hectares and production of 66092 tonnes (Anonymous, 2016).

Keeping in the view of importance of constraints in potato production technology the following objective was undertaken;

i) To work out the major constraints responsible for technological gap.
ii) To suggest about the constraints in potato grower for technological gap.

Material and methods

Purposive cum random sampling were used for select the district Kannauj and block Chhibramau. The reason for selecting of this block is good communication of investigator with people, language and Socio cultural contact with the people of the block under study. Village wise list of potato growers was obtained from the Chhibramau Block, Kannauj district. Five villages and one hundred twenty five respondent selected by using proportionate random sampling method.

Analytical tools

The data collected from the sample farmers through personal interview with the help of pre structured scheduled were analysed and estimated with certain statistical technique like:

i) Per cent

The frequency of particular cell was divided by the total number of respondents and multiplied by 100 to calculate the percentage.

ii) Average

The simplest and important measure of average which have been used into statistical x

analysis was the weighted average. The formula used to estimate the average is:

Mean = $_N$

Constraints Analysis

Garrett's ranking technique was used to rank the constraints faced by respondents in adoption of the finance. Initially the rank given by the respondents were changed to per cent position by using the following formula: 100 Rij − 0.5
per cent position = (Nj)

Where,
Rij= Rank given for i^{th} constraints by j^{th} respondents,
Nj= Number of constraints ranked by j^{th} respondents.

The per cent of rank, for a single constraint was added up for total sample to give the overall per cent position of that constraint. The overall per cent position thus calculated divided by the number of respondents in order to derive the average per cent position, which was then converted to score by reforming to the transmutation table given by Garrett's value. The ranks were finally assigned by arranging the scores in descending orders.

Result and Discussion

Constraints faced by respondents of potato production technology

The table-1 indicates, that the rank order of economic constraints viz., 'Costly diesel charges, was ranked I (0.82) followed by 'Corruption of credit sanctions.' ranked II (0.79), 'Lack of money, ranked III (0.77), 'No Subsidy for purchasing the input for potato e.g. Seed, chemical etc.' ranked IV (0.75), 'More margin to middleman/commission agents, ranked V (0.64), 'Inadequate availability of proper fertilizer.' ranked VI (0.62), 'Lack of credit facilities' ranked VII (0.54), 'Inadequate availability of proper sufficient seed treatment chemicals' ranked VIII (0.51), 'Inadequate availability of F.Y.M.' ranked IX (0.46), 'High Irrigation Charges' ranked X (0.41) and 'Tractor on hire hardly made available to the farmer' ranked XI (0.34). The score value for each constraint indicates that the seriousness of constraints caused by low adoption of technology.

Table 1: Distribution of respondents according to economic constraints: N=125

S. No.	Constraints	Mean score value	Rank order
1.	Costly diesel charges	0.82	I
2.	Corruption of credit sanctions.	0.79	II
3.	Lack of money.	0.77	III
4.	No Subsidy for purchasing the input for potato e.g. Seed, chemical etc.	0.75	IV
5.	More margin to middleman/commission agents.	0.64	V
6.	Inadequate availability of proper fertilizer.	0.62	VI
7.	Lack of credit facilities.	0.54	VII
8.	Inadequate availability of proper sufficient seed treatment chemicals.	0.51	VIII
9.	Inadequate availability of F. Y. M.	0.46	IX
10.	High Irrigation Charges.	0.41	X
11.	Tractor on hire hardly made available to the farmer.	0.34	XI

The table-2 shows that the rank order of social constrains viz. 'Skilled farm workers are hardly available, was ranked I(0.81), followed by 'Co-operative societies do not help the potato growers for better production, ranked II (0.81), 'More incidence of pest & diseases' ranked III (0.73), 'Lack of advice and guidance from change agents.' ranked IV (0.71), 'Lack of scientific knowledge about potato cultivation' ranked V (0.69), 'Inadequate training facilities' ranked VI (0.63) and 'Ineffectiveness of plant protection chemicals' ranked VII (0.51) respectively. The score value for each constraint indicates the seriousness that caused low adoption.

Table 2: Distribution of respondents according to social constraints

S. No.	Constraints	Mean Score value	Rank order
1.	Skilled farm workers are hardly available.	0.81	I
2.	Co-operative societies do not help the potato growers for better production.	0.81	II
3.	More incidence of pest & diseases.	0.73	III
4.	Lack of advice and guidance from change agents.	0.71	IV
5.	Lack of scientific knowledge about potato cultivation	0.69	V
6.	Inadequate training facilities.	0.63	VI
7.	Ineffectiveness of plant protection chemicals.	0.51	VII

The table-3 shows that the rank order of technical and resources management constrains viz. 'Lack of availability of quality HYV seeds, was ranked I (0.73), followed by 'Duplicate fertilizers are available in market, ranked II (0.55), 'Lack of availability of plant protection chemicals, ranked III (0.45), 'Diesel supply usually disappointed at a proper moment' ranked IV (0.43), 'Scarcity of farm labour' ranked V (0.25), 'Lack of irrigation facilities' ranked VI (0.17) and 'Inadequate and erratic supply of electric for irrigation' ranked VII (0.15) respectively. The score value for each constraint indicates the seriousness that caused low adoption.

Table 3: Distribution of respondents according to technical & resources management, N=125

S. No.	Constraints	Mean Score value	Rank order
1.	Lack of availability of quality HYV seeds.	0.73	I
2.	Duplicate fertilizers are available in market.	0.55	II
3.	Lack of availability of plant protection chemicals.	0.45	III
4.	Diesel supply usually disappointed at a proper moment.	0.43	IV
5.	Scarcity of farm labour.	0.25	V
6.	Lack of irrigation facilities.	0.17	VI
7.	Inadequate and erratic supply of electric for irrigation.	0.15	VII

The table-4 shows that the rank order of Transportation constrains viz. 'Indigenous transport-means viz., Bullock cart, Dunlop, Tonga take much time and causes more inconveniences in transporting the products, was ranked I(0.93), followed by 'Transportation means viz., tractor/jeep/tempo, etc. rarely available, ranked II (0.83), 'Sometimes transporters bargain badly during odd periods and compel the producers to pay highly charges, ranked III (0.68), 'The condition of road are not good which damage the vehicle as well as products/potato' ranked IV (0.26) and 'Lack of roads to transport the products for disposal' ranked V (0.19), respectively. The score value for each constraint indicates the seriousness that caused low adoption.

Table 4: Distribution of respondents according to transportation constraints: N=125

S. No.	Constraints	Mean Score value	Rank order
1.	Indigenous transport-means viz., Bullock cart, Dunlop, Tonga take much time and causes more inconveniences in transporting the products	0.93	I
2.	Transportation means viz., tractor/jeep/tempo, etc. rarely available.	0.83	II
3.	Sometimes transporters bargain badly during odd periods and compel the producers to pay highly charges.	0.68	III
4.	The conditions of road are not good which damage the vehicle as well as products/potato.	0.26	IV
5.	Lack of roads to transport the products for disposal.	0.19	V

The table-5 shows that the rank order of Post-harvest technological constrains viz. 'Lack of space in house of potato farmers for storing the products, was ranked I (0.92), followed by 'Dumping off the products due to un-availability of space in cold storage, ranked II (0.84), 'Lack of knowledge about the proper market of value products, ranked III (0.64), 'No strict provision of suring return of damage potato by the cold storage owners' ranked IV (0.62), 'Lack of knowledge of value added products productions' ranked V (0.59), 'The monopoly knowledge of cold storage owners' ranked VI (0.46) and 'Lack of cold storage in the area' ranked VII (0.23) respectively. The score value for each constraint indicates the seriousness that caused low adoption.

Table 5: Distribution of respondents according to Post harvest technological constraints, N=125

S. No.	Constraints	Mean Score value	Rank order
1.	Lack of space in house of potato farmers for storing the products.	0.92	I
2.	Dumping off the products due to un-availability of space in cold storage.	0.84	II
3.	Lack of knowledge about the proper market of value products.	0.64	III
4.	No strict provision of sureing return of damage potato by the cold storage owners.	0.62	IV
5.	Lack of knowledge of value added products productions.	0.59	V
6.	The monopoly knowledge of cold storage owners.	0.46	VI
7.	Lack of cold storage in the area.	0.23	VII

Suggestive measure to overcome the constraints faced by the potato grower

Table-5 envisages on suggestive measures for better potato production, the majority of the respondents suggested the points viz., 'Suitable approach for the safeguard of the crop against the animal (blue calf)' (73.33%) followed by 'A permanent source of information should be among the farmers related to crop production' (71.67%), 'The government should provide the well facilities of call centers to advice and guidance for the farmers and also other information sources be made available, (69.60) 'Young generation do not like to work in farming, (65.80). 'Flexible source of credit must be there' (62.50%), 'Production procurement arrangement be made by government as in case of wheat and rice' (57.50%), 'Governmental irrigation facilities should be there' (55.0%), 'Reliable seed fertilizers and pesticide supply should be ensured' (46.67%), 'Potato processing unit should be established' (45.83%) 'demonstrations of different cultural methods should be organized' (40.0%) and state department of agriculture should ensure the timely and adequate supply of inputs viz., fertilizer, seed and plant protection. ranked I, II, III, IV, V, VI, VII, VIII, IX, X and XI respectively.

Table 6: Suggestive measures to overcome the constraints faced by the potato growers, N=125

S. No.	Suggestive measures	Percentage	Rank order
1.	Suitable approach for the safeguard of the crop against the animal (blue calf)	73.33	I
2.	A permanent source of information should be among the farmers related to crop production	71.67	II
3.	The government should provide the well facilities of call centers to advice and guidance for the farmers and also other information sources be made available.	69.60	III
4.	Young generation does not like to work in farming.	65.80	IV
5.	Flexible sources of credit must be there	62.50	V
6.	Production procurement arrangement be made by government as in case of wheat and rice	57.50	VI
7.	Government irrigation facilities should be there	55.00	VII
8.	Reliable seed fertilizers and pesticide supply should be ensured	46.67	VIII
9.	Potato processing unit should be established	45.83	IX
10.	Demonstrations of different culture methods should be organized	40.00	X
11.	State department of agriculture should ensure the timely and adequate supply of inputs viz., fertilizer, seed and plant protection.	36.00	XI

Conclusion

Keeping the view of constraints faced by respondents in technological gap in potato production in which out of 11 economic constraints causing technological gap the major constraint like Costly diesel charges, out of 7 social constraints causing technological gap the major constraints i.e. 'Skilled farm workers are hardly available followed by 'Co-operative societies do not help the potato growers for better production and 'More incidence of pest & diseases respectively. Out of 7 technological and resource management constraints causing technological gap the major constraints like 'Non-availability of quality HYV seeds, out of 5 transportation constraints causing technological gap the transportation constraints i.e. 'Indigenous transport-means viz., Bullock cart, Dunlop, Tonga take much time and causes more inconveniences in transporting the products, 'Sometimes transporters bargain badly during odd periods and compel the producers to pay highly charges, out of 7 post-harvest technological constraints causing technological gap the major constraint i.e. 'Lack of space in house of potato farmers for storing the products' followed by 'Dumping off the products due to unavailability of space in cold storage and 'Lack of knowledge about the proper market of value products respectively.

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