



SWOT analysis of potato cultivation under arid conditions in western Rajasthan (India)

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ABSTRACT

India aims to produce 125 million tonnes potatoes in 2050 for ensuring food security to its natives and for achieving this massive target the country needs to explore non-traditional areas. Rajasthan in general and Jodhpur district in particular are dominated by the arid climate. The state in general and the study area in particular are not known for potato cultivation. CIP-SWCA, New Delhi and ICAR-CPRI, Shimla jointly identified potential location in Jodhpur district for successful potato introduction. SWOT analysis of socio-economic and agro-climatic factors for potato cultivation in this area is based on 110 farmers' responses. The paper identified a large number of strengths and opportunities linked to potato cultivation in the area while the recognised weaknesses and threats can be mitigated with the use of technology and through the process of focussed rural development. Agriculture in the study area, needs enhanced impetus of agricultural extension machinery and special hand-holding of relatively less aware farmers by the project implementing agency, for bringing in the desirable change.

Key words: Arid zone, India, Potato cultivation, Profitability, SWOT analysis

FAO declared potato as food crop of the future for fighting global hunger and poverty (<http://www.fao.org/potato-2008/pdf/IYPbook-en.pdf>). Consequently, tremendous growth in potato production and consumption was observed, especially in the developing countries. India experienced silent potato revolution in the recent past as potato production in the country nearly doubled during 2003 and 2013. This surge in potato production was duly backed by the domestic consumption demand which was much higher [per capita 3.9% annual compound growth rate(s) (ACGR)] than the population growth rate (1.4% ACGR) in the country (Singh *et al.* 2014a) during 2003 and 2013. The unnoticed food security role by the potato crop in India was the sole reason for this production uprising (Singh and Rana 2013).

India foresees to produce 125 million tonnes potatoes by the year 2050 (Singh *et al.* 2014a). However, potato production in India has characteristic 'regional' nature, with the result farmers of very large number of states get deprived of earning higher profits from the cultivation of this cash crop (Rana *et al.* 2015, Rana *et al.* 2016). Increasing geographical

spread of potato crop across non-traditional potato producing areas is very important if India has to successfully achieve the said foresight. Rajasthan is not known as an important potato growing state in India while its Jodhpur district grows negligible quantity of potatoes. International Potato Centre for South West and Central Asia (CIP-SWCA), New Delhi and ICAR-Central Potato Research Institute (ICAR-CPRI), Shimla have been conducting field trials for some years and suitable agro-climatic conditions for successful potato cultivation in the district have been reported (Sharma *et al.* 2014, Arya *et al.* 2016, 2017).

Farmers in India are finding it difficult to manage their budgets on account of higher medical, children's education and other general expenses (Chand 2016) and agricultural instability is the prime source of farmers' distress in India (Chand and Raju 2009). Hence, sustainability of agriculture is becoming more and more challenging in the study area and the farmers are scouting for adoption of high value crops with higher profitability in order to be financially resilient.

Tremendous research efforts have ensured competitive potato cultivation under water stressed conditions with drought tolerant and short duration improved potato varieties (Schafleitner *et al.* 2007, Sharma *et al.* 2011, Kadian *et al.* 2012, Monneveux *et al.* 2014, Sharma *et al.* 2014). Taking adequate research and development preparedness and agro-climatic suitability of the selected locations in Jodhpur district into consideration, CIP-SWCA and ICAR-

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CPRI planned a joint study to assess technical feasibility of introducing potato in non-conventional Jodhpur district of Rajasthan for sustainable socio-economic upliftment of farmers in this area.

MATERIALS AND METHODS

The study area comprising of Mansagar, Govindpura, Danwara and Bansī villages, of Baori block of Jodhpur district of Rajasthan state in India falls within the 26°736'N to 26°672'N and 73°024'E to 73°116'E coordinates. Mansagar and Govindpura are the action villages under the South Asian target region for the CGIAR-Dryland Systems CRP 1.1 while Danwara and Bansī are the control villages for future impact assessment of this proposed activity. The study area is about 65 km away from Jodhpur city. Study area comprises irrigated as well as rainfed agriculture. Only a few resourceful persons can afford to pump out water as the groundwater ranges from 800 to 1000 feet deep.

The study is based on primary as well as the secondary sources of data. In order to have precise understanding of socio-economic and agro-climatic feasibility of successful potato cultivation in the study area, a survey of 110 respondents (Table 1) was carried out in February 2016. In addition to the personal interviews with the respondents, focus group meetings were also held for adequate understanding of the common problems in a particular village. Secondary data on different weather parameters were online compiled (<http://www.cazri.res.in/wwwd.php>). Information on population of Jodhpur and its distribution into various types of workers vis-à-vis Rajasthan was online gathered (<http://plan.rajasthan.gov.in/statistics>). Historical data on potato prices in Jodhpur and New Delhi markets were online collected (<http://agmarknet.gov.in>). State and district wise potato area and production estimates in Rajasthan were obtained from <http://eands.dacnet.nic.in>.

Descriptive statistical techniques were supplemented by ACGRs for some variables. For assessing independence of responses between the two action villages 't test' was

Table 1 Village-wise sampling details of the study

Village	Nature of village	No. of respondents#
Mansagar	Action	48
Govindpura	Action	28
Danwara	Control	21
Bansi	Control	13
Total		110

#: Using probability proportional to size/number.

used. Non-parametric Chi-square test was used to assess independence of responses on problems related to irrigation water among different villages. Substantial literature pertaining to potato production and consumption trends in the future, introduction of potato crop in non-conventional areas, farmers' perception on new potato technologies, adoption behaviour of potato farmers, rural employment trends, farmers' income augmentation and stabilization, agrarian distress, seed potato availability and utilization pattern, moisture and temperature related stresses and genetic solutions to the problem of abiotic stresses was reviewed in order to validate conclusions and recommendations from this study.

RESULTS AND DISCUSSION

Strengths

Favourable potato prices: Agricultural Produce Market, Azadpur, New Delhi is the principal potato market in India. Being situated in National Capital Region (NCR), potato prices in this market are relatively higher compared to other markets in the major producer areas. The long term (2005 to 2014) inflation adjusted potato prices in Jodhpur market have tendency of being near to the Azadpur market prices (Fig 1). Hence, potato growers in the study area have an opportunity of selling potatoes at attractive prices. Higher wholesale potato prices during 2012 to 2015 speak of higher farmers' income hence, potato prices are another positive for

Table 2 Village-wise demographic profile of farmers of Jodhpur district in Rajasthan in India

Characteristic		Village				Overall
		Mansagar	Govindpura	Danwara	Bansi	
Family size	Total	6.95	5.97	6.33	7.62	6.74
	Male	3.60	3.11	3.33	3.62	3.43
	Female	3.35	2.86	3.00	4.00	3.31
Member engaged in agriculture	Total	3.81	3.47	3.23	3.00	3.38
	Male	1.92	1.79	1.71	1.69	1.78
	Female	1.89	1.68	1.52	1.31	1.60
Members in non-agriculture sector	Total	0.02	0.00	0.05	0.08	0.04
	Male	0.02	0.00	0.05	0.08	0.04
	Female	0.00	0.00	0.00	0.00	0.00
Non-working members	Total	3.12	2.50	3.10	4.54	3.32
	Male	1.66	1.32	1.62	1.85	1.61
	Female	1.46	1.18	1.48	2.69	1.71

Table 3 Area under different crops in *rabi* season and cropping intensity of sampled households (ha)

Particulars	Village(s)				Overall
	Mansagar	Govindpura	Danwara	Bansi	
Castor	0.81	0.67	0.81	0.85	0.79
Cumin	1.10	0.85	1.40	1.13	1.12
Wheat	0.62	0.27	0.62	0.54	0.51
Mustard	0.91	0.73	1.16	0.42	0.81
Isabgol (Psyllium)	0.42	0.46	1.04	0.18	0.53
Onion	0.22	0.44	0.39	0.31	0.34
Others	0.29	0.22	0.18	0.12	0.20
Total <i>rabi</i> cultivated	4.37	3.64	5.60	3.55	4.29
Cropped area	10.07	8.33	11.85	7.25	9.38
Cultivable area	5.70	4.68	6.25	3.70	5.08
Cropping intensity (%)	176.67	178.00	189.60	195.94	184.65

Based on the positive responses the average profitability of onion crop was the highest at ₹ 72750/ha followed by castor (₹ 66667/ha), psyllium (₹ 47036/ha) and cumin (₹ 46125/ha) while all other prevalent crops could attain average profitability less than ₹ 40000/ha. Although carrot was not grown by many farmers in the study area yet, they were expecting average net returns to the tune of ₹ 95000/ha at their farms which is equal to the conservative estimate of potato profitability in the study area. Potato produce enjoys greater storage flexibility, i.e. much lower marketing risk compared to the carrot crop.

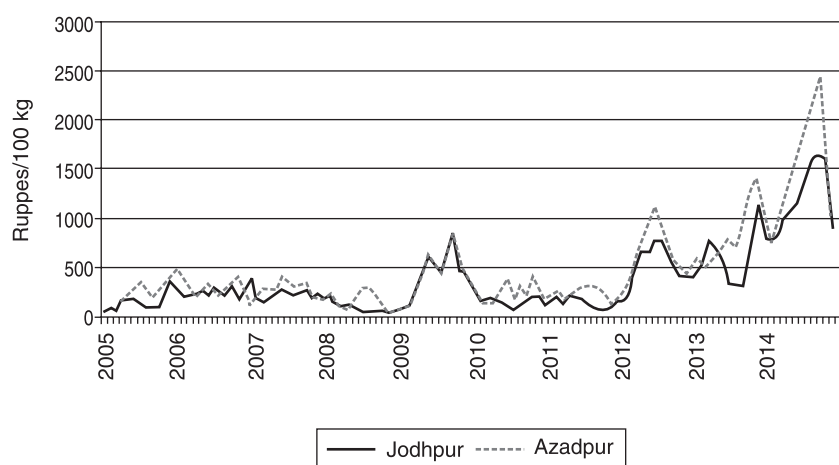


Fig 1 Multi-year inflation adjusted wholesale potato prices in Jodhpur and Azadpur markets (Agmarknet).

cultivating this profitable crop in the study area, however, recent (Year 2017) potato prices indicate abnormal trend.

Availability of farm labour: Potato crop being labour intensive in its nature can be successfully grown if sufficient farm labour is available in the locality. The selected villages fall in an area where economic activity is not enough to absorb available manpower. This is clearly indicated by the high proportion of respondents' non-working family members and lower proportion of family members working in non-agricultural sectors (Table 2).

Higher estimated profitability of potato crop: Diversification from low value to high value crops has been perceived as a source of financial sustainability in Indian agriculture (Birthal *et al.* 2007). Cumin, mustard, castor, psyllium (isabgol), wheat, onion and other miscellaneous crops were grown by the responding growers (Table 3).

Onion is the highest profitable crop among the existing ones in the study area. Castor being an annual crop compared poorly with other existing crops. All other crops generated net returns less than ₹ 40000/ha and they can't be considered as high value cash crops.

On-farm trials carried out by the CIP-SWCA in the area achieved potato yield levels of more than 30 tonnes/ha at 90 days after planting for three clones/varieties (Sharma *et al.* 2014). Since farmers will maximise their yield without bothering for a fixed date harvest the yield levels under best management and input conditions are likely to go higher. However, to be conservative the survey team assumed average target yield of 25 tonnes/ha in the

study area. Taking into consideration the spurt in prices of fruits and vegetables in India during recent years farmers

Table 4 Probability of growing new crops for higher average profitability

Crop	Village				Overall
	Mansagar	Govindpura	Danwara	Bansi	
Potato	0.96	1.00	1.00	1.00	0.99
Carrot	0.90	0.75	1.00	1.00	0.91
Groundnut	0.02	0.00	0.00	0.00	0.01
Fenugreek	0.04	0.00	0.00	0.00	0.01
Onion	0.00	0.07	0.00	0.00	0.02
Cotton	0.02	0.00	0.00	0.00	0.01

Probability ranges from 0 to 1 based on respondents' opinion.

will be able to sell their produce at a long term average price of ₹ 8000/tonne. The 2017 potato prices represent abnormal behaviour and are not part of the long term expected trend. Due to cheap rental value of land in the study area (average ₹ 18000/ha/year), nearness to seed potato producing area (Punjab state) and relatively easy human labour availability the average potato profitability was estimated at ₹ 95000/ha [benefit-cost (B-C) ratio=1.90] while the normal estimate at the yield of 30 t/ha the profitability estimate was ₹ 135000/ha (B-C ratio=2.29). However, if farmers adopt drip irrigation for potato cultivation then their profitability is likely to further improve by 30% (Singh *et al.* 2014b). Potato farmers can further improve their profitability by cold storing the produce and selling during off season at higher prices. Although, carrot cultivation may generate comparable profits yet, higher marketing risk associated with carrot crop due to its high perishability is favourable for introducing potato crop in the area. Moreover, farmers' desire to shift from 'low value-low risk' crops to 'high value-high risk' crops is likely to accommodate both these crops on their farms as the agricultural land under irrigation in the study area is limited and there is no risk of oversupply of either of the commodities. This analysis has been duly supported by the respondents through their elicitations on adoption of new crops (Table 4).

Possible replacement of wheat area with potato: Wheat is an important existing crop in the study area covering nearly 12% of the cultivated area in *rabi* season (Table 3). However, lower profitability of this crop (average ₹ 32292/ha) and rising profit expectations of farm families made them consider replacement of wheat with some high value crop and potato was one of the most important alternatives on their minds (Table 4). Irrigation water, the highly crucial input for cultivation of wheat as well as potato, needs to be taken into consideration before suggesting/recommending such crucial change. Based on their own experience, farmers have found no difference in the total water needs of potato (80-90 days) and wheat (120-135 days) crops in the study area. With the strong drought tolerant potato variety development focus during recent years (see last paragraph of Introduction) and with the higher suitability of micro-irrigation the potato crop (Singh and Sood 2013) is expected to consume significantly lesser water compared to the currently grown wheat crop.

Suitable temperature: Most of Indian potato varieties start failing in tuberization and bulking if the minimum temperature sustains above 18 to 20 °C on daily basis (Basu and Minhas 1991, Minhas and Kumar 2005). On the other hand, if maximum temperature remains above 30 to 32°C then wilting of potato plant starts. The recommended period of potato cultivation in the study area is *rabi* season (October to March). Climatic data were not available for the study area from public as well as private sources, however, experts at ICAR-CAZRI, ICRISAT and GRAVIS-Jodhpur, all having activities in the study area, unanimously believe that both day and night temperature in the action villages is 4 to 5 °C lower than the Jodhpur town. Long term weekly

average minimum and maximum temperature data obtained from ICAR-CAZRI were favourable for potato cultivation in the study area. This advantage of suitable temperature in the study area provides a window of opportunity for successfully growing potato crop, provided all other factors are congenial. Encouraging performance of the regular potato cultivation trials by the CIP-SWCA for last four years confirms this conclusion (Sharma *et al.* 2014).

Better sunshine: Sunshine is important for all plants in order to have the needed photosynthesis. In *Rabi* season, sun remains in southern hemisphere and a lower photo-intensity is available in countries like India. Significant potato area in north-western India experiences prolonged foggy conditions during December and January months consequently potato crop undergoes considerable productivity and quality loss (lower dry matter and nutrition). However, sunshine conditions are much better in the study area without incidences of fog leading to better prospects of potato yield and quality.

Freed from frost risk: Frost is another serious potato production risk in north-western India. The adjoining Punjab state is prone to frost and potato yield losses of 52% in 2006 and 41.5% in 2008 were reported (Arora *et al.* 2010). However, this risk is absent in the study area as the minimum temperature in all the weeks of all the years has been well above the frosting temperature (ICAR-CAZRI website; farmers' responses).

Suitable soil types: Most of the western Rajasthan, including Jodhpur district, possesses deep sandy and sandy loam soils. Potato crop performs best on sandy loam soils if nutrients and water management are managed scientifically. Potato tubers from such soils are attractive in colour and tuber bulking is smooth and better. Hence, type of soil available in the study area is a favourable factor.

Nearness to the markets: The action villages are 65 km away from Jodhpur city. Road transport is quite fast in this part of India due to lower population density which will result in lower marketing cost for the potential potato producers. Hence, nearness to market both in terms of distance as well as time is another favourable factor for intruding potato cultivation in this new area.

Innovator and early adopter farmers: Most of the respondents having irrigation facilities at their farms are innovator or early adopter farmers who are highly responsive to innovative ideas and technologies; hence chances of success of proposed potato cultivation in this unconventional area are quite high.

Weaknesses

Limited precipitation and scarce irrigation water: Potato is a water loving crop that needs regular irrigation for good productivity. But, limited precipitation and scarce availability of irrigation water from a strong weakness for introduction of potato crop in this unconventional area. However, detailed discussion with the respondents revealed that most of them are growing wheat and water needs of wheat crops are higher than drought tolerant

Table 5 Problems and source of irrigation water and methods of irrigation (% responses)

Particulars	Village				Over-all
	Mansagar	Govindpura	Danwara	Bansi	
<i>Problems</i>					
Deep ground water###	69.05	50.00	80.95	92.31	73.08
No issue with water###	19.05	50.00	19.05	7.69	23.94
<i>Source</i>					
Tube-well	100	100	100	100	100
<i>Methods</i>					
Furrow	39	0	24	65	32
Sprinkler@@	61	100	76	35	68
Drip	0	0	0	0	0

###: χ^2 test established that concerns related to ground water depth were statistically significant at 1% level of significance among all villages as well as between the action villages. @@: Application of t test established statistically better use of sprinklers in Govindpura village compared to the Mansagar at 5% level of significance.

Table 6 Reason for not growing potatoes (multiple % responses)

Reason	Village(s)				Over-all
	Mansagar	Govindpura	Danwara	Bansi	
Non-traditional crop@	19	32	00	00	13
Seed problems	06	03	00	08	04
Lack of technical know how	91	93	100	100	96
Other*@@	13	29	00	00	11

*: Other responses include lack of on-farm purchasing facilities for potato harvest, limited agricultural land, wild animals infested area and scarcity of water. Application of t test established statistically grimmer situation of transfer of technology on two parameters in Govindpura village than Mansagar at @=10%; and @@=5% level of significance.

potato varieties/clones due to the longer crop duration of the former crop. Moreover, farmers want this switch-over due to higher profitability of potato crop and the drought tolerant potato varieties development program (Schafleitner *et al.* 2007, Rana *et al.* 2011, Sharma *et al.* 2011, Kadian *et al.* 2012, Rana *et al.* 2013a, 2013b; Monneveux *et al.* 2014, Mahmud *et al.* 2017) of CIP and Indian National Agricultural Research System (NARS) is likely to augment farmers' profitability through this proposed potato cultivation. Though Govindpura village had better adoption of sprinklers than the Mansagar (scarcer irrigation-water availability), yet the possibility of large scale adoption of drip irrigation system (Table 5) in the area is further likely to mitigate this problem to a significant extent considering emphasis of Government of India to popularize micro-irrigation in water stressed areas under More-Crop-Per-Drop initiative.

Lack of technical knowhow and weak transfer of technology: Growers in the study area were asked to elicit reasons for not growing potatoes on their farms. The strongest reason for non-potato cultivation in the area was the lack of technical know-how about this crop (Table 6) which is a strong weakness in the process of introducing potato cultivation in this area. By and large the situation was grimmer in Govindpura village than the Mansagar. Project implementation agency will have to ensure transfer of technologies and basic technical know-how to the adopter farmers for initial 3 to 5 years. In this duration the project implementation agency will also have to develop strong linkage between agricultural extension agencies and adopter farmers. During this incubation period the adopters should be exposed to ideal potato cultivation practices in similar agro-climatic conditions (Deesa area in Gujarat an apt example) and input/output marketing skills etc.

Non availability of quality seed: Seed is an important determinant of potato productivity (Sharma *et al.* 2013, Bag *et al.* 2015). Establishing a robust seed potato supply chain in the study area is very crucial in order to mitigate this weakness. The best local seed potato multiplication mechanism needs to be designed for ensuring adequate profitability and sustainability of potato cultivation in this non-traditional area.

Limited number of potato growers: Very little number of respondents had ever tried potato cultivation on their farms and none had done on regular basis. The scenario in itself doesn't provide a stimulus for respondents to readily accept this new crop. In the absence of a convincing demonstration affect the targeted growers may start focussing more on risks than rewards. Although, CIP-SWCA has already cultivated potatoes in the study area with adequate success (Sharma *et al.* 2014), yet more demonstration experiments need to be laid down in targeted villages for generating additional stimulus for adoption of potato as new cash crop on large number of farms.

Opportunities

Poverty elimination: The study revealed lack of basic facilities in large proportion of respondents' households. In relation to sanitation and television facilities the situation was grimmer in Govindpura than Mansagar (Table 7). Role of potato in poverty elimination and ensuring food security has been adequately documented (FAO 2008, Thiele *et al.* 2010, Singh and Rana 2013). Introduction of potato crop will ensure better living standard of growers in the study area with the possible spill over to wider geography.

Exploitation of drip irrigation techniques: Drip irrigation, during recent years, has become a new successful technology in Indian potato cultivation. In a study, 33% higher potato yield was reported in agro-climatically similar areas in Gujarat state of India under drip irrigation system (B-C ratio=1.67; ICAR-CPRI Annual-Report 2011-12) compared to furrow irrigation having a B-C ratio equal to 1.37. In an agronomy trial, Singh *et al.* (2014b) reported potato yield under drip irrigation systems (with fertigation)

Table 7 Availability of basic household facilities at village level (% responses)

Particular	Mansagar	Govindpura	Danwara	Bansi	Overall
Individual water connection at home	16.67	14.28	19.05	0.00	12.50
House electrification availability	50.00	46.43	52.38	46.15	48.74
Availability of sanitation facilities					
Flush toilet@@	31.25	21.43	47.62	23.08	30.84
Temporary toilet	6.25	0.00	47.62	7.69	15.39
Open field@	62.50	78.57	4.76	69.23	53.76
Availability of radio/transistor	36.17	39.29	52.38	46.15	43.50
Availability of television facility@@@	43.75	10.71	52.38	46.15	38.25
Availability of DTH connection@@@	37.50	7.14	47.62	46.15	34.60

t-test established statistically different situations in Mansagar and Govindpura at @=10%; @@=5%; and @@@=1% level of significance.

Table 8 Village-wise demographic profile of head of responding farm family in Jodhpur district of Rajasthan

Characteristic		Village				Overall
		Mansagar	Govindpura	Danwara	Bansi	
Family head (%)	Male	100.00	100.00	100.00	100.00	100.00
	Female	0.00	0.00	0.00	0.00	0.00
Age (Years)		50.31	43.43	50.29	52.23	49.07
Education (No. of schooling years)		5.89	3.89	6.95	5.54	5.57
Participation in groups (%)*		0.08	0.04	0.05	0.00	0.04

*: For augmentation of technical knowhow

equal to 43.1 tonnes/ha compared to furrow irrigation system (30.9 tonnes/ha) having 39.5% yield advantage and B-C ratio=2.48 against the B-C ratio =1.98 for furrow irrigation system. In addition, irrigation water saving up to 50%, higher potato tuber dry matter, 10-15% higher number of tubers, 20-25% higher processing grade tubers, 25% fertilizer economy and 30-35% labour economy were also reported by Singh *et al.* (2014b). Standardization of agronomic requirements for application of micro-irrigation technology to potato (Singh and Sood 2013) has another advantage. Hence, expansion of drip irrigation use in the area will not only be profitable for the farmers but beneficial to the environment and nation also.

Employment generation opportunities: Potato cultivation, particularly in areas where land holdings are small and fragmented, is a labour absorbing enterprise. Since, the proportion on non-working members of the respondent families was quite high (Table 2), introduction of potato crop will create local employment opportunities.

Women empowerment: Women in the area generally lack ownership to land and decision making opportunities as they are not considered head of the family (Table 8). Potato cultivation is female labour absorbing also as many operation, viz. placing seed tuber in the field while planting, weeding, picking of harvested tubers, grading and packing of the harvest are mainly performed by female labour in India. Hence, introduction of potato crop in the study area is likely to ensure women empowerment and balanced social growth.

Efficient transfer of technology: The target farmers' exposure to ideal agricultural experiences and their capacity building as proposed, will prepare them for efficient participation in the agricultural technology transfer programmes. Repeated interactions with agricultural extension officers will enhance level of their confidence and ability to extract/utilize technical knowledge by these relatively backward farmers. Such positive transformation is likely to build capacity of farmers in other crops also.

Development of markets: Very large proportion of potato produce is actually the marketable surplus. In addition, potatoes need cold storage for maintaining round the year supply. Hence, introduction of potato crop in the study area is likely to develop physical markets as well as associated businesses particularly the cold storage industry in and around the study area.

Threats

Introduction of other profitable crops: Respondents were desperate to adopt cultivation of cash crops including other profitable cash crops like carrot (Table 4) which may find favour of local farmers more than potato as private companies selling carrot seed may act quicker to seize this opportunity.

Rural development schemes of employment: Negative impact of rural employment guarantee schemes like MGNREGS on supply of agricultural labour wage enhancement has already been experienced (Chand and Srivastava 2014). If such trend sustains in the long run then

potato cultivation being labour intensive may be constrained and farmers might have to go for large scale mechanization which is still a challenge particularly for small and marginal farmers in India having fragmented land holdings.

Possible under delivery of technology transfer machinery: Agricultural extension machinery in the country is inadequate vis-à-vis the huge diversity of agro-climatic regions and very large number of small and marginal farmers. Poor adoption of recommended technologies by potato farmers is quite common in India (Peer *et al.* 2014, Singh *et al.* 2015). Hence, if extension machinery under delivers then project implementation agency will have the responsibility to provide adequate handholding to such farmers for a longer duration.

Conclusions

The SWOT analysis of this proposal suggests that introduction of potato crop in the study area is not only important for ensuring socio-economic upliftment of the local farmers but also for warranting financial sustainability of crop husbandry in the study area. However the area being unconventional for potato cultivation, teething problems are expected to arise and concerned developmental agencies will have to provide adequate handholding to naive potato growers. The infrastructural support in terms of delivering benefits of well thought-of government schemes and initiatives like More-Crop-Per-Drop, Attracting-and-Retaining-Youth-in-Agriculture, *Mera-Gaon-Mera-Gaurav*, Doubling-Farmers'-Income-by-2022 etc. to the ultimate farmers in the study area is crucial for this economically attractive activity. With the very high level of commitment of the Government of India to the overall developmental activities, such support is expected to be delivered at a high level of probability.

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