

**RESEARCH ARTICLE :**

Constraints as perceived by the kinnow (*Citrus deliciosa* x *Citrus nobilis*) farmers in adoption of recommended technology in Rajasthan

■ KULDEEP SINGH, K.L. DANGI AND NARPAT SINGH**ARTICLE CHRONICLE :****Received :**
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30.06.2017**SUMMARY :** The present paper highlights the constraints levels of farmers of kinnow recommended technologies in Sri Ganganagar (Rajasthan). Total 150 farmers were selected for study. There was no significant difference between two categories. It means that the small and big farmers had perceived more or less similar constraints toward kinnow cultivation in the study area.**How to cite this article :** Singh, Kuldeep, Dangi, K.L. and Singh, Narpata (2017). Constraints as perceived by the kinnow (*Citrus deliciosa* x *Citrus nobilis*) farmers in adoption of recommended technology in Rajasthan. *Agric. Update*, 12(3): 376-382; DOI : 10.15740/HAS/AU/12.3/376-382.**KEY WORDS :**Constraints, Farmers,
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technologies**BACKGROUND AND OBJECTIVES**

Fruits are of great importance in human nutrition. At present, next to China, India is the second largest producer of fruits. Citrus is world's leading fruit crop. It is also known as fancy fruit. India occupies 0.488 million hectares area under citrus fruits with a production of 4.575 million tonnes (1.39 % of total production under fruits). Among the citrus fruits, mandarin is placed at the first position with respect to the area and production, which is followed by sweet oranges and limes. Commercially, kinnow mandarin is grown in the states like Punjab, Haryana, Himachal Pradesh, Western Rajasthan and Uttar Pradesh.

The present study was under taken in Sri Ganganagar and Sri Karanpur Panchayat samities of Sri Ganganagar district. District and Panchayat samities were selected purposely due to having highest area and production of kinnow fruit as compared to other Panchayat samities and districts in the state. From the selected Panchayat samities, ten villages from each selected Panchayat samities, which were having maximum area and production under the kinnow cultivation, were selected. From the selected villages, a sample of 150 respondents was selected by simple random sampling technique from the study purpose. Data were collected by the researcher with the help of well constructed interview schedule by the face to face method of interview technique. Thereafter, collected data were analyzed, tabulated and interpreted

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authors' affiliations**RESOURCES AND METHODS**

in the light of above objective. The statistical measures used mean, standard deviation were mean per cent score, t- test and Z – test.

OBSERVATIONS AND ANALYSIS

In present investigation, an effort was made to identify the causes hindering the adoption regarding different aspects of kinnow cultivation *viz.*, technical constraints, management constraints, storage and market constraints, finance and credit constraints, processing and value addition constraints and general constraints. These constraints with their degree of intensity have been presented under various heads in the subsequent tables. To association between ranks assigned by the small and big respondents to different aspect of problems, rank order correlation (rs) was also calculated.

Distribution respondents on the basis of constraints encountered by them in adoption of kinnow production technology:

To get an overview of the respondents regarding the constraints encountered by respondents in the adoption of recommended practices of kinnow cultivation, they were divided into three strata *i.e.* high, medium and low level of constraints. These categories were formed on the basis of calculated mean and standard deviation of the sources given to the constraints items by them. Tables 1 reveal that 80 (53.33 %) respondents had faced medium level of constraints in adoption of recommended practices of kinnow cultivation. Besides, 21 (14.00 %)

and 49 (32.67 %) respondents had faced high and low level of constraints in adoption of recommended practices of kinnow cultivation, respectively.

Table 1 show that 57.33 per cent small and 49.33 per cent big farmers fell under the category of medium level of constraints. Similarly, 20.00 per cent small and 8.00 per cent big farmers fell under the category of high level of constraints. However, 22.67 per cent small and 42.67 per cent big farmers fell under the category of low level of constraints.

Aspectwise constraints encountered by the respondents:

Various constraints with their respective intensities have been presented under the following heads.

Table 2 reveal that “lack of need based training programme by the training institutions” and “lack of skill in performing technical operation” were expressed most severe constraints by both types of farmers which were assigned first and second rank with MPS 88.93 and 73.47, respectively, in the hierarchy of technical constraints. Besides, lack of technical guidance, lack of knowledge and unavailability of technical literature were the somewhat severe constraints expressed by both types of farmers and assigned III, IV and V ranks with 66.80, 58.00 and 54.00 MPS, respectively. Table also shows that “lack of awareness” was perceived to be less severe constraints among both types of farmers, as it was placed at last rank with its total MPS 24.53.

From the above discussion, it could be concluded

Table 1 : Distribution respondents on the basis of constraints encountered by them in adoption of kinnow cultivation (n= 150)

Sr. No.	Constraints level	Small farmers		Big farmers		Total	
		f	%	f	%	f	%
1.	Low (Upto 143.99)	17	22.67	32	42.67	49	32.67
2.	Medium (144.00-189.02)	43	57.33	37	49.33	80	53.33
3.	High (Above 189.02)	15	20.00	6	8.00	21	14.00
	Total	75	100.00	75	100.00	150	100.0

f = Frequency, % = Per cent, Mean = 166.51 and Std. Deviation = 22.52

Table 2 : Technical constraints encountered by the respondents in kinnow cultivation (n= 150)

Sr. No.	Technical constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Lack of awareness	26.40	VI	22.67	VI	24.53	VI
2.	Lack of knowledge	59.73	IV	56.27	IV	58.00	IV
3.	Lack of skill in performing technical operation	80.00	II	66.93	II	73.47	II
4.	Lack of technical guidance	70.67	III	62.93	III	66.80	III
5.	Lack of need based training programme by the training institutions	91.20	I	86.67	I	88.93	I
6.	Unavailability of technical literature	58.40	V	49.60	V	54.00	V

that lack of need based training programme by the training institutions and lack of skill in performing technical operation were recorded most severe constraints. The reason of these constraints may be due that the technical information and training programmes about kinnow cultivation were not covered the all kinnow growers because training programmes and seminars schedules were not timely broadcasted in whole areas, due to this reason farmers could not attended the programmes and seminars. The number of VEW's for horticultural crop were still less and the jurisdictional area of a VEW was more. Therefore, it was not possible to cover the entire farm families in the area.

Management constraints faced by the respondents in kinnow cultivation:

Table 3 reveals that “shortage of irrigation water from canal throughout the year”, “poor quality of ground irrigation water”, “lack of electricity connection for tube well / drip system”, “diseases sensitive” and “lack of labour” were expressed as the most severe constraints by the respondents which were placed at I, II, III, IV and V ranks with 99.73, 98.27, 92.80, 90.40 and 87.87 MPS, respectively, in the rank hierarchy of management constraints. “Lack of reliable nursery at accessible distance”, “unavailability of good planting material”, “lack of organic manures and fertilizers at proper time” and “high mortality of plants during initial years” were quite severe constraints encountered by the respondents and ranked VI, VII, VIII and IX with 73.20, 68.13, 68.00 and 62.27 MPS, respectively by them. This might be due to the fact that plants were not propagated under guidance of the horticulture experts. High mortality of plants were

due to infection of fungal disease because established nursery in the orchards. Besides, “long duration of first fruiting” and “lack of standard agronomic practices (MPS 47.23)” were somewhat severe bottlenecks faced by the respondents’ assigned ranks X and XI with 56.80 and 47.73 MPS, respectively.

Table 3 reveals that the constraint *i.e.* “unavailability of good planting material” obtained seventh rank in case of small farmers (MPS 69.33) and eighth rank in case of big (66.93) farmers”, “lack of organic manures and fertilizers at proper time” was assigned eighth rank by small farmers (66.13 MPS) and seventh rank in case of big farmers (69.87 MPS). Remaining items were assigned similar ranks by all the categories of respondents. It could be concluded that shortage of “irrigation water from canal throughout the year”, “poor quality of ground irrigation water”, “lack of electricity connection for tube well / drip system”, “diseases sensitive” and “lack of labour” were observed as the most severe constraints by the respondents. The reason is that irrigation water from canal is limited because it is depending on rain (monsoon) and almost farmers used flood irrigation method. Kinnow crop is very sensitive to saline and alkaline water and quality of ground water was saline and alkaline in the almost area. Phytophthora infestation is most severe problem in study area. Labour tendency have changed and they are moving to urban.

Storage and market constraints faced by the respondents in kinnow cultivation:

Table 4 reveals that both small and big farmers perceived that “product’s price fluctuations” and “involvement of middlemen” are severe problems. These

Table 3 : Management constraints faced by the respondents in kinnow cultivation (n= 150)

Sr. No.	Management constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Long duration of first fruiting.	61.07	X	52.53	X	56.80	X
2.	High mortality of plants during initial years	65.87	IX	58.67	IX	62.27	IX
3.	Lack of reliable nursery at accessible distance	74.67	VI	71.73	VI	73.20	VI
4.	Unavailability of good planting material	69.33	VII	66.93	VIII	68.13	VII
5.	Lack of standard agronomic practices	49.87	XI	45.60	XI	47.73	XI
6.	Lack of organic manures and fertilizers at proper time	66.13	VIII	69.87	VII	68.00	VIII
7.	Diseases sensitive	90.93	IV	89.87	IV	90.40	IV
8.	Shortage of irrigation water from canal throughout the year	99.73	I	99.73	I	99.73	I
9.	Poor quality of ground irrigation water	98.40	II	98.13	II	98.27	II
10.	Lack of electricity connection for tube well / drip system	94.40	III	91.20	III	92.80	III
11.	Lack of labour	89.33	V	86.40	V	87.87	V

were placed at the top rank jointly with 88.27 MPS as regards the constraints of market was concerned. In order of sequence, “lack of remunerative market price”, “lack of marketing intelligence” and lack of storage facilities in the area were quite severe constraints confronted by the respondents and ranked II, III and IV, respectively in problem hierarchy. Besides “lack of suitable market for produce” and “lack of satisfactory transportation facilities” were some what severe constraints found by the respondents which were placed at V and VI positions by the sampled kinnow farmers, respectively.

A critical look at table brings to focus that “lack of market intelligence” obtained third rank in case of small and fourth rank in case of big farmers similarly, “lack of storage facilities in the area” was accorded fourth rank by small and third by big farmers. Rest of items was accorded similar ranks by small and big farmers. From the above result, it could be concluded that “product’s price fluctuations” and “involvement of middlemen” were perceived most severe constraints. This might be due to fact that there is low and high price due to gult in market.

High involvement of middlemen was due to traditional marketing system in area.

Finance and credit constraints faced by respondents in kinnow cultivation:

Table 5 reveals that “high cost of diesel” was expressed as the most severe constraints by the small and big farmers which were placed at I rank with 99.47 in the rank hierarchy. However, “high cost of drip irrigation system” and “perishable nature of commodity results in economic losses” were next most severe constraints as jointly expressed by respondents with 92.80 MPS. Besides “labour intensive affair” and “high repayment installments and interest rate” were also observed as most severe constraints by respondents with 92.67 and 88.80 MPS, respectively.

Table also shows that constraints *i.e.* “malpractices at different levels and delayed credit release”, “high initial cost” and “costly plant protection measures” were quite severe constraints found by the respondents which were placed at V, VI and VII positions by the kinnow growers farmers, respectively. This was followed by the constraint

Table 4 : Storage and market constraints faced by the respondents in kinnow cultivation

(n= 150)

Sr. No.	Storage and market constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Lack of suitable market for produce	65.87	V	57.07	VI	61.47	V
2.	Lack of marketing intelligence	80.00	III	69.07	IV	74.53	III
3.	Lack of remunerative market price	84.00	II	78.13	II	81.07	II
4.	Product’s price fluctuations	89.60	I	86.93	I	88.27	I
5.	Involvement of middlemen	89.60	I	86.93	I	88.27	I
6.	Lack of storage facilities in the area	74.40	IV	73.07	III	73.73	IV
7.	Lack of satisfactory transportation facilities	60.27	VI	61.60	V	60.93	VI

Table 5 : Finance and credit constraints faced by respondents in kinnow cultivation

(n= 150)

Sr. No.	Finance and credit constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Unawareness of credit facilities	37.87	XII	32.53	XI	35.20	XI
2.	Lack of credit facility in the area	56.53	XI	51.73	X	54.13	X
3.	Malpractices at different levels and delayed credit release	85.60	VI	78.13	V	81.87	V
4.	High repayment installments and interest rate	87.20	V	90.40	IV	88.80	IV
5.	Inadequate subsidy	75.20	IX	61.60	VIII	68.40	VIII
6.	High initial cost	84.00	VII	76.80	VI	80.40	VI
7.	Perishable nature of commodity results in economic losses	94.40	II	91.20	III	92.80	II
8.	Labour intensive affair	94.13	III	91.20	III	92.67	III
9.	High cost of transportation of fruits and plant materials to near market	60.80	X	56.27	IX	58.53	IX
10.	Costly plant protection measures	80.27	VIII	74.93	VII	77.60	VII
11.	High cost of diesel	99.47	I	99.47	I	99.47	I
12.	High cost of drip irrigation system	90.67	IV	94.93	II	92.80	II

“inadequate subsidy” and “high cost of transportation of fruits and plant materials to near market” were observed somewhat severe constraints by all respondents with 58.53 and 54.13 MPS, respectively. However, “unawareness of credit facilities was less severe constraint and ranked XI in rank hierarchy.

It could be concluded based on result that “high cost of diesel”, “high cost of drip irrigation system”, “perishable nature of commodity results in economic losses”, “labour intensive affair”, “high repayment installments and interest rate” and “malpractices at different levels and delayed credit release” were accorded most important constraints in adoption of improved technology. This might be due to the facts that Government and co-operative banks take more time in release of loan and loan allotment is complex procedure.

Processing and value addition constraints faced by respondents in kinnow cultivation:

Table 6 reveals that “lack of processing industries in the study area” was expressed most severe constraints by the small and big farmers, which were assigned, first rank in the hierarchy of processing and value addition constraints. Besides, “lack of grading and waxing units in the study area” and “un-awareness about kinnow by-products and their nutritional or medicinal importance” were somewhat severe constraints expressed by the respondents and assigned II and III ranks, respectively.

A further glance of the data incorporated in Table 6 reveal that all constraints were assigned similar ranks

by both categories of respondents. From the above discussion, it could be concluded that “lack of processing industries in the study area” was reported most severe constraints by the small and big farmers. This might be due to lack of unawareness of Government agencies, NGO’s and other institution for preservation facilities.

General constraints faced by the respondents in kinnow cultivation:

Table 7 reveals that “unfavourable weather conditions (frost, drought and erratic rainfall etc.)” was expressed as the most severe constraint by the respondents ranked I with 95.07 MPS. This was followed by the constraints “lack of motivational agencies in the area” was expressed as quite severe by the respondents’ assigned II rank with 82.67 MPS. Table also shows that constraints *i.e.* “threat from wild and stray animals”, “chance of theft” and “ridiculous behavior of other farmers” were somewhat severe constraints found by the respondents, which were placed at III, IV and V positions by the kinnow growers farmers, respectively. However, “reluctance for fruit growing” and “wrong notion about profitability of kinnow among general mass” was less severe constraints, which assigned ranked VI and VI, in rank hierarchy.

A critical look at table bring to focus that “threat from wild and stray animals” obtained fourth rank in case of small and third rank in case of big farmers similarly, “chance of theft” was accorded third rank by small and fourth by big farmers. Rest of items was accorded similar

Table 6 : Processing and value addition constraints faced by respondents in kinnow cultivation (n= 150)

Sr. No.	Processing and value addition constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Un-awareness about kinnow by-products and their nutritional or medicinal importance	72.27	III	65.33	III	68.80	III
2.	Lack of grading and waxing units in the study area	74.13	II	72.00	II	73.07	II
3.	Lack of processing industries in the study area	97.07	I	98.40	I	97.73	I

Table 7 : General constraints faced by the respondents in kinnow cultivation (n= 150)

Sr. No.	General constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Wrong notion about profitability of kinnow among general mass	30.40	VII	25.60	VII	28.00	VII
2.	Ridiculous behaviour of other farmers	53.60	V	50.93	V	52.27	V
3.	Reluctance for fruit growing	48.53	VI	36.53	VI	42.53	VI
4.	Lack of motivational agencies in the area	82.93	II	82.40	II	82.67	II
5.	Threat from wild and stray animals	65.33	IV	66.13	III	65.73	III
6.	Chance of theft	66.13	III	58.67	IV	62.40	IV
7.	Unfavourable weather conditions (frost, drought, erratic rainfall etc.)	96.27	I	93.87	I	95.07	I

ranks by small and big farmers. It may be concluded that “unfavourable weather conditions (frost, drought, erratic rainfall etc.)” was found as the most severe constraint by the respondents. Insurance of orchard was not popular and insurance policies were not farmers friendly to overcome the problems of unfavourable weather conditions in study area.

Overall constraints faced by the respondents in kinnow cultivation:

To get an overview of the overall constraints faced by the respondents in kinnow cultivation, the overall score for each major head was summed up and the results have been presented in Table 8.

Table 8 divulge that the respondents expressed processing and value addition constraints as quite severe impediments in the growth of kinnow cultivation and assigned ranks first with 79.87 MPS, in the problem hierarchy. This was followed by finance and credit constraints, management constraints and storage and market constraints. The mean per cent scores of these constraints were 76.89, 76.84 and 75.47 with assigned II, III and IV ranks by the respondents, respectively. Besides, market general constraints and technical constraints were also found somewhat severe constraints and were assigned rank V and VI with 61.24 and 60.96 MPS, respectively. A critical look at Table 8 bring to focus that finance and credit constraints were assigned second rank by small and third by big farmers with 78.85 and 74.93 MPS, respectively. Similarly, management

constraints were faced in third by small (MPS 78.16) and second by big farmers (75.51 MPS). The technical constraints were placed at fifth by small (MPS 64.40) and sixth by big farmers (57.51 MPS). Similarly, general constraints were assigned sixth by small (MPS 63.31) and fifth by big farmers (MPS 59.16). Processing and value addition constraints and storage and market constraints were assigned as similar rank by both categories of farmers.

Further analysis of table clearly shows that the calculated value of rank order correlation (r_s) was 0.99 found to be statistically significant at 1 per cent level of significance. This led to the conclusion that there was a significant correlation between the ranks assigned by both the categories of respondents about constraints aspects, though there was difference in magnitude of mean per cent scores of the respondents from both the sites.

Comparison of constraints of respondents in two categories regarding kinnow cultivation:

H_0 : There is no difference between small and big respondents with respect to constraints encountered by them.

H_1 : There is difference between small and big respondents with respect to constraints encountered by them.

To find out the significance of difference in constraints between two categories of respondents regarding kinnow cultivation, Z-test was applied. The calculated Z-value come to be 2.56, which is non

Sr. No.	Constraints	Small farmers		Big farmers		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Technical constraints	64.40	V	57.51	VI	60.96	VI
2.	Management constraints	78.16	III	75.51	II	76.84	III
3.	Storage and market constraints	77.68	IV	73.26	IV	75.47	IV
4.	Finance and credit constraints	78.85	II	74.93	III	76.89	II
5.	Processing and value addition constraints	81.16	I	78.58	I	79.87	I
6.	General constraints	63.31	VI	59.16	V	61.24	V
	Overall	73.94		69.83		71.88	

MPS= Mean per cent score
 ** indicates significance of value at P=0.01

Sr. No.	Category of respondents	Mean	S.D.	'Z' Value
1.	Big farmers	171.13	21.89	2.56 NS
2.	Small farmers	161.88	22.32	

NS = Non-significant

significant (Table 9).

It led to be acceptance of Null hypothesis (H_0) and rejection of alternative hypothesis (H_1). Thus, non-significant difference in constraints between two categories of respondents toward practices of adoption kinnow cultivation.

From the above discussion, it could be concluded that there was no significant difference between two categories. It means that the small and big farmers had perceived more or less similar constraints toward kinnow cultivation in the study area. Similar work related to the present investigation was also carried out by Gomase and Patil (1998); Kaul (1993); Neelam (2006); Poonia (2002) and Saini (2008).

Conclusion :

Based on the findings, it could be concluded the data incorporated revealed that 80 (53.33 %) respondents had faced medium level of constraints in adoption of recommended practices of kinnow cultivation. Besides, 21 (14.00 %) and 49 (32.67 %) respondents had faced high and low level of constraints in adoption of recommended practices of kinnow cultivation, respectively. This might be due to the fact the extent of knowledge of big farmers were found to be substantially higher than the small farmers about recommended practices of kinnow cultivation. Further, it was concluded that significant difference in knowledge between small and big farmers. Majority of farmers expressed moderate level of constraints regarding adoption of kinnow production technology. Hence, It is recommended that all possible constraints must be reduced as far as

possible. To reduce the general constraints the ridiculous behaviour of the farmers and wrong notion of the profitability of kinnow among general masses may be reduced by the massive campaign and strategic propaganda about kinnow cultivation.

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REFERENCES

Gomase, A.S. and Patil, R.L. (1998). Adoption behaviour of kagzi lime growers. *Thesis Abstract*, **24**: 201-202.

Kaul, G.L. (1993). Development of horticulture. *A boost in the 7th plan Indian horticulture*, April-June: 9-13.

Neelam, K. (2006). Knowledge and adoption of garlic production technology by the farmers of Begun tehsil in Chittorgarh district of Rajasthan. M.Sc. Agriculture Thesis, Maharana Pratap University of Agriculture and Technology, Udaipur, RAJASTHAN (INDIA).

Poonia, A. (2002). Technological gap among the kinnow (*Citrus deliciosa*) orchard owners in Sriganganagar district of Rajasthan. M.Sc. Agriculture Thesis, Maharana Pratap University of Agriculture and Technology, Udaipur, RAJASTHAN (INDIA).

Saini, H. (2008). Impact of jojoba cultivation through 'Ajorp' in Rajasthan – A process Evaluation. Ph.D. Thesis, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan Gomase, A.S. and Patil, R.L. 1998. Adoption behaviour of kagzi lime growers. *Thesis Abstract*, **24**: 201-202.

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