DOI: 10.15740/HAS/AU/10.1/61-64
Agriculture Update
Volume **10** | Issue 1 | February, 2015 | 61-64 |
Visit us : *www.researchjournal.co.in*
e ISSN-0976-6847

A CASE STUDY :

Adoption, correlates and constraints of Nagpur mandarin farming in Rajasthan

VINOD ANAVRAT

ARTICLE CHRONICLE :
Received :
10.07.2014;
Accepted :
25.01.2015

SUMMARY : Present study was carried out in Zalawar, Pratapgarh and Bhilwara, the Nagpur mandarin growing districts of Rajasthan. The total sample of 100 was derived from two taluka each of three districts using simple random and proportionate random sampling method. In all the three categories of farmers (small, medium and large), mandarin acreage showed positive relationship (r=0.642, 0.708 and 0.721, respectively) on adoption. It means the quantum of production commensurate with the acreage under mandarin cultivation. The major critical constraint in Nagpur mandarin production was singled out to be inadequate irrigation (65 %) followed by excessive fruit drop (26 %) and insect pest management (23 %).

How to cite this article : Anavrat, Vinod (2015). Adoption, correlates and constraints of Nagpur mandarin farming in Rajasthan. *Agric. Update*, **10**(1): 61-64.

KEY WORDS :
Nagpur mandarin, Adoption, Constraints, Technology transfer

Author for correspondence **:**
VINOD ANAVRAT
National Research Centre for Citrus, NAGPUR (M.S.) INDIA
Email: nikulsinh_m@yahoo.in

BACKGROUND AND OBJECTIVES

Popularly known as *Nagpur Santra*, Nagpur mandarin (*Citrus reticulata* Blanco) has been traditionally grown in central India since last three centuries. Its cultivation in Rajasthan started during 1940-41 first in Junakheda village of Asnawar (previously Patan) tehsil in Zalawar district. Being a cash crop, its area increased to 35,000 ha in Zalawar district alone and its cultivation spread to the adjoining Bhilwara and Pratapgarh districts. The present acreage under Nagpur mandarin in Bhilwara is 800 ha, out of which 600 ha is in Mandalgarh and 200 ha in Kothdi tehsil. In Pratapgarh district, Nagpur mandarin has an area of 350 ha, out of which 200 ha is in Arnod and 150 ha in *Chhoti-Sadri* tehsil. Being easy peeler, Nagpur mandarin is preferred as a table purpose fruit. The origin of citrus is said to be Indo-China region and mandarin ascribe its name to deep orange coloured robe of the Buddhist monks. The name *naringi or santra* acquired cultural identity and the monk's discourses became synonymous with Chinese tongue designated later as the official language of China, the Mandarin.

The Nagpur mandarin seedling bears fruiting at tenth year whereas the budlings start fruiting after 5th year, although commercial crop is obtained only after 7th year. The entire Nagpur mandarin industry of Rajasthan is on the budlings procured from the Warud taluka of Amrawati district in Maharashtra. There are three flowering seasons in citrus, but two flowerings are commercially preferred in Rajasthan. Those having assured sources of irrigation prefer *Ambia* flowering whereas those dependent on monsoon rains prefer *Mrig* flowering. For inducing June flowering, one-month water stress is given during April-May. After monsoon (*mrig*) rains, the stress is broken and the consequential flowering called as *Mrig* bahar. However, for December-January flowering, there is a natural stress due to low temperature in North-West and North-East India. The lack of such climate in the Nagpur mandarin growing districts of Rajasthan necessitates soil stress. This flowering derives the name *ambia* as

it coincides with mango blooming and takes nine month for maturity. *Ambia* bahar fruits mature in October-November, *Mrig* season fruits are available during February-March, whereas the *Hasta* season fruits mature during April-May. The marketing of Santra in Rajasthan is not a problem as the village *Jojwa* in Bhilwara district houses a big 'Mandi' (Santra market) from where, the fruits are packaged and sent to various markets across India. There in a tremendous scope for commercial Nagpur mandarin farming in Rajasthan but the orchards are nurtured mostly in a traditional manner due to inadequate technical know-how. It gave rise to the problems like premature yellowing, untimely aging of the orchard especially in light soils etc. Considering these aspects, the present study was undertaken to know the constraints inhibiting the technology transfer and its adoption by the growers.

RESOURCES AND METHODS

The study was conducted in Zalawar, Pratapgarh and Bhilwara districts of Rajasthan (Table A). In each districts, two taluka and two villages in a taluka predominantly covering large acreage under mandarin formed the total sample of 100.The respondents comprised Nagpur mandarin growers whose orchards were under fruiting. Based on the land holding of respondents, the sample was divided in 40:25:35 proportions and into three categories *viz.*, 1-10 acres, >10 but <=15 acres and more than 15 acres. The rationale for such categorization and proportionate delineation were based on earlier studies in central India conducted by the researcher himself. A structured interview schedule was administered to the respondents and proportionate random sampling method was used for collection of data. To examine constraints, the tabular method and percentage analysis were carried out besides the correlation analysis.

Table A : Acerage under mandarin cultivation

Sr. No.	District	Taluka	Villages
1.	Zalawar	Patan (now Asnawar)	Dityakedi
			Junakheda
		Raipur	Diwalkheda
			Pidawa
2.	Pratapgarh	Chhoti-Sadri	Baseda
			Nogavan
		Arnod	Jiwanpura
			Khediaryanagar
3.	Bhilwara	Mandalgarh	Khatwada
			Jojwa
		Kothri	Shopura
			Badliyas

OBSERVATIONS AND ANALYSIS

The technology adoption is not a single shot activity but a multidimensional decision making process that finally culminates into adoption. The various independent variables influence the process in its own inherent way. The perusal of data in Table 1 reveal that, total land holding (r = 0.365) had statistically significant and positive relationship in the first category of respondents. Its absence in other two categories connotes their inability to make the optimum utilization of the land. In second category, the citrus farming experience (r= 0.656) had positive and significant relationship. It manifests proper applicability of experiences in mandarin cultivation gained over a period of time. In all the three categories, mandarin acreage (r= 0.642, 0.708 and 0.721) showed positive relationship on adoption. It means the production commensurate with the acreage under mandarin cultivation. Due to scanty sources of irrigation in Rajasthan, *mrig* bahar is mostly preferred and occasionally *ambia* bahar but there was also a tendency in all the three categories (1.70, 1.64, and 1.82, respectively) to go for both the flowerings.

Table 2 delineates the extent of impact exercised by each one of the constraints. In case of first category, only personal factors had significant but negative correlation. It implies

Table 1: Correlation analysis between independent variables and adoption **(n=100)**

	Category of respondents					
	1 to 10 acres (n=40)		>10 acres but <=15 acres (n=25)		15 acres and above (n=35)	
Variables	Mean	Correlation co-efficient (r)	Mean	Correlation co-efficient (r)	Mean	Correlation co-efficient (r)
Education	3.87	0.066	3.56	0.184	4.85	0.114
Citrus farming experience	2.22	-0.143	2.68	0.656**	3.80	0.064
Irrigated land holding	5.00	0.128	8.04	0.340	14.25	0.329
Total land holding	8.25	0.365*	12.40	-0.193	20.82	0.127
Occupation	2.77	-0.139	2.60	0.177	2.80	0.272
Bahar	1.70	-0.064	1.64	0.105	1.82	-0.133
Mandarin acreage	3.02	0.642**	3.92	0.708**	6.94	0.721**

* and ** indicates significance of values at P=0.05 and P=0.01, respectively; Edn: Functional literacy=1, Primary=2, middle school=3, High school=4, College=5, Graduate=6, Post graduate=7; Citrus farming experience : 0-5 Yrs=1, 5-10 yrs=2, 10-15 yrs=3, 15-20 yrs=4, ancestral profession=5; Occupation: Farming only=3, Farming + Govt. service=2, Farming + business=1; Bahar : Ambia only =3, Mrig only =2, Mrig and Ambia=1

that, the growers achieved the desired or optimum production by overcoming the personal constraints. The rest other constraints showing insignificant relationship was due to the fact that, by living in a climatically hostile situation especially in terms of water availability, they have leant to overcome it by sheer gritty determination .

The critical constraints are those variables that directly affect the ultimate production and productivity. In a bearing orchard, farmer encounters various predictable as well as unforeseen constraints that demand due attention. If neglected or not attended at crucial stages, it adversely affects the quality and quantity of production. It is evident from the data in Table 3 that, inadequate irrigation was singled out to be the major factor followed by the excessive fruit drip and insect pest management received third rank. When the fruits are mature, theft by people and nuisance of wild animals was felt only for by 12 responders. *Phytophthora* induced diseases as a critical constraint received the last but one rank proceeded only by the erratic electric supply.

Table 4 indicates that, 48 per cent farmers approached two agencies for their credit requirements. However, 52 per cent farmers reflected their attitude of credit avoidance. Merely 12 per cent farmers seeking financial credit from nationalized banks can be attributed to the prosperity of 88 per cent farmers and the tendency of mostly the resource rich farmers preferring the high value crop like Nagpur

Table 2 : Constraints affecting the extent of adoption by Nagpur mandarin growers

Constraints	Correlation co-efficient (r)		
	1 to 10 acres	>10 acres but <=15 acres	15 acres and above
Technical	0.131	-0.327	0.043
Personal	-0.403*	-0.158	0.165
Socio-natural	0.005	0.102	0.162
Financial	-0.220	-0.124	0.209

Table 3 : Critical constraints of Nagpur mandarin production **(n = 100)***

Sr. No.	Constraints	Main	Secondary
1.	Due to inadequate water supply	65	…
2.	Excessive fruit drop	26	5
3.	Inability to undertake insect pest management measures	23	-
4.	Inability to apply required doses of fertilizers in time	11	19
5.	Theft/ wild animals	12	-
6.	Any other ……..……Erratic electric supply	8	-
7.	Due to Phytophthora induced diseases like gummosis etc.	….	9

*multiple responses

Table 4 : Ascertaining credit needs of Nagpur mandarin growers

Institutional/ non-institutional credit agencies	Persons approached	Cases approved	Lack of collateral security	Track record as defaulter
Nationalized banks	12	12	2	-
Co-operative / rural bank	36	36	-	1
Not required	52	-	-	-

Table 5 : Motivational factors of new technology adoption in Nagpur mandarin possible maximum score **(PMS = 400)**

Sr. No.	Motivational factors	Total score	Mean score	Rank order
1.	Maximum profit	374	93.5	I
2.	Assured yield /results	349	87.25	II
3.	Demonstration to test its efficacy on my field	338	84.5	III
4.	Minimum risk	325	81.25	IV
5.	Demonstration on other farmers field	311	77.75	V
6.	Theoretical skills and practical training	310	77.5	VI
7.	Adequate information about the pros and cons of technology	302	75.5	VII
8.	Financial help if it involves external inputs	286	71.5	VIII
9.	Crop insurance	273	68.25	IX
10.	Free inputs from the government	254	63.5	X

mandarin. The easy accessibility contributed towards 36 per cent farmers approaching co-operative banks for their credit needs. Quoting the NCAP study Gowda (2013) also opined to reduce the financial and skill barriers including access to credit, insurance and information.

Motivation is an inducement for a particular action. Table 5 showing the values derived from the 4 point continuum scale favored maximum profit and assured yield as first and second most important motivational factor. For achieving the same, they wanted the technology to be demonstrated on their fields followed by minimum risk that received third and fourth rank, respectively. The demonstration on other farmers and adequate theoretical skills and practical training hence received fifth and sixth ranking. The adequate information about pros and cons of the technology relegated backseat as seventh rank and financial help if the external inputs were involved received eighth rank. It indicated more self-reliance and less dependency on government support as crop insurance and free inputs from the government received nine and tenth ranks, respectively. Similar work related to the present investigation was also carried out by other workes namely Choudhary *et al*. (2011); Gomase and Patil (1998); Mohammad and Punjabi (1997); Phuse *et al*. (2007); Poonia (2002); Shrivastva (2003); Thakare *et al.* (1996) andYadav (2006).

Conclusion :

The study revealed that, inadequate irrigation water is a critical constraint in Nagpur mandarin cultivation. Although there are few techno savvy farmers, the major chunk is still confined to the traditional sources of information. Nagpur mandarin being cash crop and as it remains in the field for more than two decades; removing the adoption constraints would be an assurance for sustainable production. Hence, developing thirst in the farmers for the right technical information and creating accessibility to them would put the Nagpur mandarin industry in Rajasthan on sound footing.

REFERENCES

Choudhary, H., Bangarva, G.S. and Singh, N. (2011). Adoption of recommended kinnow production technology. *Rajasthan J. Extn. Edu.*, **19**:190-193.

Gomase, A.S. and Patil, R.L. (1998). Adoption behaviour of kagzi lime growers. *Thesis abstract,* **24**(1):201-202.

Gowda, M.V. Srinivasa (2013). Crisis in Indian agriculture-call for prompt action. In: K. Shetty and M.V. Gowda (Eds). *Innovations in agriculture Policy*. National Institute of Advanced Studies, Bangalore, 13pp.

Mohammad, A. and Punjabi, N.K. (1997). A study on knowledge and adoption of improved cultivation practices of mandarin among farmers in Jhalawar district of Rajasthan. M.Sc. (Ag.) Thesis, Rajasthan Agicultural University, Bikaner, Campus- Udaipur, RAJASTHAN (INDIA).

Phuse, A.P., Vitonde, A.K. and Thipse, C.D. (2007). Adoption of recommended mandarin orange production practices. *Indian Res. J. Extn. Edu.,* **7** (2&3): 98-100.

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

Shrivastva, A.K. and Singh, Shyam (2003). Establishing soil constraints-free mandarin orchards. *Indian Hort.*, **48** (1) : 10-13.

Thakare, P.V., Chikale, N.J. and Deshmukh, P.V. (1996). Factor affecting adoption of orange technology by growers. *Maharashtra J. Extn. Edu.*, **15**:176-178.

Yadav, B.C. (2006). A study on knowledge and adoption of improved production technology of mandarin by the farmers in Jhalarpatan panchayat samiti of Jhalawar district of Rajasthan. M.Sc. (Ag.) Thesis, S.K.N. College of Agriculture, Jobner, RAJASTHAN (INDIA).