



## Assessment of stakeholders' knowledge and attitude towards good agricultural practices for grapes

SUKANYA SOM<sup>1</sup>, R ROY BURMAN<sup>2</sup>, J P SHARMA<sup>3</sup>, V SANGEETHA<sup>4</sup>, V LENIN<sup>5</sup>, M A IQUEBAL<sup>6</sup> and N J THOKE<sup>7</sup>

ICAR- Indian Agricultural Research Institute, New Delhi 110 012

Received: 8 December 2015; Accepted: 11 August 2016

**Key words:** Attitude, Good Agricultural Practices, Grapes, Knowledge, Stakeholders

Food safety and quality have been gaining considerable importance at the national and international level. Furthermore, the estimates that food production needs to rise by 50% by the year 2030 to meet rising demand and the global trend of increase in food prices enhance importance of food safety. Consumers' willingness to pay for certified food in European market is also turning favourable day-by-day (Tranter *et al.* 2009). To set a common understanding about the quality standards, Food and Agriculture Organisation (FAO) came up with certain globally accepted control and compliance systems and standards for measures of food safety like Good Agricultural Practices (GAP). Appropriate promotion and adoption of GAP from farm to fork will help improve the safety and quality of food and agricultural products and would also promote optimum utilization of resources. Implementation of GAP is still at nascent stage in India. Though importance of GAP equally implies to all crops over all farms, it is inescapable in case of fresh and perishable produce. India with diverse soil and climate comprising several agro-ecological regions provides ample opportunity to grow a variety of horticulture crops. For the first time in 2013-14 production of horticultural crops surpassed the production of food grains in the country with a record of 277 million tonnes.

Grapes (*Vitis* sp.) cultivation is one of the most remunerative farming enterprises in India. India has the distinction of achieving the highest productivity in grapes in the world, with an average yield of 21.8 MT/ha. There is a phenomenal rise in export of grapes from India from 54 049.87 MT during 2005-06 to 107 257.86 MT in 2014-15

valuing ₹ 1 086.49 crores (Anonymous 2015). However, India still occupies 15<sup>th</sup> position in global grapes export market with only 1.76% of world share. In 2010, the European Union rejected Indian table grape consignments as traces of chlormequat chloride, a plant growth regulator were found for which the farmers of Maharashtra faced losses of about ₹ 300 crores. India's export to European and American market is still very less due to not complying with stringent quality standards (Gangaram 2014). The farms which have already adopted GAP have been reported to increase grape export revenue to a great extent by improving the confidence of importing countries in Indian produce. But the number of these farms is still very less and the major challenge in Indian context at present is creating and spreading awareness about GAP among the farmers, stakeholders and also the retailers at a large scale.

In order to design effective extension interventions to popularize and promote GAP among farmers and other stakeholders, it is important to measure their current level of knowledge and attitude towards GAP. Present paper aims to assess the knowledge level and attitude of the stakeholders towards GAP for grapes.

Maharashtra state was purposively chosen for the study being the largest producer of grapes (80%) as well as leading exporter of grapes (99%) in the country. Further two districts of Maharashtra, namely *Nashik* and *Sangli* which are at forefront in the state with regard to area under grapes and production were purposively selected. Simple Random Sampling technique was used for selection of seventy grapes growers from the two districts, with 35 from each. Seven KVK scientists and 15 officials from line departments from each district and twenty grapes exporters were selected purposively. Five scientists from National Research Centre for Grapes (NRCG) were selected randomly.

A standardized knowledge test was developed to assess the knowledge level of farmers and other stakeholders. The items with difficulty index values ranging from 30 to 80 and discrimination index values more than 0.20 were considered for final selection in the knowledge

<sup>1</sup>Student (e mail: sukuesh@gmail.com), <sup>2</sup>Senior Scientist (e mail: burman\_extn@hotmail.com), <sup>3</sup>Joint Director (Extension) (e mail: head\_exten@iari.res.in), <sup>4</sup>Scientist (e mail: sangeeq@gmail.com), <sup>5</sup>Senior Scientist (e mail: leninextn@gmail.com), Division of Agricultural Extension, ICAR-IARI, New Delhi, <sup>6</sup>Scientist (e mail: jiqubal@gmail.com), Division of Bioinformatics, ICAR-IASRI, New Delhi, <sup>7</sup>Subject Matter Specialist (Agricultural Extension) (e mail: jayindh@rediffmail.com), ICAR-KVK, YCMOU, Nashik.

Table 1 Comparative knowledge of farmers about GAP of grapes (n=70)

Items	GAP practicing farmers (n1=43)		Non-GAP practicing farmers (n2=27)	
	Mean	Standard Deviation	Mean	Standard Deviation
Overall knowledge	20.89	4.03	13.56	6.81
General understanding of GAP and its importance	23.75	2.79	18.21	4.98
Importance of GAP in grapes cultivation and export	19.67	4.02	12.25	6.21
GAP certification agencies and export criteria of grapes	18.85	4.87	11.31	6.98

test. After discarding the items by difficulty index and discrimination index, total 30 and 35 items were retained in the final knowledge test for farmers and other stakeholders, respectively. The reliability coefficient of the test was 0.75. Scores of '0' and '1' were given to incorrect and correct answers, respectively. Thus, total score obtained by all individual respondents on all the items for correct answers was the knowledge score.

The attitude scale developed by Shashi (1986) was modified for the present study and was administered to selected farmers and other stakeholders. Statements were formulated so as to assess the attitude of stakeholders specifically towards GAP and its importance, economic utility of grape cultivation, export of grapes and relevance of GAP for grape cultivation and grape export. The statements varied slightly for farmers and other stakeholders, considering the difference in their situations. There were 26 and 24 statements, respectively, for farmers and other stakeholders about their attitude towards GAP for grapes. The responses were recorded on a five point continuum, viz. strongly agree, agree, undecided, dis-agree and strongly dis-agree with the scores of 5, 4, 3, 2 and 1, respectively,

for each positive statement and their reverse order for negative statement.

Data were collected through personal interview method using a structured interview schedule. The collected data were analyzed using relevant statistical tools and techniques namely arithmetic mean, percentage, frequency distribution, standard deviation and Mann Whitney U test.

The knowledge test revealed wide range of variability among the respondents as obtained score of the farmers ranged from 4 to 27 (out of 30). Similarly, obtained score of other stakeholders the knowledge score ranged from 4 to 24 (out of 25). Most of farmers (more than 70%) were aware of concept of Maximum Residue Limit (MRL), features of important grapes varieties, use of bioregulators and chemicals. However, few correct responses (less than 50%) were found in case of concept of traceability, principles of GAP, requirements of GLOBALGAP, consequences of delay in harvesting and source of safe irrigation water. This implies that respondents had only partial knowledge on various aspects of food safety and GAP. They were mostly aware of the practical aspects while a lot of clarification was required in case of the conceptual facets.

Mean knowledge score for GAP practicing farmers was higher than that of non-GAP practicing farmers (Table 1). It was noticed that farmers had better knowledge of general understanding of GAP and its importance followed by importance of GAP in grapes cultivation and export, GAP certification agencies and export criteria of grapes in case of both the groups. Higher standard deviation for non-GAP practicing farmers (6.81) than GAP practicing farmers (4.03) implied greater variability in knowledge level among the non-GAP practicing farmers.

It was further observed that most of the GAP practicing farmers had medium to high level of knowledge while most of the non-GAP practicing farmers were found to have low to medium level of knowledge. In case of other stakeholders, it was observed that majority of exporters (45%) and scientists (52.63%) had high level of knowledge while most of the line department staff (43.33%) possessed medium level of knowledge (Table 2).

While analyzing the scores of attitude test it was found that statements like 'GAP has become boon for Indian grower-exporters', 'GAP enhances exportability of Indian

Table 2 Knowledge level of farmers and other stakeholders on GAP

Knowledge level	GAP practicing farmers (n1=43)	Non-GAP practicing farmers (n2=27)	Scientists (KVK and NRC) (n3=19)	Line Dept. Staff (n5=30)	Exporters (n4=20)
	f	f	f	f	f
Low	3 (6.98)	14 (51.8)	0 (0)	10 (33.34)	0 (0)
Medium	20 (46.51)	12 (44.4)	5 (26.32)	13 (43.33)	4 (20)
High	18 (41.86)	1 (3.8)	10 (52.63)	7 (23.33)	9 (45)
Very high	2 (4.65)	0 (0)	4 (21.05)	0 (0)	7 (35)
Total	43 (100)	27 (100)	5 (100)	30 (100)	20 (100)

\* Categorization of knowledge level done as mean $\pm$ 2sd, \*\* Values within parenthesis represent percentage

Table 3 Attitude of farmers towards GAP

Statements	Mean scores	
	GAP practicing farmers (n1=43)	GAP non-practicing farmers (n2=27)
I Don't feel I need to know about GAP	3.84	3.75
GAP has come as a boon for Indian grower-exporters	4.08	4.43
GAP is best way to increase profit for grapes farmers	3.99	4.63
GAP is inconvenient for small scale farmers	3.42	2.68
Profit is not adequate as compared to cost of adopting GAP	3.41	3.08
GAP is simple and easy to implement	3.81	4.02
GAP is not suitable in Indian context	3.57	3.64
GAP is too much time consuming	3.38	2.86
More grape growers should go for GAP to promote export	4.23	4.34
GAP enhances exportability of Indian grapes	4.26	4.08
Adequate facilities required for GAP are not available in India	3.95	3.47
Adopting GAP for grapes cultivation is risky	3.52	2.76
State Govt. should pay more priority to promote GAP	4.02	4.34
Adequate training facilities are available regarding GAP for grapes	3.49	3.46
Adopting GAP will raise standard of living of people in India	4.29	3.868
If I start GAP I shall be able to capture domestic and export market	4.38	4.03
I feel the importance of food safety & quality control	4.48	4.13
I think environment safety should be taken care of while cultivation	4.32	4.39
The procedure of GAP certification is too complex and time consuming	3.89	2.65
GAP will help to prevent food borne diseases and protect consumer health & hygiene	4.30	4.26
GAP can build reputation of Indian grapes in international market	4.30	4.15
There is no need at all to practice Gap for grapes	4.04	3.41
I practice (or plan to practice) GAP only because it is mandatory for grapes export	3.08	2.55
Criteria of GAP don't make any sense for me	4.52	3.98
I am not sure of the benefits of GAP for grapes	3.32	3.62
I am ready to go through the GAP criteria	4.84	4.23

grapes' and 'I feel importance of food safety' got high mean score of above four for both the GAP practicing and non-GAP practicing farmers. Low mean scores were found (below 3) for the statements like 'GAP is inconvenient for small scale farmers', 'GAP is too much time consuming' and 'Adopting GAP is risky' in case of non-GAP practicing farmers which implied unfavourable attitude towards above statements (Table 3). Comparatively higher mean score was found for scientists for most of the statements than the other stakeholders (Table 4).

While most of the GAP practicing farmers (62.8%) had favourable attitude towards GAP, most of the non-GAP practicing farmers (51.85%) were found to have neutral attitude. In both the groups very few were found to have overall unfavourable attitude towards GAP which showed that even those who did not practice GAP had favourable attitude towards it. Most of the scientists (68.42%) and exporters (65%) had favourable attitude towards GAP while most of the line department staff (46.67 %) had neutral and favourable attitude (Table 5).

In order to compare knowledge and attitude level of GAP practicing and non-GAP practicing farmers Mann Whitney U test was performed since the data were at ordinal level. The test result showed that there was significant difference in knowledge level between GAP practicing and non-GAP practicing farmers in case of both the districts under study. Thus, the null hypothesis of no significant difference was rejected. In case of attitude level, null hypothesis of no difference between two groups was accepted for both the districts (Table 6). Therefore it could be concluded that though there was significant difference in knowledge level between GAP practicing and non-GAP practicing farmers no noteworthy difference was found in case of their attitude towards GAP.

Meti (1998) in Tungabhadra Command Area of Karnataka where around 57% farmers were found to have favourable attitude towards improved practices and modern agriculture. The present study reinforces the fact that farmers are having favourable attitude towards improved practices like GAP on an average, strengthening the potential of promotion of such modern practices in future. However, there existed significant knowledge gap among the non-GAP practicing farmers. In a study on grape growers of Andhra Pradesh, Kumar (1989) reported that 38% of the grape growers had medium level of knowledge of grapes cultivation whereas only 35% had high level of knowledge and 27% had low level of knowledge. It could be inferred that the non-GAP practicing farmers would be interested to take up GAP if proper knowledge can be imparted since they possessed favourable attitude towards GAP. Another study by Ogunsumi *et al.* (2011) depicted that farmers who used technology persistently were found to have favourable attitude towards improved technology as well.

It can be concluded that on an average moderate level of knowledge and favourable attitude was noticed among farmers and all other stakeholders. This implied that extension interventions are required for bridging the

Table 4 Attitude of other stakeholders towards GAP

Items	Mean scores		
	Scientists (n3=19)	Line Dept. Staff(n4=30)	Exporter (n5=20)
I don't feel I need to know about GAP	4.66	2.91	2.89
GAP has come as a boon for Indian grower-exporters	4.47	4.06	4.63
GAP is best way to increase profit for grapes farmers	4.5	4.27	4.68
GAP is inconvenient for small scale farmers	2.9	2.64	4.58
Profit is not adequate as compared to cost of adopting GAP	4.47	4.3	4.37
GAP is simple & easy to implement	3.32	3.19	4.42
GAP is not suitable in Indian context	4.23	3.56	3.89
GAP is too much time consuming	2.95	3.08	3.47
More grape growers should go for GAP to promote export	4.43	4.19	4.26
GAP enhances exportability of Indian grapes	4.45	4.12	4.21
Adequate facilities required for GAP are not available in India	3.02	2.45	3.63
Adopting GAP for grapes cultivation is risky for farmers	4.2	3.14	3.37
State Govt should pay more priority to promote GAP	4.75	4.09	4.26
Adequate training facilities are available regarding GAP for grapes	3.41	3.32	3.789
Adopting GAP will raise standard of living of people in India	4.32	3.76	4.10
If farmers start GAP they will be able to capture domestic and export market	4.46	4.03	4.21
I feel the importance of food safety & quality control	4.59	4.22	4.31
The procedure of GAP certification is too complex & time consuming	3.18	2.80	4.26
GAP will help to prevent food borne diseases & protect consumer health & hygiene	4.04	4.04	4.37
GAP can build reputation of Indian grapes in international market	4.6	4.30	4.05
There is no need at all to practice Gap for grapes	4.34	3.56	4.26
I advise farmers to adopt GAP only because it is mandatory for grapes export	3.61	2.38	3.53
Criteria of GAP don't make any sense for me	4.37	3.51	2.47
I am ready to advice farmers to start GAP for grapes	4.75	4.18	3.95

Table 5 Classification of farmers and other stakeholders based on their attitude towards GAP of grapes

Attitude	GAP practicing farmers (n1=43)	Non-GAP practicing farmers (n2=27)	Scientists (n3=19)	Line Department Staff (n4=30)	Exporters (n5=20)
	f	f	f	f	f
Unfavourable	01 (2.33)	02 (7.41)	0 (0)	2 (6.66)	0 (0)
Neutral	06 (13.95)	14 (51.85)	3 (15.79)	14 (46.67)	4 (20)
Favourable	27 (62.8)	10 (37.04)	13 (68.42)	14 (46.67)	13 (65)
Highlyfavourable	09 (20.92)	01 (3.70)	3 (15.79)	0 (0)	3 (15)
Total	43 (100)	27 (100)	18 (100)	30 (100)	20 (100)

\* Classification of attitude level done as mean±2sd, \*\*Values within parenthesis represent percentage

knowledge gap of GAP among farmers as they already had certain level of preparedness to learn. Majority of the non-GAP practicing farmers were found to hold neutral attitude towards GAP which could be converted into favourable attitude by proper guidance. The high level of knowledge of the other stakeholders could also be effectively utilized to spread awareness among farmers and to convince them to adopt GAP.

## SUMMARY

The present study was undertaken in *Nashik* and *Sangli* districts of Maharashtra with a respondent set of 70 farmers along with 69 other stakeholders (19 scientists, 30 line department staff and 20 exporters). The knowledge test revealed that majority of the GAP practicing farmers possessed medium to high level of knowledge whereas

Table 6 Statistical significance of knowledge and attitude of farmers towards GAP of grapes

Category	Knowledge		Attitude	
	Value		Value	
	Nashik	Sangli	Nashik	Sangli
Mann-Whitney U	.004*	.001*	.031*	.028*
Z	-2.236	-2.236	-2.236	-2.236
Asymp. Sig. (2-tailed)	.025	.025	.025	.025

most of the non-GAP practicing farmers possessed low to medium level of knowledge. Mann-Whitney U test established significant difference in knowledge level between GAP practicing and non-GAP practicing farmers. Most of the GAP practicing and non-GAP practicing farmers had favourable (62.8%) attitude towards GAP. It was also found that most of the scientists and exporters had high level of knowledge (52.63% and 45% respectively) and favourable attitude towards GAP (68.42% and 65% respectively) while most of the line department staff had medium level of knowledge (43.33%) and neutral attitude (46.67%) towards GAP. The results of the study implied that extension interventions are required to enhance knowledge of non-GAP practicing farmers and to convert their neutral

attitude towards GAP into favourable attitude.

## REFERENCES

- Anonymous. 2015. APEDA. Ministry of Commerce and Industry, Government of India.
- FAO. 2003. Good Agricultural Practices. Available at <http://www.fao.org/prods/gap/>. (browsed on 06.01.2014).
- Gangaram S D. 2014. Comprehensive analysis of the quality assurance for the export of grapes for the year 2009 of Adani Agrifresh Limited. Export project on grapes -Scribd. Available at [www.scribd.com/doc/24799123](http://www.scribd.com/doc/24799123).
- Kumar A. 1989. 'A study on adoption behavior and information consultancy pattern of grape growers in Ranga Reddy district of Andhra Pradesh'. M Sc (Agri) thesis, University of Agricultural Sciences, Bengaluru, India.
- Meti S K. 1998. 'Technology reach, perception, knowledge, adoption and attitude towards agriculture technology by small and marginal farmers in Tungabhadra command area'. Ph D thesis, University of Agricultural Sciences, Dharwad.
- Ogunsumi and Lucia O. 2011. Attitude of farmers towards improved agricultural technologies in south-west Nigeria. *African Journal of Biotechnology* **10**(50): 10 108-5
- Shashi. 1986. 'A study on acceptance of mulberry sericulture by farm families in Udaipur region'. M Sc thesis, Sukhadua University, Udaipur.
- Tranter R B, Bennett R M, Costa L, Cowan C, Holt G C, Jones P J, Miele M, Sottomayor M and Vestergaard J. 2009. Consumers' willingness to pay for organic conversion-grade food: Evidence from five EU countries. *Food Policy* **34**: 287-94