

ADOPTION OF GOOD AGRICULTURAL PRACTICES IN MANGO CULTIVATION**P. B. Khodifad¹, M. V. Chaudhari² and K. L. Chadhary³**

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ABSTRACT

Good Agricultural Practices (GAP) is one of the quality standards within the framework of commercial agricultural production for long-term improvement and sustainability. Quality Council of India (QCI) launched Good Agricultural Practices for India – INDGAP defining certain minimum standards with a well-defined certification and accreditation mechanism to facilitate national and international farm produce trade. Despite the benefits of GAP in mango production, there is little information known by the farmers about it, even though they lack adoption of the GAP. The present study was conducted to explore the level of adoption of Good Agricultural Practices by the mango growers in the Navsari district of Gujarat. For the selection of respondents, a multistage random sampling technique was employed. Data were collected through personal interviews using the structured schedule. The study indicated that more than half (53.00 percent) of the mango growers had a low level of overall adoption of GAPs of mango cultivation, followed by 34.00 percent of respondents. Results of practices-wise adoption clearly revealed that waste and pollution management practices under all farm base component was adopted by 43.00 per cent of respondents, whereas irrigation practices of GAP, fertilizer application and site history and site management were adopted by 78.00, 74.00 and by 72.00 per cent of respondents, respectively.

Keywords: adoption, mango, good agricultural practices**INTRODUCTION**

Modern agriculture has effectively met the rising food demands of a growing population. However, issues tied to modern agricultural practices, such as the high costs of synthetic fertilizers and pesticides, stagnated yield growth in recent years, and increasing health and environmental risks, have pushed many farmers and scientists to explore ecologically sound, viable, and sustainable farming methods (Gupta & Mehta, 2019; Vinaya and Tapan, 2023). With global markets expanding, it is crucial to make farm products internationally competitive. Achieving this requires innovative farming practices that incorporate the principles of globally recognized Good Agricultural Practices (GAP) within commercial agriculture, ensuring long-term improvement and sustainability (Food and Agriculture Organization, 2003).

Although various systems and standards focus on grade criteria such as size, shape, color, and local preferences for adding value to fruits and vegetables through processing in India, aspects like maturity standards, pesticide residues, microbial loads, and other contaminants have not been thoroughly addressed (Qureshi & Sharma, 2020; Ranoliya et al., 2023; Padaliya and Jadav, 2023; Padaliya et al., 2023). Therefore, it is essential to establish minimum standards and

a robust certification and accreditation system to effectively implement GAP, facilitating both domestic and international trade in agricultural goods (Quality Council of India, 2019).

The Quality Council of India (QCI) launched the INDGAP initiative to promote Good Agricultural Practices in India. As defined by the FAO, GAP represents a “collection of principles to apply for on-farm production and post-production processes, ensuring safe and healthy food and non-food agricultural products while considering economic, social, and environmental sustainability” (FAO, 2003). GAP aims to deliver safe, high-quality food and non-food products in a manner that sustains yields, supports producers’ and processors’ livelihoods, and protects or enhances the environment. Adopting GAP for food safety and hygiene enables farmers to access new markets, secure reliable quality inputs, increase farm value, and improve farming skills for both domestic and global markets (Anonymous, 2004).

Considering the importance of adoption of GAP among mango growers for quality production, a study titled “Adoption of Good Agricultural Practices in Mango Cultivation” was conducted in the Navsari district of Gujarat.

OBJECTIVES

(1) To know the extent of adoption of good agricultural

practices in mango cultivation.

- (2) To ascertain the relationship between selected personal, socio-economic, communicational and psychological characteristics of the mango growers and their extent of adoption of GAPs in mango cultivation

METHODOLOGY

The study was undertaken in the South Gujarat region. A multistage sampling technique was followed for the selection of respondents. South Gujarat comprises seven districts, out of these seven districts; Navsari has the highest area under mango cultivation. Therefore, Navsari is selected for the present study. Navsari district has six blocks – Navsari, Gandevi, Vansda, Chikhli, Khergam, and Jalalpore. Information about the number of growers under mango in each block was collected and out of all these, Jalalpore and Navsari talukas were selected as both have the highest numbers of mango growers. Lists of villages of both blocks, in which mango crop was grown extensively were prepared separately and from these lists, Aat, Bhutsad, Dambher, Vedchha and Vesma villages of Jalalpore and Adada, Italwa, Khadsupa, Mogar and Wada villages from Navsari taluka were randomly selected for the study. From the selected villages, 10 mango growers as respondents were selected randomly. Thus, a total of 100 mango growers were selected as respondents for the study. An *Ex-post-facto* research design was used for the study.

For determining the extent of the adoption of good agricultural practices for mango crops a structured schedule had been developed considering all the suggestions of experts and research scholars. In the construction of the adoption scale, due care was taken that all the good agricultural practices of INDGP should be included in the scale that represented content validity. To get a higher degree of content validity the scale was sent to the group of experts which included extension scientists and horticulturists. The scale comprised seventy-five different good agricultural practices of mango crop like land preparation, seed and sowing, cultural practices, plant protection, harvesting, post-harvesting, storage and marketing. For the collection of information, this structured schedule was administered to the respondents. The response against each statement was recorded on a three-point continuum by assigning the score two for full adoption, one for partial adoption and zero for no adoption. Scores of each practice were calculated and the adoption quotient developed by used by Chattopadhyay and Pareek (1964) was used to measure the overall extent of adoption of GAP by the respondents as below:

Based on the extent of adoption of the respondents

were classified accordingly into low, medium, and high adoption.

For data collection, the interview schedule was prepared and respondents were interviewed personally at their home and field. The collected data were analyzed by using percentage, mean and standard deviation.

RESULTS AND DISCUSSION

Extent of adoption of good agricultural practices by the mango growers

Table-1: Distribution of the respondents based on their overall adoption (n=100)

Sr. No.	Category	f	%age
1	Low adoption (≤ 33 per cent score)	53	53.00
2	Medium adoption (> 33 to 66 per cent score)	34	34.00
3	High adoption (> 66 per cent score)	13	13.00

The findings presented in Table 1 clearly indicated that more than half (53.00 percent) of the mango growers had a low level of overall adoption of GAPs of mango cultivation, followed by 34.00 percent and 13.00 percent had medium and high levels of adoption, in that order. The average adoption score of the mango growers was 45 indicating a medium level of adoption of GAPs for mango. Thus, it can be concluded that the majority of the mango growers had low to medium levels of adoption of GAPs in mango cultivation.

The probable reason of poor adoption of GAPs of mango crops might be that concept of GAPs in agriculture is evolved recently. So that mango growers had poor awareness, perception and knowledge about GAPs of mango cultivation. This is because the extension functionaries especially grassroot level not equipped, informed and trained to train, guide and to provide technical services to the mango growers. Moreover, dissemination and promotion of IndGAP standards established by the Quality Control of India were not adequately done by the development agencies. This finding was in line with Bennur *et al.* (2015). However, Agnes, *et al.* (2013) differs to this finding.

Component-wise adoption of good agricultural practices by mango growers

In present study component wise extent of adoption was also calculated. The data in Table 2 indicated that under all farm base component, waste and pollution management

Table 2 : Component-wise adoption of good agricultural practices by the respondents (n = 100)

Sr. No.	Component	f	%age
A All farm base			
1	Site history	07	07.00
2	Worker health, safety and welfare	19	19.00
3	Waste and pollution management	43	43.00
4	Environment and conservation	00	0.00
B Crop base			
1	Traceability	00	0.00
2	Propagation material	52	52.00
3	Site history and site management	72	72.00
4	Soil management	57	57.00
5	Fertilizer application	74	74.00
6	Irrigation/fertigation	78	78.00
7	Integrated pest management	29	29.00
8	Plant protection product	42	42.00
9	Annual routine, verification and calibration of equipment	32	32.00

practices was adopted by 43.00 per cent of respondents followed by worker health, safety and welfare by 19.00 and site history by 7.00 per cent. None of the respondents had adopted environmental and conservation practices. In the case of crop base component, the majority of the respondents had adopted the irrigation practices of GAP (78.00 per cent), fertilizer application (74.00 per cent) and site history and site management (72.00) whereas, soil management, propagation material, plant protection product, annual routine, verification and calibration of equipment and integrated pest management practices of GAP were adopted by 57.00, 52.00, 42.00, 32.00 and 29.00 per cent of the respondents, respectively. No one had adopted the traceability practices of GAP. It can be summarized that the majority of the mango growers had adopted irrigation/fertigation, fertilizer application, site history and site management, soil management and propagation material practices of crop base component, whereas the majority of the mango growers had not adopted practices under all farm bases component. The result might be that mango growers might have enough knowledge about these practices and the impacts of overuse on health and the environment. Sennuga et al., 2020) also found similar findings.

Relationship between profiles of mango growers with their adoption of good agricultural practices of mango crop

Several past studies have proved that innovation adoption behavior of an individual farmer is influenced by personal, socio-economic, communicational, situational and

psychological characteristics of the innovation adopters. Considering this, an attempt was made to ascertain the relationship between selected personal, socio-economic, communicational and psychological characteristics of the mango growers and their extent of adoption of GAPs in mango cultivation by computing the correlation coefficient (r). The results obtained are presented in Table 3.

Table 3: Relationship between characteristics of the mango growers and their extent of adoption of good agricultural practices (GAPs)

(n=100)

Sr. No.	Profiles	Coefficient of correlation (r)
X ₁	Age	-0.106 ^{NS}
X ₂	Education	0.243 ^{**}
X ₃	Size of family	0.059 ^{NS}
X ₄	Social participation	0.0182 ^{NS}
X ₅	Size of land holding	0.290 ^{**}
X ₆	Annual income	0.292 ^{**}
X ₇	Mango yield index	0.013 ^{NS}
X ₈	Experience as mango grower	0.062 ^{NS}
X ₉	Scientific orientation	0.253 ^{**}
X ₁₀	Achievement motivation	0.199 [*]
X ₁₁	Risk orientation	0.067 ^{NS}
X ₁₂	Extension participation	0.274 ^{**}
X ₁₃	Mass media exposure	0.222 ^{**}

NS = Non-significant, * = Significant at 0.05 level, ** = Significant at 0.01 level

(1) Age and adoption of good agricultural practices

The data presented in Table 3 revealed that the calculated correlation coefficient (r) between age and adoption of good agricultural practices was -0.106, which was negative and non significant at 0.05 level of probability. The results of test of significance can be inferred that the adoption of good agricultural practices was not correlated with age of the respondents. This means that age of the respondents had not any influence on adoption of good agricultural practices. This is due to the reason that respondent who were elder had good experience of mango cultivation and adopted many good agricultural practices because of experience. On the other hand, even though respondents who were younger and had less experience of mango cultivation but had higher education and scientifically oriented toward modern agriculture adopted the good agricultural practices. Because of this, both old aged and younger respondents had more or less equal adoption level. Similar result also found by Pandit et al. (2017) and Baria et al. (2013).

(2) Education and adoption of good agricultural practices

The data presented in Table 3 revealed that the calculated correlation coefficient (r) was 0.243 at one per cent of significance. It shows positive but highly significant relationship between adoption of good agricultural practices of mango cultivation and education of respondents. The results of test of significance can be inferred that level of education of the respondents had greater influence on adoption of good agricultural practices. This is might be reason that the respondents who had higher education also had more mass media exposure and because of this they were having more scientific orientation towards modern science and new concept of agriculture. This is true that an individual who believe in something also apply it in their real life. This might be happened in this case of adoption of good agricultural practices, also. This finding was similar to finding of Baria *et al.* (2013).

(3) Size of family and adoption of good agricultural practices

Data depicted in Table 3 indicates that the calculated correlation coefficient ($r = 0.059$) was positive and non significant. It is concluded that there was non-significant relationship between family size of respondents and their adoption of good agricultural practices. It shows that family size had no influence on adoption of good agricultural practices. This might be that in study area majority of the household family had small to medium size of family and those who had large size family, their family member had occupation other than agriculture and they might had no any role in mango cultivation. Therefore, size of family did not influenced on adoption of good agricultural practices.

(4) Social participation and adoption of good agricultural practices

The correlation coefficient ($r=0.0182$) of social participation of the respondents and their adoption of good agricultural practices was non-significant. It can be concluded that social participation had not any influence on adoption of good agricultural practices This might be due to the fact that social organization to which respondents associated probably undertaken mostly none development activities and limited activities related to agricultural development.

(5) Size of land holding and adoption of good agricultural practices

The data in Table 3 were used to test the null hypothesis ($H_0:18$) that there was no relationship between land holding of the respondents and their adoption of good agricultural practices. The calculated correlation coefficient

value ($r = 0.290$) was positive and highly significant at 0.01 level of probability. It can be inferred that adoption of good agricultural practices was strongly correlated with size of land holding of the respondents. This might be due to the fact that the respondent who had more land, also had good financial condition and risk bearing capacity which led them to adopt new innovation of good agricultural practices. The similar finding was also reported by Baria *et al.* (2013) and Pandit *et al.* (2017).

(6) Annual income and adoption of good agricultural practices

The calculated correlation coefficient ($r = 0.292$) presented in Table 3 indicates that relationship between annual income of respondents and their adoption of good agricultural practices was positive and highly significant, which indicates that the adoption of good agricultural practices increased with increases in annual income of the respondents. The probable reason might be that respondents with higher annual income had good economic condition and because of that they had risk bearing capacity, management ability and achievement motivation. These traits might be helpful in adoption of good agricultural practices. This finding was in line with finding of Baria *et al.* (2013).

(7) Mango yield index and adoption of good agricultural practices

The data presented in Table 3 shows that calculated value of correlation coefficient ($r = 0.013$) was positive but non-significant at 0.05 level of probability. It indicated that the adoption of good agricultural practices by the respondents decreased with increase in their mango yield index. This might be the fact that respondents who had higher mango yield index satisfied with their present mango production. Moreover, they might felt fear of failure of good agricultural practices in increasing the mango production and income from the mango crop as well. This finding was similar to finding of Baria *et al.* (2013).

(8) Experience of mango cultivation and adoption of good agricultural practices

Calculated coefficient of correlation ($r = 0.062$) of experience of mango cultivation and adoption of good agricultural practices presented in Table 3 was non-significant at 0.05 level of probability. Hence it can be inferred that adoption of good agricultural practices by the respondents did not influenced by their experience of mango cultivation. This might be due to the fact that respondents who had more the experience of mango cultivation had adopted more good agricultural practices due to experience. On the other hand, the respondents who had less experience of mango cultivation

might younger in age and more educated had more knowledge about good agricultural practices and adoption of it as well.

(9) Scientific orientation and adoption of good agricultural practices

The data depicted in the Table 3 indicated that calculated correlation coefficient ($r = 0.253$) was positive and significant at 0.01 level of probability. This means that the adoption of good agricultural practices increased with increase in extent of scientific orientation. The reason behind this might be that the concept of good agricultural practices is entirely scientific one. Respondents who were oriented towards science would always have positive attitude towards innovations and because of this they adopted the good agricultural practices. This finding was in line with the finding of Baria *et al.* (2013).

(10) Achievement motivation and adoption of good agricultural practices

The statistics of computed correlation coefficient ($r = 0.199$) of achievement motivation and adoption of good agricultural practices was positive and significant at 0.05 level of probability. This indicates that achievement motivation of the respondents had effect on adoption of good agricultural practices. The probable reason for this might be that achievement motivation possessed by the respondents reinforced them to attain more difficult goals. Once respondents attained maximum production, they might be motivated to adopt good agricultural practices to get premium price of mango produced through good agricultural practice of mango crop. This finding was similar to finding of Baria *et al.* (2013).

(11) Risk orientation and adoption of good agricultural practices

The results presented in Table 3 indicated that the calculated correlation coefficient ($r = 0.067$) was negative and non-significant. It can be interpreted that change in risk orientation of the respondents did not cause any change in extent of adoption of good agricultural practices. The non-significant relationship between these two variable might be due to the reason that, generally risk oriented individuals have short vision. They are eager to get immediate benefit. On the other hand, good agricultural practices, by nature, are a long-term mandate to be attained desired goal. If adoption of good agricultural practices is to be raised, requires well thought courageous measures rather than unconscious and hurriedly decided actions.

(12) Extension participation and adoption of good agricultural practices

The data of Table 3 pertaining to correlation coefficient ($r = 0.274$) of adoption of good agricultural

practices of the respondents and their extension participation was positive and highly significant at 0.01 level of probability. Results revealed that extension participation of the respondents plays a significance impact on adoption of good agricultural practices. The probable reason of this might be the respondents who had higher extension contact, had higher mass media exposure, localite and cosmopolite contact with scientific community and were scientific orientation towards innovations. They might believe in innovation and same had adopted on their mango orchard. Similar also reported by Baria *et al.* (2013).

(13) Mass media exposure and adoption of good agricultural practices

The calculated correlation coefficient ($r = 0.222$) indicated that there was positive and highly significant at 0.01 level of probability. It was concluded that adoption of good agricultural practices was highly correlated with mass media exposure of the respondents. This might be due to the fact that the respondents who had more the mass media exposure had more knowledge of good agricultural practices and positive attitude towards this innovation. This encourages them to adopt the good agricultural practices. Similar also reported by Baria *et al.* (2013) and Pandit *et al.* (2017).

CONCLUSION

The findings of the study can be concluded adoption of good agricultural practices by the mango growers of the study area was very low. The probable reason might be that mango growers were not fully aware of the GAP. This necessitates the launching of widespread and intensive extension programs to create awareness among mango growers. Meantime it is also necessary to disseminate information about GAP. Also, result of investigation shows that size of land holding, annual income, education, scientific orientation, extension participation, mass media exposure and achievement motivation of the respondents influenced the adoption of GAPs of mango cultivation, whereas, age, education, size of family, social participation, mango yield index, experience of mango grower's and risk orientation had no influence on adoption of GAPs of mango cultivation. Therefore extension functionaries and stake holders of agricultural development should first focus their efforts of disseminating information, training and solving problems about good agricultural practices of mango cultivation on the mango growers who are educated, rich, big farmers, scientifically orientated, having good extension participation, mass media exposure and achievement motivation for enhancing its speedy and widespread adoption by the mango growers.

RECOMMENDATIONS

(1) Information and farm advisory services should be provided

to the mango growers about good agricultural practices of mango crop. Also, campaigns, advertisements, radio and television programmes, newspaper and magazine articles and similar communication methods should be adopted to create awareness about good agricultural practices of mango crop among the farmers.

- (2) Skill and knowledge-oriented training should be organized for both farmers and extension workers on good agricultural practices.
- (3) The certification system and process should be made so simple and easy that small farmers can apply and get GAP certificate for their farm produce.

CONFLICT OF INTEREST

There is no conflict of interest among researchers.

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