

## Knowledge and Adoption of Export Oriented Practices Followed by the Mango Growers

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### ABSTRACT

*The study analyses the selected characteristics of mango growers, knowledge and adoption levels of mango growers on export oriented mango cultivation practices. Large majority of the mango growers had knowledge on the practices like maturity indices used for judging of mango fruits, harvesting, desapping, recommended variety for export, transportation, pesticide residues, nutrient management, flowering and fruitfulness, plant material and planting, protocols for bearing orchard, sorting and grading, recommended spacing, and soil preparation. Less than three fourth of mango growers had knowledge on integrated disease management, integrated pest management, irrigation management. More than 90.00 per cent of the mango growers completely adopted the practices like recommended variety for export and protocols for bearing orchard. Whereas 80-90 per cent of mango growers completely adopted practices like harvesting, nutrient management, recommended spacing. Nearly half of the farmers adopted practices like desapping, integrated disease management, integrated pest management, transportation and irrigation management. Larger majority of the farmers had not adopted the practices namely, hot water treatment for mango, conditions for storage of produce and cleaning.*

**Key words :** Knowledge; Adoption; Mango growers.

Mango is one of the most important tropical fruits of the world and is called as “King of fruits”. It is also recognized as “National fruit of India”. India has a large range of varieties of fruit in its basket and accounts for 10 per cent of world's total fruit production and 14.4 per cent in vegetables. India is the leading producer of mango in the world. The total mango export from India during the year 2009-10 was 74460.61 MT with the value of Rs 20053.98 lakhs and during 2010-11 was 59,220.78 MT with the value of Rs 162.92 crores. In India, Andhra Pradesh is one of the major mango cultivating states with an area of 4.80 lakhs hectares and with a production of Rs 41.31 lakhs tonnes during 2009-10. In view of good demand for mangoes in the export sector and keeping the export behaviour of mango growers a study is planned with the following objective

1. To study the Knowledge and adoption of export oriented practices followed by the mango growers.

### METHODOLOGY

The study was conducted in Vissannapet, Reddigudem, Nuzvid and Agiripalli tahsils of the Krishna district of Andhra Pradesh. From each selected tahsil, 30 mango growers were selected by following simple random sampling technique (Lottery method). Thus a total of 120 mango growers from 48 villages of

four tahsils were selected for the study and were interviewed with the help of structured interview schedule personally.

### RESULTS AND DISCUSSION

#### Knowledge Pre harvest technologies

The data from the Table indicated that the majority of mango growers had knowledge on the practices like nutrient management (104.67 %) followed by recommended variety for export (96.67 %), protocols for bearing orchard (95.53 %), pesticide residues (94.99 %), flowering and fruitfulness (94.72 %), recommended spacing (93.33 %), plant material and planting (93.19 %), soil preparation (89.58 %), integrated pest management (76.49 %), irrigation management (75.83 %) and integrated disease management (63.89 %).

#### Post harvest technologies

Majority (98.96 %) mango growers had knowledge on harvesting, followed by, desapping (98.75 %), transportation (95.83 %), sorting and grading (87.22 %), packaging and packing material (79.02 %), maturity indices used for judging of mango fruits (26.25 %) and very few mango growers had knowledge on cleaning (6.67 %) , receipt of the produce at pack house (4.17 %), storage (4.16 %) and hot water treatment (2.50 %).

**Table 1. Distributions of mango growers according to their knowledge and adoption.**

**I. Pre harvest technologies**

Sr. No.	Item	Knowledge	Adoption		
		Yes	Complete	Partial	No
<b>A</b>	<b>Recommended variety for export</b>	116 (96.67)	112 (93.34)	4 (3.33)	4 (3.33)
<b>B</b>	<b>Soil preparation</b>				
1	Type of suitable soil (sandy clay loam soil)	119 (99.17)	115 (95.83)	4 (3.33)	1 (0.83)
2	Suitable PH (6.5 – 7.0)	118 (98.33)	64 (53.33)	38 (31.67)	18 (15.00)
3	Application of gypsum for alkali soil	97 (80.83)	4 (3.33)	14 (11.67)	102 (85.00)
4	Application of lime for acid soil	96 (80.00)	2 (1.67)	15 (12.50)	103 (85.83)
<b>C</b>	<b>Recommended Spacing</b>				
	(7.3-7.4-meters)	112 (93.33)	96 (80.00)	14 (11.67)	10 (8.33)
<b>D</b>	<b>Plant Material and Planting</b>				
1	Selection of plant material	119 (99.17)	115 (95.83)	3 (2.50)	2 (1.67)
2	Size of the pit (1x1x1 meters)	118 (98.33)	112 (93.34)	4 (3.33)	4 (3.33)
3	Pit sanitation (paclobutrozol)	119 (99.17)	111 (92.50)	3 (2.50)	6 (5.00)
4	Filling the pit with manures (20-25 kgs)	110 (91.67)	99 (82.50)	11 (9.17)	10 (8.33)
5	Filling the pit with fertilizers	90 (75.00)	60 (50.00)	26 (21.67)	34 (28.33)
6	Precautions while planting the graft	115 (95.83)	112 (93.34)	3 (2.50)	5 (4.16)
<b>E</b>	<b>Irrigation management</b>				
<b>1</b>	<b>Drip Method</b>				
i)	No. of emitters upto 5 years	77 (64.17)	56 (46.67)	21 (17.50)	43 (35.83)
ii)	Fertigation equipment	54 (45.00)	30 (25.00)	21 (17.50)	69 (57.50)
iii)	Irrigation schedule during fruiting period	55 (45.83)	54 (45.00)	1 (0.83)	65 (54.17)
<b>2</b>	<b>Modified Ring Method</b>				
i)	Size of the ring/basin (1-1.5 meters)	102 (85.00)	85 (70.83)	17 (14.17)	18 (15.00)
ii)	Irrigation schedule during fruiting period	99 (82.50)	91 (75.83)	8 (6.67)	21 (17.50)
iii)	When to stop irrigati on during fruiting (2-3 months)	97 (80.83)	90 (75.00)	7 (5.83)	23 (19.67)
<b>F.</b>	<b>Nutrient Management</b>				
1.	Application of organic manures (rotten farm yard manure)	110 (91.67)	90 (75.00)	18 (15.00)	12 (10.00)
2.	Application of inorganic fertilizers (N,P,K)	113 (94.17)	94 (78.33)	7 (5.83)	19 (15.84)
3.	Application of micronutrients ( Fe, Zn, Bo)	110 (91.67)	90 (75.00)	16 (13.37)	10 (8.33)
4.	Split application of NPK fertilizers	98 (81.67)	46 (38.33)	52 (43.33)	22 (18.33)
5.	Foliar application of nutrients	99 (82.50)	84 (70.00)	15 (12.50)	21(17.50)
<b>G.</b>	<b>Protocols for bearing orchard</b>				
1.	Timely harvests	115 (95.84)	112 (93.33)	3 (2.50)	5 (4.17)
2.	Resting of the trees	114 (95.00)	113 (94.17)	1 (0.83)	6 (5.00)
<b>3.</b>	<b>Pruning</b>				
a.	Pruning of unwanted Dr ied, diseased branches	120 (100.00)	111 (92.5)	9 (7.50)	0 (0.00)
b.	Pruning of fruited shoots after harvest	114 (95.00)	102 (85.00)	12 (10.00)	6 (5.00)
4.	Intercultural operations	112 (93.33)	110 (91.67)	2 (1.67)	8 (6.66)
<b>H</b>	<b>Flowering and fruitfulness</b>				
1.	Spraying of potassium nitrate for bud break	113 (94.17)	35 (29.17)	54 (45.00)	31 (25.83)
2.	Irrigation schedule after fruit set	112 (93.33)	111 (92.50)	1 (0.83)	8 (6.67)
3.	Spraying of growth hormones for fruit drop (2,4-D)	116 (96.67)	110 (91.67)	6 (5.00)	4 (3.33)

<b>I.</b>	<b>Integrated pest management</b>				
<b>1.</b>	<b>Mango hopper</b>				
a.	Identification and symptoms of damage	119 (99.17)	119 (99.17)	0 (0.00)	1 (0.83)
b.	Control measures	110 (91.66)	109 (90.83)	0 (0.00)	11 (9.16)
<b>2.</b>	<b>Thrips</b>				
a.	Identification and symptoms of damage	105 (87.5)	105 (87.5)	0 (0.00)	5 (4.17)
b.	Control measures	105 (87.5)	105 (87.5)	0 (0.00)	5 (4.17)
<b>3.</b>	<b>Leaf Webber</b>				
a.	Identification and symptoms of damage	62 (51.67)	12 (10.00)	50 (41.17)	55 (45.83)
b.	Control measures	60 (50.00)	12 (10.00)	48 (40.00)	60.0 (55.00)
<b>4.</b>	<b>Termites</b>				
a.	Identification and symptoms of damage	53 (44.17)	53 (44.17)	35 (29.17)	32 (26.66)
b.	Control measures	40 (33.33)	40 (33.33)	36 (30.00)	44 (36.67)
<b>5.</b>	<b>Fruit borer</b>				
a.	Identification and symptoms of damage	85 (70.83)	85 (70.83)	0 (0.00)	35 (29.17)
b.	Control measures	78 (65.00)	60 (50.00)	18 (15.00)	42 (35.00)
<b>J.</b>	<b>Integrated disease management</b>				
<b>1.</b>	<b>Powdery Mildew</b>				
a.	Identification and symptoms of damage	32 (26.67)	32 (26.67)	0 (0.00)	88 (73.33)
b.	Control measures	32 (26.67)	32 (26.67)	0 (0.00)	88 (73.33)
<b>2</b>	<b>Anthracnose</b>				
a.	Identification and symptoms of damage	102 (85.00)	102 (85.00)	0 (0.00)	18 (15.00)
b.	Control measures	95 (79.16)	90 (75.00)	5 (4.17)	25 (20.83)
<b>3.</b>	<b>Sooty mould</b>				
a.	Identification and symptoms of damage	96 (80.00)	96 (80.00)	0 (0.00)	24 (20.00)
b.	Control measures	94 (78.33)	88 (73.33)	6 (5.00)	26 (21.67)
<b>K</b>	<b>Pesticide Residues</b>				
1.	G.A.P. with respect to Pesticide use	113 (94.16)	73 (60.83)	16 (13.33)	31 (25.83)
2.	Phytosanitary certificate	115 (95.83)	44 (36.67)	11 (9.17)	65 (54.17)

## II. Post harvest technologies

Sl.No.	Item	Knowledge		Adoption	
		Yes	Complete	Partial	No
<b>A.</b>	<b>Maturity indices</b>				
1.	Visual method	120 (100.00)	105 (87.50)	15 (12.50)	0 (0.00)
2.	Physical method	2 (1.67)	0 (0.00)	0 (0.00)	120 (100.00)
3.	Chemical method	2 (1.67)	0 (0.00)	0 (0.00)	120 (100.00)
4.	Physiological method	2 (1.67)	0 (0.00)	0 (0.00)	120 (100.00)

<b>B.</b>	<b>Harvesting</b>				
1.	Time of Harvesting	120 (100.00)	110 (91.67)	10 (8.33)	0 (0.00)
2.	Use of Harvester	119 (99.17)	116 (96.67)	3 (2.5)	1 (0.83)
3.	Method of Harvesting	119 (99.17)	117 (97.50)	2 (1.67)	1 (0.83)
4.	Precooling	117 (97.5)	87 (72.5)	23 (19.17)	10 (8.33)
<b>C.</b>	<b>Desapping</b>				
1.	Method of desapping	118 (98.33)	20 (16.67)	88 (73.33)	12 (10.00)
2.	Duration of desapping	119 (99.17)	9 (7.50)	70 (58.33)	41 (34.17)
<b>D.</b>	<b>Receipt of the produce at pack house</b>				
1.	Recording the temperature	5 (4.17)	-	5 (4.16)	115 (95.84)
2.	Recording weight	5 (4.17)	-	5 (4.16)	115 (95.84)
3.	Writing growers code	5 (4.17)	-	5 (4.16)	115 (95.84)
<b>E.</b>	<b>Cleaning</b>				
1.	Recommended detergent for washing	8 (6.67)	-	8 (6.67)	112 (93.33)
2.	Recommended fungicide for washing	8 (6.67)	-	8 (6.67)	112 (93.33)
<b>F.</b>	<b>Hot water treatment</b>				
1.	Recommended temperature for hot water treatment	3 (2.50)	-	3 (2.50)	117 (97.50)
2.	Recommended fungicide for hot water treatment	3 (2.50)	-	3 (2.50)	117 (97.50)
<b>G.</b>	<b>Sorting and grading</b>				
1.	Sorting of the fruits	100 (83.33)	95 (79.17)	5 (4.17)	20 (16.67)
2.	Grading of the fruits	97 (80.83)	87 (72.5)	10 (8.37)	23 (19.17)
3.	Weighment of the fruits	117 (97.5)	111 (92.5)	6 (5.00)	3 (2.50)
<b>H.</b>	<b>Packaging and packing material</b>				
1.	Boxes used for packing	104 (86.67)	103 (85.83)	1 (0.83)	16 (13.33)
2.	Positioning of mangoes in packing box	97 (80.83)	93 (77.50)	4 (3.33)	23 (19.17)
3.	Precautions taken during packing	69	60	9	51
4.	Weight of the total box	102 (85.00)	100 (83.33)	2 (1.67)	18 (15.00)
5.	Placement of holes for proper ventilation	100 (83.33)	100 (83.33)	0 (0)	20 (16.67)
6.	Palletization	97 (80.83)	90 (75.00)	7 (5.83)	23 (19.17)
<b>I.</b>	<b>Conditions of storage</b>				
1.	Temperature (12-13 <sup>o</sup> c)	5 (4.16)	5 (4.16)	-	115 (95.84)
2.	Relative humidity (80-90 lbs)	5 (4.16)	5 (4.16)	-	115 (95.84)
<b>J.</b>	<b>Transportation</b>				
1.	Transport vans	119 (99.17)	116 (96.66)	2 (1.67)	2 (1.67)
2.	Reefer vans	111 (92.50)	20 (16.67)	37 (30.83)	63 (52.50)

Figures in parentheses indicate percentages

## Adoption

### Pre harvest technologies

The data further reveal that majority of mango growers adopted the practices like recommended variety for export (93.34 %) followed by protocols for bearing orchard (91.33 %), recommended spacing (80.00 per cent), flowering and fruitfulness (71.11 %), nutrient management (67.33 %), plant material and planting (62.25 %), integrated disease management (61.11 %), irrigation management (52.38 %), integrated pest management (59.16 %), pesticide residues (48.75 %) and soil preparation (38.54 %).

### Post harvest technologies

Majority of mango growers completely adopted harvesting (89.58 %) followed by maturity indices (87.50 %) for judging of mango fruits, sorting and grading (81.39 %), packaging and packing material (75.83 %), desapping (65.83 %) and transportation (56.65 %). The practices namely, Hot water treatment for mango was not adopted by (97.50 %) of the mango growers followed by receipt of the produce and conditions for storage of produce (95.84 %) each and cleaning (93.33 %).

## CONCLUSION

It is evident from the study that majority of mango growers had knowledge about the pre and post

harvest practices compared to adoption of pre and post harvest practices. Practices like nutrient management followed by recommended variety for export, protocols for bearing orchard, pesticide residues, flowering and fruitfulness, recommended spacing, plant material and planting, harvesting, desapping, transportation had above 90 per cent knowledge where as soil preparation, integrated pest management, irrigation management, sorting and grading and integrated disease management, packaging and packing material had 60-90 per cent knowledge. But adoption of recommended variety for export followed by protocols for bearing orchard had above 90 per cent, where as recommended harvesting, maturity indices, judging of mango fruits, sorting and grading spacing, packaging and packing material are above three fourth. Remaining practices are 50-75 per cent flowering and fruitfulness, nutrient management, plant material and planting, integrated disease management, irrigation management, integrated pest management,

The practices namely, Hot water treatment for mango was not adopted by majority of the mango growers followed by receipt of the produce and conditions for storage of produce and cleaning.

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## REFERENCES

1. Anonymous, 2004. Pre-harvest manual for export of mangoes, Agricultural Processed Food Products Export Development Authority, New Delhi.
2. APEDA 2010. Agricultural and Processed Food Products Export Development Authority.
3. Gorfad, P. S., Munshi M. A., Verma P. D. and Thakkar D. M., 2003. Study on knowledge and adaptation of recommended mango production technology. In abstract on *National seminar* in Mango Challenges in Management of Production, Post harvest, Processing and Marketing, organized by Gujarat Agricultural University, Junagadh on 14-15 June, 2003 : 127.
4. Kadam, J.R. 2006. A study on the adoption behaviour of commercial mango growers with reference to commercial mango production technology, *Ph. D. Thesis*, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli.
5. Kokate, K.D. 2010 Experiences of livelihood opportunities in horticulture, *Asian J. of Exten. Edu.*, **28** (1&2), 7-20.
6. Latha, K.R., 2009. An analytical study on the mango export farmers in Krishna district of Andhra Pradesh. *M. Sc., (Ag) Thesis*, Acharya N. G. Ranga Agricultural University, Hyderabad.
7. Leonardo R. D. and Quintos N., 2006. Adoption of mango production technologies in Pangasinan. [www.neda.gov.ph/com](http://www.neda.gov.ph/com).
8. Naik, S.N. 2006. A study on personal and socio-economic characteristics of marketing pattern of the mango growers. *M.Sc. (Agri.) Thesis*, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli.
9. Rogers, E. M. Shoe Maker, F. F. and 1971. Communication of innovations a cross cultural approach. *The Free Press*, New York.
10. Srinivasan, N. 2005. Development initiatives by NABARD for promotion of mango export. A report of *workshop* on "Mango export projects of Indian mangoes" held on 23rd February, 2005 at Mumbai
11. Sujatha, R. V., Eswaraprasad, Y. and Vaudev, 2003. Export scenario of mangoes from India, Department of Agricultural Economics, *Indian Journal of Agricultural Marketing*, Conference Special, **17** (3) : 142-150.