



## Operational Performance of Mango Pulp Industry in Tamilnadu – An Analysis

### KEYWORDS

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**ABSTRACT** *Mango is acknowledged as the king of fruits of tropical area by the world. Tamilnadu is one of the major mango growing states in India as the climate is conducive for mango cultivation. It is generally grown under rain-fed conditions in the state. While mangoes are popularly consumed directly as fruits, not all could be done so and preservation in the form of processing is widely recorded to. It is also an economic requirement in order that remunerative prices are realised by growers and the consumers get the benefit of spread over consumption. The main objective of this study is to analyse the operational performance of Mango Pulp Industry in Tamilnadu. It was found that stated that the mango pulp units are facing a number of bottlenecks and issues in the opinion of producers, like non availability of sufficient mangoes for processing which they have to compete with manufacturers in other states for procurement. The availability within Tamilnadu is felt as not sufficient. The very short period of availability makes it economically non-feasible an investment due to gross under utilisation of infrastructure. Very few units have taken up processing of other fruits to better utilise the capacity. This need to be seriously addressed and measures taken by the units. Direct export marketing need to be considered through a co-operative effort instead of depending heavily on merchant exporters.*

### Introduction

Mango (*Mangifera indica*) is acknowledged as the king of fruits of tropical area by the world. Tamilnadu is one of the major mango growing states in India as the climate is conducive for mango cultivation. The total world production of mango was 388.94 lakh tonnes in the year 2011. Production of mango in India was 151.88 lakh tonnes in an area of 23.12 lakh hectares under cultivation during 2011 which accounts for nearly 40% of world production.

While mangoes are popularly consumed directly as fruits, not all could be done so. Due to high moisture content, it has very poor retention quality and cannot withstand any adverse climatic conditions during storage. This results in considerable amount of mango fruit going waste every year. To overcome such losses the mango fruits have to be processed. Various types of mango products are produced from raw mango and fruits like pickles, squashes, jams, juices and pulp. Sterilised pulp is the prominent product which enables consumption to be spread over in non-season also and shelf life enhanced substantially.

### Production status of Mango in Tamilnadu

Mango is one of the trinity of fruits in Tamilnadu and is a seasonal one. It is generally grown under rain-fed conditions in the state. The area under crop is 0.11M.Ha. in the state. Mango is generally grown all over the state but the cultivated area and quantity produced is concentrated specifically in the districts of Krishnagiri, Dindigul, Theni, Vellore, Thiruvallur and Madurai. The total area under this crop in the above districts accounts for 70.33 percent of the total area.

The State of Andhra Pradesh and Uttar Pradesh are the major producers of mango and their production accounts for nearly 50% of the total production of India. Tamilnadu ranks 6<sup>th</sup> in total mango production in India.. Table 1 shows the mango production in Tamilnadu and its share in total production for 10 years from 2003-2004 to 2012-2013.

**Table 1**

**Production in Tamilnadu and share of total production in India during 2003-2013**

Year	Production (In M.T)		Percentage share to total production in India
	India	Tamilnadu	
2003-04	11490	615.4	5.64
2004-05	11829.7	539.4	4.97
2005-06	12663.1	537.8	4.25
2006-07	13734.0	580.8	4.23
2007-08	13997.0	753.6	5.46
2008-09	12750.0	821.41	6.44
2009-10	15026.7	636.30	4.23
2010-11	15188.0	823.74	5.24
2011-12	16196.4	889.64	5.49
2012-13	18002.4	885.60	5.00

**Source : APEDA Annual report-2013**

It is seen that during the year 2003-04 the production was 615.4 M.T. of mangoes with a share of 5.64 percent to the total production in India. But in the following three years the production had decreased and its share also decreased. In 2008-09 the production of mangoes was 821.41 M.T with a share of 6.44% which is the highest during the period. In the last three years production and share was around 900 M.T. and around 5.0%.

From Table 1, it is clear that the state Tamilnadu has contributed around five percent to the total production in India and this has been mostly steady with only minor fluctuations. Hence, it can be considered that the state Tamilnadu is playing an important if not a major role in mango production.

### Mango Pulp Industry in Tamilnadu

In India, Tamil Nadu is the second largest producer of

mango pulp next to the Andhra Pradesh. Krishnagiri district in the Tamil Nadu state is the prominent region which is involved in the mango cultivation and fruit processing activity. The area under mango cultivation in Krishnagiri district is about 45,000 hectares with a total production of 4,00,000 tons per annum. Only around 6,000 tons of mango fruit, mostly Alphonso and Totapuri varieties are utilised for mango pulp processing. There are 54 Mango fruit processing units in Tamilnadu. Out of the 54 units, 46 units are situated in Krishnagiri district. Around 90 percent of the processed pulp is exported and the balance only goes for consumption in the domestic market.

### Operational Performance

In a business context, operational efficiency can be defined as the ratio between input to run business operations and the output gained from such activities. The alignment of the various sections of the business unit within a company is to be ensured, in order to ensure that they are helping the company achieve a centralized set of goals. This is done by reviewing and optimizing the operations of the business units periodically. By improving operational efficiency, the output to input ratio improves.

Input would typically be money (cost and investment), people-headcount, time and effort. Output would typically be revenue generated, margin and cash, contributed by the market, customers and customer loyalty which is maintained by product differentiation, innovation, quality, speed and agility with which opportunities are utilised.

### Need for the Study

Being one among the major cash crop, mango cultivation is taken up widely due to its easiness and long term benefits of fruit bearing. Better product utilisation would ensure economic benefits to the cultivators and value addition would result in such benefits accruing to producers. On the other hand industry is beset with a number of problems which are typical to an agro based industry. Capacity utilisation, availability of materials for a restricted season only during the year, absence of domestic market for processed products and improper nurturing of foreign markets are some of the problems which have been well documented. To what extent such problems hamper the growth of the units and identifying the gaps would help in increasing efficient utilisation of resources. It is towards this end that a study of the operational efficiency of the mango pulp units in the state is taken up.

### Objective of the Study

The main objective of this study is to analyse the operational performance of Mango Pulp Industry in Tamilnadu specifically with reference to capacity utilisation, bottlenecks in operations and marketing.

### Methodology

This study is based on primary data. The study is confined to units in three prominent districts of Krishnagiri, Dharmapuri and Vellore having a large number of mango pulp industrial units and constitutes the sample districts. A well structured questionnaire was administered on the study units to elicit opinion on their perception of production and marketing problems.

The period of the study for collecting primary data was April to June, 2013. The period was purposively selected as it was the season for mango harvesting and processing.

The collected data were classified and tabulated in a sys-

tematic manner. Simple percentage analysis, mean and standard deviation are the tools used in the analysis in the present study. A five point scale was used to ascertain the opinion regarding the production and marketing aspects from the producers. Weighted score and rank analysis were used to analyse their opinion and their perception on problems faced.

### Selection of Study Units

There are 54 mango pulp units registered with the Fruits and Vegetables Processors Federation in Tamilnadu. All the units were approached with a well structured questionnaire. Information was not forth coming from all. On the basis of responses which were amenable for analysis, some of the units had to be eliminated and the number of units for study was confined to those which had provided the desired data, which numbered 25 units. Of these, 20 units out of 46 units are from Krishnagiri district, two units out of the four units in Dharmapuri district and three units out of four units from Vellore district, which responded were taken for further analysis. Hence, 25 units out of 54 being 47% of the universe were considered for analysis as is shown in Table 2.

**Table 2**  
**Selected Units**

Districts	Total No. of registered units	No. of units responded	Percentage
Krishnagiri	46	20	43%
Dharmapuri	4	2	50%
Vellore	4	3	75%
Total	54	25	47%

### Scope of the Study

The present study is confined to production and marketing performance of Mango pulp industry in Tamilnadu. Operational data as given by the processing units were considered for analysis as no other official records were available or maintained. For analysing the marketing performance the processors' opinion about the market and their related aspects were used. Market price and labour related aspects were not taken up for detailed analysis and were considered only to the extent it relates to the operational and production aspects. Cultivator's problems and opinion were considered out of scope of the study.

### Capacity Utilisation

Capacity utilisation is one of the important aspects determining the operational efficiency of any manufacturing unit. Being an agro based industry, processing is confined to availability of mangoes to the processing units during the harvest season only. In other words the processing is restricted to only the period of availability of mangoes for processing. On the basis of the data obtained from the processors, it was identified that all the processing units were operating their units for an average period of 60 days to 80 days in a year. Hence, the utilisation of installed capacity of machineries in mango processing units was found to be very low. It is a major problem faced by the pulp processing units especially since their capital is locked up and leads to interest burden.

Even though there are many reasons for under utilisation of the installed capacity by the mango pulp processing units in Tamilnadu, the major reason for under utilization of capacity by these units was short seasonal availability of mangoes. In Tamilnadu mango season commences in the

month of May and ends in July. The processing units can process the mangoes only for a period of 3 to 4 months and non availability of cold storage and also due to non-desirability to use such facility is another reason for the short processing period which is only up to the period of availability of mangoes in the market. Cold storage is one common way by which the useful life of fruits can be extended, at least for a limited period. Since cold storage is likely to alter the taste of the product and the material, it is not resorted to widely. More over the investments required for establishing a cold storage facility would be heavy, resulting in uneconomical and prohibitive cost. One another method to overcome this problem is to take up processing of other fruits which would be available for a longer period like grapes, guava, pomegranate, tamarind, tomato and so on. The factors causing under utilization of capacity in the opinion of the processing units in the study area was obtained. Table 3 shows the opinion of the owners of pulp processing units about the reasons for capacity under utilization.

**Table 3 Reasons for Under Utilization**

S.	Reason for under utilization	No of Respondent Units	Percentage
1	Availability of mangoes only during short period	9	24
2	Low demand in the market for other processed fruits	14	38
3	Operating cost of other fruit processing is high compared with mango	14	38
Total		37	100

Source : Primary Data

All the units unanimously stated that the capacity utilisation was much below optimum and it ranged between 40 and 60%. The reason for low capacity utilisation was obtained and they are given in Table 3. Some of the units gave more than one reasons and hence the total is more than the number of units' studied.

The prominent reason stated is that of the restricted availability of mangoes for processing. As stated earlier the season during which mangoes are available is highly restricted, which is about three months only during the year, unlike some other fruits which are available for extended period like 7 to 10 months.

Of course the machines can be utilised for processing other fruits, during the off-season. Only two units stated that they are taking up processing of other fruits. In fact one of the unit was able to utilise the machines in this manner for more than 7 months during a year. Other units studied gave further reasons for under utilisation as cost being prohibitively high by 14 units (38%) and an equal number of units stating that demand for other fruit products not being so encouraging.

If the units had to process other fruits, they will have to procure it from other places, mostly far away in the state and other states as well. This involves transportation costs and in order that this is economical, it should be procured in large quantities which the units feel is not feasible.

Other units also feel that marketing fruit products other than mangoes is difficult, may be because they are not fa-

miliar or also may be due to the fact that middlemen services not being developed this far. Executives of the units during personal queries confirmed this.

**Opinion of the Mango Fruit Processors about Production and Marketing of Mango Pulp**

Table 4 exhibits the opinion of the mango fruit processors, about production and marketing problems faced by the mango pulp manufacturing units like availability of mangoes, labour, power supply, packing material, market demand, export formalities, market price, buyers support and so on.

**Table 4 Opinion of the Mango Fruit Processors on Production and Marketing of Mango Pulp**

S No	Factors	Opinion of the Mango Fruit Processors					Weighted Score Percentage
		Highly Satisfied	Satisfied	NS/DS	Dissatisfied	Highly Dissatisfied	
1	Supply of Mangoes	5	18	1	1	Nil	81.6%
2	Price of Mangoes	7	18	Nil	Nil	Nil	85.6%
3	Utilisation of Machinery	2	23	Nil	Nil	Nil	81.6%
4	Power Supply	Nil	Nil	2	11	12	32%
5	Supply of Labour						
	i. Skilled	Nil	19	3	3	Nil	72.18%
	ii. Semi-skilled	Nil	16	7	2	Nil	71.2%
	iii. Un skilled	Nil	14	3	8	Nil	64.8%
6	Packing Material						
	i. Quantity	1	22	Nil	2	Nil	77.6%
	ii. Quality	1	19	Nil	5	Nil	72.8%
	iii. Price	Nil	17	Nil	8	Nil	67.2%
7	Demand for Pulp						
	i. Domestic	Nil	8	9	8	Nil	60%
	ii. International	3	17	4	1	Nil	77.6%
8	Market Share						
	i. Domestic	Nil	7	2	15	1	52%
	ii. International	3	21	1	Nil	Nil	81.6%
9	Export formalities	Nil	15	2	8	Nil	65.6%
10	Procedure to obtain Quality assurance certificate(ISO/HACCP)	2	19	1	3	Nil	76%
11	Prevailing Market Price						
	i. Domestic	Nil	8	10	7	Nil	60.8%
	ii. International	3	18	2	2	Nil	77.6%
12	Buyers Support						
	i. Domestic	Nil	1	9	14	1	48%
	ii. International	2	17	4	2	Nil	75.2%

Source : Primary Data

A five point scale has been used to collect the opinion from the unit owners on some basic production and marketing problems they are facing. A majority (92 per cent) of the units stated that they were satisfied or highly sat-

ified with the supply of mangoes and price of mangoes. Even though usage of processing machinery was stated as restricted to around 60 to 70 days of operations in a year, all the units expressed satisfaction with the utilization. 23 (92 per cent) of the units were satisfied and 2 units (8 per cent) of the units stated they were highly satisfied. The units probably were resigned to the fact that underutilization is unavoidable. Availability of uninterrupted power is an important requirement for operating the machines. The peak processing period of these units were May to July, but it is during the same period that heavy load shedding generally prevails. Hence, 48 per cent of the units had given the opinion that they were highly dissatisfied with the power supply from TNEB. 44 per cent of them expressed dissatisfaction and only 8 per cent of units stated that they were neither satisfied nor dissatisfied. When enquired about how they manage the power situation, all the units stated that they used power generating machinery so as to keep the operations going. Even though this involved capital investment and operating costs, this had to be resorted, to since there was no other alternative.

Majority of the units (76 per cent) expressed satisfaction with the supply of skilled labour. Previously skilled labour were required for fruit de-stoning but now only few skilled labour is enough to operate the machineries. Hence, their dependency on skilled labour had probably been reduced. Majority of the units were satisfied with the sufficient quantity, quality and price of the packing material.

Existence of good market is an important requirement for the production efforts to bear results. In other words, unless the market is efficient in the sense, the prices are correct, absorption of the products in time, regularity and stability in demand, etc., these goes to instill a sense of confidence in the minds of the producers to take up production activities. This aspect as studied by ascertaining the opinion of the production units.

Table 4 also shows that in the opinion of the producers, there exists a very good market demand for mango pulp internationally and majority of the units (78 per cent) were satisfied in this regard. On the other hand, the domestic market demand is comparatively low and the processors were not much satisfied with the domestic market. It was found that more than 90 per cent of the processed pulp is exported. The reasons for taking up exports might be many and this was further assessed. Good price for the products, lack of market support locally and hassle free formalities could act as a boost to export market. The processors fully rely on exporting their products because there is no market potentiality in domestic market for the mango pulp. Hence, majority of the processors has given the opinion that they were satisfied with the market share, market price and buyers support from international market. As far domestic market is concerned they are not very much satisfied relating to these aspects.

The weighted average score of the opinion was also calculated and is also given in table 4. Taking a score of 80 and above as indication of high satisfaction, 70-79 as satisfaction, 60-69 as indifference and below 59 as dissatisfaction, it was ascertained that the producers were highly satisfied with the supply of mangoes, prices of mangoes, utilisation of machinery and international market share. The very low weighted average score of 32 had been arrived for power supply. It is seen that the producers were highly dissatisfied with this factor. Buyers support and market share in domestic market were the other factors on which a high

level of dissatisfaction was expressed by the producers. With regard to the factors supply of labour, packing material in quantity and quality, demand for mango pulp in international market, market price and buyers support in international market the producers expressed satisfaction on these aspects.

Problems faced by processing units in production and marketing of Mango pulp

Based on discussion with producers on common perceptions as problems, a set of 10 factors were selected and the respondents were asked to rank them based on their perception of the severity of the factor.

**Table 5**  
**Factors affecting production and marketing of Mango Processing Units**

S.	Factors	Rank	Mean	Std. Deviation
1	Fluctuation in prices of Mangoes	1	2.28	1.67
2	Shortage of power supply	2	3.6	1.96
3	Low demand for processed items in domestic market	3	4.44	1.80
4	Non availability of skilled labour	4	4.84	3.21
5	Inadequate availability of quality raw material	5	5.16	2.19
6	Irregular payment system in export marketing	6	5.4	1.98
7	Lack of knowledge about export formalities	7	6.12	2.05
8	High cost of packing material	8	7.08	2.64
9	Inadequate storage facility	9	7.56	2.96
10	Maintenance of Machinery	10	8.52	1.96

**Source: Computed from Primary Data**

The ranks have been arranged on the basis of mean value of ranks assigned by the respondents. Majority of the producers ranked fluctuation in prices of mangoes as the prime factor that affects production of mango pulp. The mean for this factor is 2.28 and it has a low standard deviation value of 1.67. It indicates that majority of the respondents had given similar ranks for this factor with minimum deviation. In the opinion of the producers there is no uniformity in prices year on year and it fluctuates very widely which makes it difficult for them to plan their production because the pricing of the final product, namely the pulp cannot be finalised and contracts for exports cannot be completed in time.

Shortage of power supply has been assigned the second rank as affecting production and hence marketing as well. The mean value of these factors is 3.60 with standard deviation value of 1.96. Discussions with the producers revealed that optimum production need to be carried out during the season when mangoes are available and if power from TNEB is not forthcoming, alternate captive

power generation need to be necessarily taken up. Both owning and renting increases the operating costs prohibitively high, which have adverse impact on the profits of the units.

Absence of demand for processed mangoes has been ranked third with a very low standard deviation of 1.8, indicating that much of deviation does not exist in ranking this factor among the producers studied. It is a known fact that most of the consumers have not taken up to consumption of processed mangoes very widely except in urban packets. In fact, there is a marked preference for consumption of mangoes directly as fruit. Unless some promotional activities are taken up in a concerted manner the scope for developing a wide market for processed mangoes is very bleak. What this means is, lack of value addition, which in turn would mean less remunerative prices both to the cultivators and producers. Steps need to be taken up to avoid this avoidable loss

Non availability of skilled labour has been assigned the fourth rank. Its mean score value is 4.84. The standard deviation recorded the highest value of 3.21, which indicates that, difference of opinion among the respondents while assigning rank to this factor is comparatively higher and that all the respondents do not perceive the same way. For operating machines skilled labour is required which probably is not sufficiently available. Being seasonal in nature, obviously skilled operators may not take up a job for a short period. Employing them for a long period would again not be feasible economically. One way out would be to utilise machine capacity efficiently as mentioned earlier. Non availability of raw materials, high cost of packing materials and lack of storage facilities including cold storage have been cited as 5<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> rank in production factor categories the standard deviation is also high indicating absence of unanimity among the units. Maintenance of machinery is not that much an important factor getting the last rank among the factors stated. The standard deviation value of 1.96, shows that the producers do not have much of a deviation in ranking this factor among themselves.

Among the marketing factors, irregular payments from export houses and lack of knowledge of export formal-

ties has been ranked 6<sup>th</sup> and 7<sup>th</sup> implying an important, but not a major problem among the producers studied. The very low standard deviation shows the near consensus among them. None of the producers are exporting directly but only through merchant exporters. The quantum of exports was found not sufficient enough to take up exporting directly and they have to depend on merchant exporters and obviously some of the producers are not probably happy with their functioning.

### Conclusion

In conclusion it can be stated that the mango pulp units are facing a number of bottlenecks and issues in the opinion of producers, like non availability of sufficient mangoes for processing which they have to compete with manufacturers in other states for procurement. The availability within Tamilnadu is felt as not sufficient.

The very short period of availability makes it economically non-feasible an investment. Very few units have taken up processing of other fruits to better utilise the capacity. This need to be seriously addressed and measures taken up by the units to rectify the situation. Direct export marketing need to be considered through a co-operative effort instead of depending heavily on merchant exporters.

This is an industry with a very high potential and prospects for upliftment of this arid area. Lack of planning and following modern practices in procurement of materials affects the production activities directly and steps need to be taken up to bring efficiency in this regard for better utilisation of available infrastructure which would also pave the way for more business.

### REFERENCE

1. Dr.G.D.Banerjee 2011, "Economics of Mango cultivation" NABARD, Mumbai. | 2. R. Indhumathy, 2008, "An economic analysis of production, processing and marketing of mango in Madurai District" an unpublished thesis submitted to Tamilnadu Agricultural university, Coimbatore | 3. Records of Fruits and Vegetables Processors Federation, Krishnagiri | 4. <http://agriexchange.apeda.gov.in> | 5. [www.en.wikipedia.org](http://www.en.wikipedia.org) |