**Assess the financial viability of Sapota orchard in South Gujarat region.**


## Abstract

Agriculture continues to be the mainstay of our economy as it occupies the central place in rural life. The contribution of agriculture towards national income was about 22.1 per cent in 2003-04 besides 64 per cent of population still depending on it. Financial analysis revealed that of 12 per cent discount rate, the sapota enterprises has maximum NPV (Rs. 324309.00 and Rs. 340183.78), BCR (6.18 per cent and 6.49 per cent), PBP (6.4 and 6.1 years) and IRR (34 per cent and 37 per cent) in Valsad and Navsari district respectively. As sapota is a market oriented crop, on an average about 99 per cent of production was marketed, while negligible portion was utilized for other purposes. Majority of farmers about 65 per cent of sapota was disposed to co -operative society. The producer to co-operative society to wholesaler - cum-commission agent to retailer to consumer was the major marketing channel as more than 65 per cent of sapota moved through this route. The total marketing cost incurred by sapota growers amounted to Rs. 93.25 per quintal in which transportation cost ranked first Rs. 20.00, followed by, Loading and Unloading Charges cost Rs. 5.00, commission charge Rs. 58.25 Weighing Cost Rs. 2.50. The total expenses incurred by co -operative society, post harvest contractor, wholesaler -cum-commission agent and retailer were Rs. 121.00, Rs. 174.95, Rs. 133.90 and Rs. 130.35 per quintal of sapota, respectively. The producer's share in consumer's rupee was 21.72 per cent in sapota. Price spread 78. 23 per cent in sapota.




## 1. Introduction

### Status of sapota as commercial proposition :

Fruits are a part of Indian heritage and culture. Sapota (*Manilkara achras* (Mill.) Fosberg) is one of the important tropical fruits belonging to the family sapotaceae. It is called by many names VIZ., chikku, sapodilla plum, zapota, and nose-berry. It is said to be the native of southern parts of Mexico and it spread to other countries such as Philippines, Malaysia, United States, Sri Lanka, India and Caribbean Islands. At present, it is cultivated in all the tropical countries of the world .

In India sapota cultivation was taken up for the first time in Maharashtra in 1898 in Gholwad village. Thereafter, the cultivation of this fruit crop spread mainly in tropical parts of India. Now sapota occupies a significant position

among fruit crops in India. Sapota is mainly valued for its sweet and delicious; it has high sugar content (20per cent) in addition to vitamins A, B1, B2 & C. It is also rich in minerals such as phosphorous, calcium, potash, iron, magnesium and sodium. Sapota is also grown for its edible milky latex known as "gutta-percha", from which chewing gum is manufactured. Many processed products such as jam, jelly, candy, marmalade, toffee, fruit bar, flakes and wines are prepared from fruits. Of late, sapota cultivation has attracted many farmers of this region on account of its better adoption to diversified soil and climatic conditions. Though, there is more scope for cultivation of sapota; the expansion of area is limited due to the non-availability of genuine planting material .

Post harvest loss of fruits is one of the most pressing problems in the tropical countries like India. It is estimated that the total loss of fruits in India for want of adequate post harvest care, transportation and storage facilities was around 20 to 30 per cent of the fruit production. In addition to the physical losses in quantity severe losses also occur in the essential nutrients, vitamins & minerals. It has been observed that when there is bumper production of sapota the fruit goes waste for non-availability of suitable preservation facilities. Processing of fruits can prevent the losses , thereby add value addition. Further, during glut periods, surplus as well as scarred fruits, which consist of high sugar and better edible pulp, need to be utilized for processing into value added products based on the available technology such as ready to serve sapota juice, wine, dehydrated products, powder etc. as many of these products are new to consumers. Sincere efforts are needed to introduce them in the market and to evaluate the consumer acceptance and economic viability of such products .

As a part of new agricultural strategy towards diversification, horticulture has given a big boost both at central and state levels. Gujarat has a wide variety of soil, rainfall pattern, temperature regimes and irrigation availability. This diverse agro climatic situation across the state holds promise for development of the horticulture sector in a big way. The horticultural production has registered more than 10 per cent growth in the state during the last decade.

Gujarat is the third largest sapota producing state in the country accounts for 20.2 per cent of the total production of sapota. The state produces about 0.29 m MT of sapota from an area of 0.03 m hectare having productivity of 10 MT/ha. Major sapota producing belts in the state are Valsad, Navsari, Kheda and Bhavnagar.

Major cultivation of sapota in the state are Kalipati, Bhuripati, Pillipatti, Dhola Diwani, Jhumakhia and Cricket ball. 0.23 lakh MT of sapota have been traded in organized markets with average price of Rs. 18.86/kg.

In South Gujarat 60 per cent area under sapota cultivation only in Navsari district. The area under sapota cultivation is 6000 ha and 3000 ha in Navsari and Valsad districts respectively in year 2012 as can u seen from table: 1 The districts wise acreage is shown in table: 1 The rapid increase in sapota cultivation is observed nearby the towns and suburbs of the cities in South Gujarat, which is due to good co-operative network and facility for perennial irrigation in the region .

In Gujarat, southern part, the fruit is so much popular that people feel it to be native of this region, in spite of the fact that it was introduced from America. Every year, more than one lakh grafts are being planted in Gujarat. However, Kalipatti cultivar is the main choice of the cultivators and therefore, more than 70 per cent of area under sapota in Gujarat is of this cultivar which amounts to monoculture.

Sapota is highly suited to humid Tropical climate. It is an evergreen tree . It produces fleshy, generally globes, conical or oval edible fruits, having one or many seeds. They are 5 to 9 cm in diameter and weight 75 to 200 gm and have a rusty brown, scurfy skin and a yellowish brown or reddish pulp is soft, crumbling with a sandy granular texture.

The sapota tree can thrive under a diversity of soil and climatic conditions up to an altitude of 1000 m above sea level. The tree is more prolific if cultivated at altitudes less than 400 m above sea level. It can be grown on any soil including sandy loam, lateritic, calcareous and heavy black soils. It prefers temperature above $28^0$ c and if planted in colder areas, the height and production is found to get reduced .



## 2. Review of literature

**To assess the financial viability of sapota orchard in South Gujarat region.**

Sharma and Singh (1990) examined tips of sapota growing for Tripura state. They stated that sapota is an early bearing and highly remunerative crop supplying fruits throughout the year which are delicious nutritive and medicinal valued fruits of several uses. For every rupee invested on nursery, fruit seed and papain industry of sapota got a profit of Rs. 2.26 from fruit production (Rs. 780.95 per hectare) Rs. 3.26 from seed (Rs. 103095 per hectare) and Rs. 2.35 from papain can be

fetched out from hermaphrodite variety like Coorg honeydew of this crop cultivated for these purposes. As sapota plant supplies the fruit at any time during the year, unripe fruits are therefore cooked as vegetables throughout the year owing to the paucity of other greens in this isolated region of the country. Unripe fruits of" sapota are sold @ Rs. 3 to 5 per kg while ripened ones @ Rs. 10 to 15 per fruit. Commercial cultivation of sapota on large scale in state may attract the attention of fruit preservation factories preserving at present only pineapple and also commands a bright potential of exporting unripe fruit.

Singh and Singh (1991) stated that the sapota growers can get maximum income by growing sapota crop for seedlings, seed production and fruit as well as for papain. An experimental trial on sapota production carried at Kanpur farm indicated that for sapota seedlings the net profit will be Rs. 1.26 per rupee invested. While if it is taken for sapota seed, fruit and papain production, farmers will earn Rs. 2.00, Rs. 1.66 and Rs. 1.35 as gross returns per rupee invested .

Rangaswami *et al.* (1992) examined the information about a new tray for papain extraction developed by Tamil Nadu Agricultural University , Coimbatore, which is convenient to fix and remove from sapota tree. The cost of tray being terrifically reduced from Rs. 250 to Rs. 20 only will augment market for papain to U.K, U.S.A, Japan and Germany. The in-house consumption by the food, drug, tanning, textile, brewing and cosmetic industries fluctuates between 10 to 20 tonnes a year. He also estimated that one hectare sapota over a period of three years can give 480-600 kg of dried papain. The taste and edible value of the fruit remain unaltered after papain extraction. Pockets of plains free from extremes of summer and winter may be brought under sapota cultivation for higher returns.

Mishra (1994) worked on the various practices in sapota cultivation and recommended scientific method to be adopted by farmers for sapota cultivation. They estimated as Rs. 50000 cost per hectare sapota cultivation while yield to be 600 quintals resulting in gross income of Rs. 150000 and leaving as Rs. 100000 as net profit.

Bodke (1995) carried out an experiment growing of Disco sapota on his farm in Solapur district of Maharashtra. It was observed that cost of cultivation for sapota for one acre was Rs. 20000 and the production per acre was 68 tonnes which result in income of Rs. 90000 Net profit of Rs. 70000 per acre had been received from sapota cultivation in study area.

Gadre (1997) studied per hectare input utilization and cost of cultivating sapota and intercrops and input output ratio. The per hectare cost of cultivation of sapota was Rs. 16018.10 and 31902.20 for papain extraction and intercropping whereas the per hectare gross income was Rs 81302.62 of which Rs. 55208.17 was from papain and Rs. 26094.45 from sapota fruits and Rs. 14835.18 from intercropping. He observed that input output ratio was 1:4.76 indicating thereby cultivation of sapota for papain as highly profitable .

Mali *et al*. (2001) studied the economics of production and marketing of banana in Jalgaon district of western Maharashtra found that the per hectare cost of cultivation of banana worked out to Rs. 133477.36 The gross returns per hectare of banana come to Rs. 214867.24 and net returns of Rs. 6761.87 were obtained Sundarevarodarayan Ramanathan (2003) estimated that the establishment cost of cashew plantation for the first year was Rs. 7690, Rs. 8664 and Rs. 9491 for marginal, small and large farmers, respectively. The maintenance cost of cashew plantations in the case of marginal farms were Rs. 4059, Rs.4410, Rs. 4910, Rs. 5385, Rs. 841, Rs. 6332, Rs. 6771 and Rs. 6990 for second, third, fourth, fifth, sixth, seventh, eighth and ninth year, respectively and in case of large farms the maintenance cost were Rs. 5040, Rs. 5250, Rs. 5764, Rs. 6145, Rs. 6558, Rs. 7021, Rs 7438 and Rs. 774 for second, third, fourth, fifth, sixth, seventh, eighth and ninth year, respectively. The output ratio per hectare was 1.43, 1.55 and 1.83 for marginal, small and large farms, respectively.

Florence Wambugu (2004) in the study compared tissue culture and conventional banana. The study revealed that the average establishment cost per farm (0.2 hectares) was US$200 in conventional banana and US$ 600 in tissue culture banana. Average annual net profit per farm was US$ 600 in conventional banana and US$ 1800 in tissue culture banana. This meant that there were more benefits of adopting the tissue culture technology compared with staying with the conventional bananas .

Alagumani (2005) in the study on economic analysis of tissue cultured banana and sucker-propagated banana in Theni district of Tamil Nadu revealed that per hectare cost was high in case of tissue culture banana (Rs. 141040) compared to sucker propagated banana (Rs. 108294). The net income was also high in case of tissue culture banana (Rs. 112262) compared to sucker propagated banana (Rs. 78855) clearly indicating the higher profitability of tissue culture banana production compared

to sucker propagated banana production .

Gawankar *et al.* (2005) had studied on investment on rainfed aonla cultivation in Maharashtra during the year 2003. They observed that the annual cost for aonla crop was Rs. 13500, Rs. 26966 and Rs. 28316 as Cost A, Cost B and Cost C. The annual total cost of rainfed aonla cultivation included the cost of fixed items like irrigation, working cost like wages, fertilizers, insecticides, supervision, rents and maintenance, etc. was found to be Rs. 28316 per hectare. Gross returns and net return obtained Rs. 76000 and Rs. 47684 per hectare, respectively.

Silva *et al.* (2005) carried out a study in Brazil to survey the potential of banana and apple cultivation in the region as well as to determine the technical and economic indicators of two production systems, both using micro propagated and conventional seedlings. The results of economic analysis turned out to be quite satisfactory in this region for both production systems however the net income obtained from the utilization of micropropagated seedlings was 34 per cent higher than the one obtained from the conventional system .

Umesh *et al.* (2005) observed that the establishment cost of cashewnut was Rs. 15631 per hectare in all the varieties studied during the first three years. The maintenance cost per hectare from fourth year onwards varied from Rs. 5881 to Rs. 8254 in Chintamani-1, Rs. 5640 to Rs. 8254 in Ullal-4, Rs. 5812 to Rs. 7882 in Ullal- 3 and Rs. 5821 to 7229 in ullal-1. The net returns of cashew orchard per hectare being fairly high were in the order of Rs. 61314, Rs. 62425, Rs. 49672 and Rs. 34231 in Chintamani-1 Ullal-4, Ullal-3 and Ullal-1.

Rane and Bagade (2006) studied economics of production and marketing of banana in Sindhudurg district of Maharashtra. The study revealed that the per hectare cost at cost C in Dadamarg and Sawantawadi tahsil were Rs. 1.52 lakhs and Rs. 1.53 lakh respectively. In Dodamarg tahsils banana was grown as a sole crop where per hectare cost of cultivation was Rs. 1.28 lakh and in Sawantaadi tahsil the per hectare cost was Rs. 1.15 lakh benefit cost ratio in Dadamarg tahsil and Sawantwadi tahsil were 2.20 and 2.33 respectively. The average benefit cost ratio of banana cultivation was 227 .

Gondalia and Patel (2007) studied on economic evaluation of investment on aonla in Gujarat in the year of 2003-04. The result showed that per hectare initial investment cost was Rs. 425430. The major items of investment were the land and it was about 90 per cent followed by electric motor and oil engine, tractor and tractor

drawn implement, farm house, fencing and pipe line, planting material. The result showed that due to human labour, bullock labour and tractor charges, material cost, rent of land, interest on fixed capital, interest on working capital and depreciation charges incurred and establishment cost up to first bearing stage of orchard was Rs. 34033 per hectare. The annual cost of cultivation (amortized and maintenance cost) was Rs. 46272 per hectare. Farmer got the overall gross return and net return of Rs. 110560 and Rs. 64288 per hectare per year, respectively.

## 3. Methodology and experimental result

**To assess the financial viability of sapota orchard in South Gujarat region.**

To evaluate the feasibility of investment in sapota enterprise, the criteria such as Net Present Value/worth, Benefit-Cost Ratio, Pay Back Period and Internal Rate of Return were employed and the results are presented in Table 1 .

**Table 1: Financial feasibility of investment in sapota orchard**

| Sr. No. | Particulars | Valsad | Navsari |
|---|---|---|---|
| | | 12% | 12% |
| 1 | NPV | 324309.00 | 340183.78 |
| 2 | B:C | 6.18 | 6.49 |
| 3 | IRR | 34% | 37% |
| 4 | PBP | 6.4 | 6.1 |

### 4.3.1 Net present value (NPV)

Net present worth of an investment is the difference between the present value of series of inflows (returns) and outflows (costs) over the economic life period of the sapota enterprises. Net Present Worth for the orchards in Valsad district was Rs. 324309.00 per ha. at 12 per cent discount rate Where as in Navsari district it was Rs. 340183.78 per ha. at 12 per cent discount rate.

### 4.3.2 Benefit cost ratio (BCR)

This criterion indicates the rate of return per rupee invested in sapota enterprise. The benefit-cost ratio at 12 per cent discount rate was 6.18 for the orchards in Valsad district and it was 6.49 in Navsari district.

### 4.3.3 Pay back period (PBP)

It is the period required to recover the initial investment incurred in establishing the orchard. In the present study the payback period was about 6.4 years for the orchards in Valsad district and in Navsari district it was 6.1 years. This clearly indicated that it would take 6.4 years in Valsad and 6.1 years to recover the entire investment. However, this criterion neglects the net returns realized by the farmers after 7 years, which may be more significant in

the case of long-term enterprise like sapota .

### 4.3.4 Internal rate of return (IRR)

This criterion measures the rate of return that can be realized by investment of the returns in sapota orchard. Hence, the IRR indicates an important basis of investment and better than other criteria of evaluation, which do not consider the reinvestment opportunities. The value of IRR generally depends on the magnitude of returns realized in each year over the economic life period and more particularly in the initial years of sapota enterprise .

It could be noted here that, the IRR was found to be 34 per cent for the orchards in Valsad district and 37 per cent in Navsari district, indicating that the investment in sapota orchard was highly profitable, economically feasible and financially viable .

## 5. DISCUSSION

**To assess the financial viability of sapota orchard in south Gujarat region.**

To evaluate the feasibility of investment in sapota enterprise, the evaluation criteria such as Net Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR) and Pay Back Period (PBP) were employed .

Dalton (1967) indicated that the discounted cash flow technique to be a guiding aid for deciding investment. They also indicated that the cost-benefit analysis was a practical tool for assessing the desirability of the project since it considers a complete enumeration and evaluation of all relevant cost and benefits from the project over the period of time. Those estimates have been presented in Table 4.10

### 5.3.1 Net present value (NPV)

From the table 4.10 we could be seen that the net present values were Rs . 324309.00 at 12 per cent for the orchards in Valsad district and Rs. 340183.78 at 12 per cent discount rate for sapota enterprise in Navsari. Thus, it could be concluded that investment in sapota enterprise has been economically feasible and financially sound. The higher magnitude of positive net present value might be attributed to the fact that the initial investment and maintenance cost in sapota orchards were lesser compared to returns .

### 5.3.2 Benefit-cost ratio (BCR)

This criterion indicated the returns per rupee of investment in sapota enterprise and a wise investor always expects a higher ratio. The benefit - cost ratio in the Valsad district

was found to be 6.18, indicating that for each rupee invested in sapota enterprise yields Rs. 6.18 returns. Thus, it could be concluded that investment in sapota orchard was economically feasible and financially viable. Further it was more as compared to Navsari district of Rs. 6.49 because of higher cost and lower returns .

**5.3.3 Internal rate of return (IRR)**

This criterion measures the rate of return that can be realized by the investment in sapota orchard. Hence, the IRR is an important tool and scores over other criteria, which do not consider the reinvestment opportunities. In the present study the IRR was found high (34per cent) for the orchards in both Valsad and (37per cent) Navsari district. Compared to ruling interest rates. Hence, it can be inferred that the investment in sapota enterprise was found economically feasible, financially sound and highly profitable .

**5.3.4 Pay back period (PBP)**

The Pay Back Period for sapota orchards in Valsad district and Navsari district was 6.4 and 6.1 years respectively. This clearly indicates that a shorter period of less than six years would require getting back the initial investment. This could be attributed with fact that the initial investment itself was lower, besides higher rate of returns .

**Vi. Summary and policy implications**

**6.2.3 To study the feasibility of investment in sapota cultivation**

The investment appraisal analysis revealed that the net present value of investment for the orchards in Valsad and Navsari districts was Rs. 324309.00 per ha and Rs. 340183.78 respectively at 12 per cent discount rate for sapota enterprise. The payback period was found to be 6.4 years In Valsad and 6.1 years in Navsari. The discounted benefit cost ratio was 6.49 in Valsad and 6.18 in Navsari district and the internal rate of return in Valsad and Navsari was found to be 34 per cent and 37 per cent respectively.

**6.3 Policy implications"**

Major policy implications based on the findings of the study are summarized below :

The growth rate analysis indicated that the increase in production was due to area, rather than productivity, which calls for intensive efforts to increase productivity of sapota in the study area as well as Gujarat as a whole. As indicated by the financial measurements, the investment in sapota orchard was found to be financially feasible. And as there is higher

initial investment in sapota orchards the farmers who wish to establish the orchards, financial assistance may be provided by the institutional agencies at prevailing rate of interest .

The demonstrations need to be conducted to educate the farmers to adopt recommended application of fertilizers, plant protection chemicals, since they are being under used .

Non-availability of scientific storage facility was one of the major factors contributing to lower returns from sapota. Therefore, suitable storage facilities are essential to stabilize the returns of sapota growers by increasing the storage life of the fruit .

There were more than 65 per cent sapota growers of south Gujarat sale their produce in cooperatives. Because of price stability in cooperatives therefore farmers preferred cooperatives. Also cooperatives help to sapota growers for strengthen their condition and to get high profit. Cooperatives were pursued on the principle of **"self help by mutual help".** It reduces the marketing cost, enhances the bargaining power and there is equitable distribution of the proceeds. Presence of marketing cooperatives makes the market more competitive and ensures better returns to the producer.

The share of sapota growers in the consumer rupee was very low as it was evident by the study due to the irregularities in marketing. Hence sapota may be included in the list of notified agricultural commodities and to be brought under the preview of The Gujarat Agricultural Produce Market Act 1963. Under the provision of the Gujarat Agricultural produce Markets Act 1963, 207 Market Committees have been established in Gujarat till now. Out of which 42 market committees are in the backward tribal areas of the State. No district in the State of Gujarat is left without regulation. Under these market committees 190 principal market yards and 222 sub market yards contribute their share in upliftment of the farmers by selling agricultural produce through open auction, standard weight and cash payment. The market committees of Gujarat are steadily developing and getting their financial position strengthened.

Most of the farmers expressed the incidence of leaf spot, sooty mould and flat limb disease as a major problem, the gravity of which has increased due to lack of technical guidance. Hence, there is an urgent need to evolve an integrated pest and disease management programme besides strengthening the extension system in imparting knowledge about prevention and control of pest and diseases .

## BIBLIOGRAPHY


Asmatoddin, M., Pawar, B. R. and Atefuddin, M.(2008). Economics of marketing of papaya in Maharashtra, India. International Journal of Agricultural Science, 4(1): 2022.

Azad, K.C. and Sikka, B.K. (1991). Production and marketing of temperate fruits in northwest region of India. *Acta.Horticulturae*, 270: 67-74.

Bagde, H. T. (1996). Dynamics of elected fruits in Nagpur, Bihar. J. Agrie. Mktg. 4(l):71 -78.

Bodke, D. D. (1995). Growing of disco papaya. Baliraja, Dec., pp. 52-54.

Florence Wambirgu. (2004). Food, nutrition and economic empowerment. The care for scaling up the tissue culture banana. Project to the Rest Africa. Paper presented at the NEPAD/IGAD regional conference. Agricultural Successors in the Greater Horn of Africa. Nairobi, November 22 - 25,2004.

Gadre, N. A. (1997). Economics of production of papaya for papain Extraction. PKV Res. J. 21 (2): 142-145.

Gangal, S. M. (2002). Performance of banana plantation in north Karnataka. An economic analysis. M. Sc. (Agri. ) Thesis, Univ. Agril. Sci. , Dharwad.

Gawankar, M. S. , Shingre, D. V. , Patil, B. P., Sagvekar, V. V. , Wadkar, S. S. and Joshi, G. D. (2005). Economic evaluation of rainfed aonla cultivation in Konkan region of Maharashtra. Indian Journal of Agriculture Marketing, 19(1): 73 -78.

Gondalia, V. K. and Patel, G. N. (2007). An economic evaluation of investment on aonla in Gujarat. Agricultural Economics Research Review, 20(2): 385-394.

Gummagolmath, K.C. (1994). Economics of production and marketing of mango in Dharwad district, Karnataka. *M.Sc. (Agri.) Thesis* , University of Agricultural Sciences, Dharwad.

Hugar, L.B., Murthy, P.S.S., Umesh, K.B. and Reddy, B.S. (1991). Economic feasibility of guava cultivation under scientific management - An empirical evidence.

*Agricultural Situation in India*, 46 (4) : 211-214.

margins for high grade banana. Maha. J. Agric. Econ. 4(1):32.

Kareemulla, K. , Tewari, R. K. , Singh, B. And Kuldeep Kumar. (2007). Production and marketing of Indian Gooseberry - Aonla (Emblica officinalis Gaertn. ) in Pratapgarh district of U. P. Indian Journal of Agricultural Marketing, 21 (3): 41-45.

Kaoujalagi, C. B. (1990). Pattern of investment in pomegranate orchard in Biapur district, Karnataka. M.Sc. (Agri. ) Thesis, Univ. Agril. Sci. , Dharwad.

Koujalagi, C. B. and Kunnal, L. B. (1992). Input use efficiency in pomegranate orchards in Bijapur district, Karnataka. *Indian Journal of Agricultural Economics* , 47 (3): 527-530.

Khunt, K.A., Gajipara, H.M., Gadhvi, B.K. and Vekariya, S.B. (2001). Economics of production and marketing of pomegranate. Ind. J. Agric. Mkting, 17 (1): 100 -108.

Makadia, J. J., Ahir, N. J., Patel, K. S. and Leua, A. K. (2011). Economics and marketing of cashew plantation in Valsad district of South Gujarat. Indian Society of Agricultural Marketing, pp. 68 -77

Mali, B.K. , Bhosle, S. S., Shendage, P.N. and Kale, P. V. (2001). Economics of production and marketing of banana in Jalgaon district of Western Maharashtra. Ind. J. of Agric. Marketing, 17 (1): 173-179.

Mishra, S . P. (1994 ). Scientific cultivation of papaya. Farmer and parliament, 29(3): 33 - 35.

Monayamen Miah. (1 998). Consumption pattern of selected fruits in Bangladesh. Tips of papaya growing for Bangladesh. Bangladesh Fruit Newsletter, 1 8:8-10.
More, S. S. (1999). Economics of production and marketing of banana in Maharashtra state. M.Sc. (Agri.) Thesis, Univ. Agril. Sci., Dharwad.
Pawan Dahiya, Singh, I.J. and Rai, K.N. (2002). Cost benefit analysis of ber cultivation in Rohtak district of Haryana. Ind. J. of Agril. Mkting, 16 (2): 49-52.
Pawar, N. D. and Pawar, B. R. (2005). Price spread and marketing efficiency of green chillies in watershed area of Marathwada. Ind. J. of Agril. Mkting, 48 (2): 48-51 .
Raikar, N. A. (1990). Investment in production and marketing of cashew in Karnataka. *M.Sc. (Agri.) Thesis* , University of Agricultural Sciences, Dharwad.
Raju, V.T., Dasari, V.S. and Ravishankar, C. (1987). Spatio-temporal growth and distribution of fruit crops in Andhra Pradesh. *Indian Journal of Agricultural Economics,42* (4) : 438-445.
Randev, A. K. (2005). Marketing of apple in Shimla district of Himachal Pradesh - India. Indian Journal of Agricultural Marketing, 19(3): 11-19.
Rane, A. A. and Bagade, S. R. (2006). Economics of production and marketing of banana in Sindhur district Maharashtra. Ind. J. Agril. Marketing, 20 (1): 38-45.
Rangaswami, K. R. Karunanithi, D. Manohar, Jesudas and K. R. Swaminathan. (1992). The new tray for papain collection is a low cost one. Indian Horticulture, April-June, pp. 24-28.
Saraswat, V. and Rane, A. A. (2006). Production and marketing of peach fruit - A case study of Rajgarh village. Ind. J. Agril. Mkting, 8 (5): 318-325.
Sharma, C. K. and Singh, L. P. (1990). Tips of papaya growing for Tripura. Farmer and Parliament, 25(3): 1 7-25.
Shivanand, S. G. (2002). Performance of banana plantation in north Karnataka. An economic analysis. M. Sc. (Agri. ) Thesis, Univ. Agril. Sci. , Dharwad.
Silva, M. De. C. A., Da, TArsitano, M.A.A. and Bolani, A. C. (2005). Technical and economical analysis of apple and banana tree (Musa spp.) culture, in the north-west region of Sao Paulo state. Revista - Brasileira deFruticultura, 27 (1): 1 39 -142.
Singh, S. P. and Singh, A. R. (1991). Papaya giving profit in less time. Farmer and Parliament. 26 (6): 31-40.
Singh, V.K. and Singh, J. (1997). Profitability of ber cultivation in arid region of Haryana. Ind. J. Agric. Econ., 52 (3): 625 -626.
Subrahmanyam, K. V. (1984). Growth of horticultural crops in India, constra ints and opportunities. Agril. Situation in India . 39 (5): 303 -306.
Sundaravaradarajan and Ramanathan. (2003a). Cost and return structure in banana in north Karnataka. J. of Agril. Marketing, 20 (4): 110-115.
Sundaravaradarajan and Ramanathan. (2003b). B :C ratio and IRR for cashew plantation. Ind. J. Agril. Marketing, 5 (1): 25-29.
Sundaravaradarajan, K. R. and Jahanmohan, K. R. (2002). Marketing cost, margin, price spread and marketing efficiency of cashew in Tamil Nadu. *Agricultural Situation in India,* 59(1):9-16.
Talathi, J.M., Wadkar, S.S., Veerkar, P.D. and Vaidya, K. P. (2005). Marketing of sapota in Konkan region. *Ind. J. of Agril . Mkting*, 48 (2): 53-64.
Umesh, K. B. Vishnuvardhana, and Thirumalaraju, G.T. (2005). Business opportunities in cashew industry. Agro-India The Integrated Agribusiness Magazine, 8(1):14 -17.