

Research Paper

Production and Marketing of Arunachal Orange - An Economic Evaluation

Lakshmi Dhar Hatai

Department of Social Science, College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh, India

Corresponding author: lakshmidharhatai@gmail.com (ORCID ID: 0000-0001-9313-9797)

Received: 16-05-2022

Revised: 23-08-2022

Accepted: 03-09-2022

ABSTRACT

An attempt has been made in this paper to identify the economics of production, disposal trends, post-harvest losses and marketing channels, price spread, marketing efficiency of Arunachal orange. The present study was undertaken with the sample of 60 Arunachal orange growers. Findings of the study revealed that the total cost of cultivation was the highest on small farms. The Total costs of cultivation on small, medium, and large farmers were ₹ 40,076/-, ₹ 37,395/- and ₹ 34,965/- per hectare respectively. The highest BCR of 4.86 was achieved by the large farms because of judicious expenditure in Arunachal Orange cultivation and obtaining a sizeable amount of returns. It was apparent that all categories of Arunachal Orange farmers were facing the production constraints viz. high infestation by pest and disease, high-cost inputs and scarcity of labours. Lack of cold storage in that area of study compelled the farmers to sell their produce soon after harvest. It was observed that the total marketing cost increased from 23.96 per cent in channel-I to 27.35 per cent in channel-II and to 29.49 per cent in channel-III. The total marketing margin received by the market functionaries was the highest of 31.40 per cent in case of channel-III followed by 28.59 per cent in case of channel-II and 24.65 per cent in channel-I. The indices of marketing efficiency of 3.17 in channel-I was the highest as compared to rest of the channels due to existence of only one middleman. It can be suggested for improving market infrastructure, direct and group marketing, establishment of modern marketing and processing units, market integration, Formation of FPOs in the study area.

HIGHLIGHTS

- ① Arunachal Orange cultivation is one of the alternatives for the diversification of agriculture and development of agro-processing industries.
- ② The indices of marketing efficiency of 3.17 in channel-I was the highest as compared to rest of the channels due to existence of only one middleman.
- ③ Production and Marketing of Arunachal Orange -An Economic Evaluation

Keywords: Production, Marketing, Arunachal Orange, marketing efficiency

Horticulture is the fastest growing sector contributing towards poverty alleviation, nutritional security. It provides ample scope for farmers to increase their income and is helpful in sustaining large number of agro-based industries which generate huge employment opportunities (Singh, 2009). The variation of altitude, soil and climatic conditions provide ample scope for the cultivation of a wide variety of horticultural crops in Arunachal Pradesh.

There is growing demand for horticultural products especially burgeoning market for processed fruit is evidence of the scope for accelerating horticultural growth in the state. The major horticultural crops presently being grown in the state are Arunachal

How to cite this article: Hatai, L.D. (2022). Production and Marketing of Arunachal Orange - An Economic Evaluation. *Econ. Aff.*, 67(04): 423-431.

Source of Support: None; **Conflict of Interest:** None



Orange, banana, pineapple, kiwi, papaya, jack-fruit, litchi, plum, peach, and pear. In Lower Dibang Valley majority of the people depends on agriculture for their livelihood. Arunachal Orange cultivation is one of the alternatives for the diversification of agriculture and development of agro-processing industries. In Arunachal Pradesh, Arunachal Orange is one of the important fruit crop covering an area of 32850.45 ha. and with a production of 79212.55 MT (GoAR, 2016-17).

The current national agricultural strategy aims to attain a growth rate of 4 percent per annum in the agricultural sector; growth that is based on efficient use of resources and conservation of our soil, water and biodiversity; growth with equity, growth that is demand driven and stabilizes domestic markets and maximizes benefits from exports of agricultural products in the face of global challenges (Rai, 2006). The high value export oriented agriculture is today considered as a means of integrating smallholders into the world economy (Isabelle *et al.* 2009). The availability of markets for agricultural export crops help realize the gains from trade (Jorge *et al.* 2009). Moreover, knowledge based farming is of paramount importance, enabling the farmers fully charged with skills and competency. Therefore, the farming communities need to be fully exposed to latest technologies that help them enhance crop productivity, reducing production cost, improving food safety, producing cash crops along with use of better post-harvest and market intelligence tools to realize ultimate high economic returns. Steps are needed to improve performance of Orange industry for evolving an efficient distribution network within and outside the country. This calls for an integrated approach towards development of infrastructural facilities like transportation, improvement in packaging, storage and handling facilities (ICAR, 2006). The marketing system is seen as efficient if the movement of goods from producers to consumers is undertaken at the lowest cost consistent with the provision of services and facilities that consumers desired and are able to pay for. It requires a holistic, multidisciplinary, multilevel systematic and coordinated approach in the identification of and analysis of constraints in the production and marketing (Rangi and Sidhu, 2004). Efforts to improve market information and reduction in transportation cost will improve

marketing margin and pricing efficiency of the marketers (Oladapo *et al.* 2007). In order to raise the farm's income there is need of creation of integrated and assured competitive domestic market and improvement in communication, transport, storage, distribution and other services. Efforts were made to curtail the activities of middlemen by way of market regulation, farmer's cooperative, contract farming and direct marketing through rayot bazaars and exclusive retail market (Shikhamany and Murti, 2007). There is an urgent need for promoting producer's cooperative and providing adequate short term credit facilities particularly in the rural areas (Hatai, 2018).

Adoption of new technology and sustainable utilization of resources can help Arunachal Orange growers in minimizing the cost of production. New paradigm and challenges are needed for Arunachal Orange growers of Arunachal Pradesh in solving the problem like recurrent price fluctuation, high marketing, storage and transportation cost, non-availability of adequate storage facilities, post-harvest losses and lack of competitive marketing system. Efficient marketing is a pre-requisite in the development process of any economy. Arunachal Orange marketing plays a pivot role in fostering and sustaining the tempo of rural development in the study area. Arunachal Pradesh has become very popular in organic farming which gives very good returns from the Lower Dibang Valley and East Siang region as well as export market. As the low input intensity of agriculture in Arunachal Pradesh and makes Arunachal Orange ideally suited for organic produce.

Objectives

1. To estimate the Costs, Returns and Benefit Cost Ratios (BCR) in Arunachal Orange Cultivation.
2. To examine the disposal trend and prices of Arunachal Orange.
3. To estimate the extent of post-harvest losses during marketing of products.
4. To find out different marketing channel, price spread and marketing efficiency.
5. To identify marketing constraints and suggest policy implication for Arunachal Orange market.

Methodology

A total sample of 60 Arunachal Orange farmers comprising of 30 small (< 2 ha.), 20 medium (2-4 ha.) and 10 large (> 4 ha.) farmers of their total agricultural holdings from two villages namely, Dambuk and Roing of Lower Dibang Valley, Arunachal Pradesh was considered for the study through stratified random sampling method. Lower Dibang Valley District in Arunachal Pradesh was selected purposively due to more number of Arunachal Orange farmers in this district as compared to other districts of the state. The Arunachal Orange farms are stratified into three strata i.e. small (< 1ha. of Arunachal Orange cultivation), medium (1-2 ha.) and large (> 2 ha.) farmers covering all aspects. Moreover, a sample of 10 wholesalers, 10 traders, 15 retailers and 15 village beoparies in the major marketing centres namely, Pasighat of East Siang and Roing of Lower Dibang Valley were randomly selected. The study pertaining to the agricultural year 2019-20 and primary data was collected from the sample farmers through personal interview method with the help of a specially designed schedule.

Marketing Channel: The marketing channels of horticultural commodities particularly, Arunachal Orange crop varied from place to place. The identified marketing channels for major Arunachal Orange crop in the study area are:

- ♦ Channel I: Producer – Village Beopari – Consumer
- ♦ Channel II: Producer – Wholesaler – Retailer – Consumer
- ♦ Channel III: Producer – Trader – Wholesaler – Retailer – Consumer

Price Spread: In the marketing of agricultural commodities, the difference between the price paid by consumer and price received by the producer for an equivalent quantity of farm produced is often known as farm retail spread or price spread. It depends on the volume of production, communication network and market facilities. Price spread is a good yardstick for measuring marketing efficiency and essential in the formulation of an appropriate market policy (Kohls, 1955).

Marketing Efficiency: Marketing efficiency is the ratio of market output (satisfaction) to marketing

input (cost of resources used in marketing). A higher value of this ratio indicated improves marketing efficiency and vice versa. Marketing efficiency can be measured from the ratio of total value of goods marketed to the marketing costs (Acharya and Agarwal, 1992). This can be expressed as follows:

$$M.E. = \left\{ \left(\frac{V}{I} \right) \right\} - 1$$

Where,

M.E. = Index of Marketing efficiency,

V = Value of the goods sold (consumers price)

I = Total marketing cost

Producer's share in consumer's rupee: It is the price received by the farmer expressed as a percentage of the retail price (i.e. the price paid by the consumer). This may be expressed as follows:

$$P_s = \left(\frac{P_f}{P_r} \right) \times 100$$

Where,

P_s = Producer's share in Consumer's Rupee

P_f = Producer's price

P_r = Retail price

RESULTS AND DISCUSSION

General information

Findings of the study revealed that on an average the total agriculture holding (ha) in case of small, medium, large and overall farmers were 1.68 ha., 3.41 ha, 4.80 ha, and 3.30 ha, respectively. It was seen that area under Arunachal Orange cultivation (ha) in case of small, medium, and large farmers were 0.97 ha, 2.01 ha, and 3.52 ha, respectively. It was observed that all the 60 Arunachal Orange growers were practicing the organic Arunachal Orange farming in the study area of Lower Dibang Valley (Table 1).

Costs, returns and benefit cost ratios in Arunachal Orange cultivation

The study of costs and returns play a pivotal role to determine the relative profitability and economic viability of one enterprise over the other. Apart from the economic importance of Arunachal

Table 1: Land utilization patterns among different samples of Arunachal Orange growers

Particulars	Small	Medium	Large	Overall
Agricultural holdings (ha)	1.68	3.41	4.80	3.30
Area under Arunachal Orange Cultivation (ha)	0.97	2.01	3.52	2.16
Size of Sample (n)	30	20	10	60

Table 2: Costs, Returns and Benefit Cost Ratios (BCR) in Arunachal Orange

Particulars	Small farmers	Medium farmers	Large farmers	Overall
Area (ha)	0.97	2.01	3.52	2.16
Production (q)	60.98	128.10	226.15	138.41
Productivity (q/ha)	62.86	63.73	64.25	63.61
Total cost of cultivation (₹/ha)	40076	37395	34965	37478
Price (₹/q)	2644	2660	2650	2651
Gross Return (₹/ha)	166201	169521	170262	168660
Net Return (₹/ha)	126125	132126	135567	131272
BCR	4.14	4.53	4.86	4.51

Orange cultivation, it has got greater potentiality in generative income and employment at farm level. As depicted in tables, it revealed that the total cost of cultivation was the highest on small farms. It may be due to use of more inputs and higher expenses on labour, planting materials by Arunachal Orange growers. The Total costs of cultivation on small, medium, and large farmers were ₹ 40,076/-, ₹ 37,395/- and ₹ 34,965/- per hectare respectively. It was realized that in a view of increased availability of modern inputs, recent advances in production technology and more utilization of resources to achieve the optimum level in Arunachal Orange production. It was seen that as size of farm increases the total cost of cultivation (₹/ha.) decreases. It was observed that in case of small farmers the yield of Arunachal Orange was lowest (60.98 q) and also lowest price received by them (₹ 2644 / q), but the highest Arunachal Orange production was seen in case of large categories of farmers (226.15q). The productivity (q/ha) by large farmer was the highest i.e. 64.25 q/ha. and the price (₹/q) received by the medium categories of farmer was the highest. It was observed that the gross returns by small, medium, large and overall farmers were ₹ 1,66,201/- ₹ 1,69,521/-, ₹ 1,70,262/- and ₹ 1,68,660/- per hectare, respectively. The per hectare net returns received by small, medium and large farmers were ₹ 1,26,125/-, ₹ 1,32,126/-, ₹ 1,35,567/- respectively. The benefit cost ratio (BCR) is a method to evaluate economic efficiency of a project under consideration.

The highest BCR of 4.86 was achieved by the large farms because of judicious expenditure in Arunachal Orange cultivation and obtaining a sizeable amount of returns. The BCR of small and medium farmers were 4.14 and 4.53, respectively (Table 2).

Disposal trends and prices of Arunachal Orange (marketing strategies)

It was evinced that the quantities sold (q/ha) of Arunachal Orange through wholesalers accounted for about 44.22, 47.30 and 51.77 quintal per hectare of production on small, medium and large farms, respectively. The quantity sold directly to the retailer was highest of 13.70 q/ha. in case of small farmers. Similarly, the quantity directly sold to consumer was highest by medium farmers followed by small and large farms. The price received by the farmers (₹/q) was the highest when Arunachal Orange was directly sold to consumer in all categories of farms and the lowest for the sale through wholesaler. The marketing cost incurred by all categories of sample Arunachal Orange growers for the sale through wholesaler was highest of ₹ 500 per quintal and the lowest marketing cost incurred by medium farms for the sale through consumers. However, the marketing cost incurred by overall sample farmers for the sale through wholesaler, retailer and consumers were of ₹ 500, ₹ 433 and ₹ 354 per quintal, respectively. The net price received (₹/q) by the all categories of Arunachal Orange growers was

highest of ₹ 2432 per quintal when directly sold to consumer (Table 3).

Extent of post-harvest losses of Arunachal Orange

It was observed that the maximum extent of losses of Arunachal Orange occurs during the time of harvesting. The extent of total post-harvest losses (q/ha) were 1.04, 1.11 and 0.89 quintal per hectare at the farm level on small, medium and the large farms respectively. It was estimated that during grading and packaging the extent of Arunachal Orange losses of small, medium and large categories farmer were 0.27, 0.26 and 0.22 quintal per hectare, respectively. The study revealed that at the market level, the post-harvest loss while sold in wholesale market was highest of 0.22 q/ha by small farmers followed by medium farmers 0.15 q/ha and in case of large farmers 0.13 q/ha. The quantity of losses at the retailer level in market by small and medium farmers were 0.12 q/ha and 0.11 q/ha, and in case of large farmers 0.08 quintal per hectare. Similarly, at the consumer level the losses by small and medium farmers were 0.05 and 0.04 q/ha and in case of large categories of farmers 0.03 q/ ha. It was estimated

that, at the market level the total losses (q/ha) by small, medium and large farms were 0.39, 0.30 and 0.24 q/ha respectively. Overall, the post-harvest losses of total production by small, medium and large Arunachal Orange growers were 1.43, 1.41 and 1.13 q/ha. It was seen that in case of overall sample farmers the post-harvest losses at farm level and market level were 1.01 and 0.31 q/ha respectively (Table 4).

Constraints in production and marketing

It was apparent that all categories of Arunachal Orange farmers were facing the production constraints viz. high infestation by pest and disease, high cost inputs and scarcity of labours. Lack of cold storage in that area of study compelled the farmers to sell their produce soon after harvest. Overall, it was observed that low price in wholesale market, seasonal fluctuation in prices due to irregular supply were special features of marketing problems faced by Arunachal Orange growers of the study area. Usually, efficient marketing system provides higher returns to producer and greater satisfaction to the customer by way of reduction of marketing cost. Maximum farmers experience difficulties to

Table 3: Disposal Trends and Prices of Arunachal Orange

Marketing Size of farms	Wholesaler			Retailer			Consumer					
	Q	PR	MC	NP	Q	PR	MC	NP	Q	PR	MC	NP
Small farmers	44.22	2644	500	2144	13.70	2738	443	2295	3.20	2786	327	2459
Medium farmers	47.30	2657	500	2157	13.36	2710	448	2262	4.03	2802	325	2477
Large farmers	51.77	2650	500	2150	11.04	2685	410	2275	3.31	2770	410	2360
Overall	47.76	2657	500	2150	12.70	2711	433	2277	3.51	2786	354	2432

Note: Q = Quantity sold (quintal/hectare), PR = Price received by the farmer (₹/quintal),

MC = Marketing cost (₹/quintal), NP = Net Price received (₹/quintal)

Table 4: Extent of Post-Harvest Losses of Arunachal Orange (in q/ha)

Particulars	Small	Medium	Large	Overall
At Farm Level				
Harvesting	0.77	0.85	0.67	0.76
Grading & Packing	0.27	0.26	0.22	0.25
Total (A)	1.04	1.11	0.89	1.01
At Market Level				
Sold in wholesale market	0.22	0.15	0.13	0.17
Retailer level	0.12	0.11	0.08	0.10
Consumer level	0.05	0.04	0.03	0.04
Total (B)	0.39	0.30	0.24	0.31
Total Production(A+B)	1.43	1.41	1.13	1.32

dispose their produce at remunerative price during the glut situation in the market. High transportation cost, grading, bagging and storage cost in retail market created major marketing problems. It was seen that large categories of Arunachal Orange growers were more reluctant for direct sale to the consumer due to shortage of labour force and longer time requirement for marketing of their produce as compared to small and medium categories of farmers in the study area (Table 5).

Price spread, marketing cost & margin and share in consumer's rupee in various marketing channels

Channel-I: It was evident from table 6 that the producer enjoyed 51.36 per cent share in consumer's rupee. In this marketing channel-I the consumer

purchase price was ₹ 4380/- per quintal of Arunachal Orange out of which the marketing cost incurred by the Village Beopari was about ₹ 800 i.e. 18.26 per cent of consumer's rupee. However, the marketing cost incurred by the Arunachal Orange grower was ₹ 250 per quintal. It was seen that the Village Beopari's margin was ₹ 1080, which was 24.65 per cent of the consumer's rupee.

Channel-II: From the table 7, it was revealed that the producers of this channel received a net price of ₹ 2310 out of the consumer's purchase price of ₹ 5245 per quintal of Arunachal Orange. The producer's share in consumer's rupee was about 44.04 per cent. The marketing cost incurred by the wholesaler included cost of packing, transportation, loading and unloading and octroi charge etc. which was ₹ 870 i.e. 16.58 per cent of consumer's rupee.

Table 5: Production and Marketing Constraints Faced by of Arunachal Orange Growers

Particulars	Small farmers	Medium farmers	Large farmers	Overall
Production constraints (% of Multiple Response)				
♦ High infestation by pest & disease	85.3	100.0	100.0	95.1
♦ High cost of inputs	82.3	72.0	81.0	78.4
♦ Scarcity of labour	75.0	58.0	92.0	75.0
♦ Poor quality plant protection chemical	72.3	75.0	100.0	82.4
Marketing constraints (% of Multiple Response)				
1. Wholesaler / Commission agent				
♦ Low in the market price	78.0	74.2	71.0	74.4
♦ Congestion in the market	63.3	70.5	82.5	72.1
♦ High marketing cost	83.3	62.0	100.0	81.76
2. Retailer				
♦ High transportation cost	100.0	100.0	90.0	96.6
♦ Handling, bagging and storage cost	75.95	94.0	100.0	89.9
3. Consumer				
♦ Shortage of labour force	87.0	83.0	100.0	90.0
♦ Longer time required	76.6	65.0	80.0	73.8

Table 6: Price spread of Arunachal Orange in Dambuk village market through marketing channel-I

Sl. No.	Particulars	Marketing costs and margins (₹ per quintal)	Share in consumers Rupee (%)
1	Net price received by the producer	2250	51.36
2	Cost incurred by the producer	250	5.70
3	Producer sale's price/ village Beopari purchase price	2500	57.07
4	Cost incurred by the village Beopari		
	♦ Cost of Packing	250	5.70
	♦ Transportation charges	360	8.21
	♦ Loading and unloading	190	4.33
5	Total cost incurred by the village Beopari	800	18.26
6	Beopari's margin	1080	24.65
7	Beopari's sale's price/ consumer's purchase price	4380	100.00

The wholesalers margin was about 19.44 per cent and the retailer enjoyed a margin of 9.15 per cent through incurred a cost of only 5.72 per cent of the consumer's rupee.

Channel-III: It was observed in table 8 that transportation of Arunachal Orange to the distance market fetched better price for the crop. But

producers were not benefited out of this higher price. The producer's share in consumer's rupee was less in absolute and percentage terms than channel-I and channel-II. In this channel, the net price received by the producer was of ₹ 2350 i.e. the producer's share in consumer's rupee was 39.06 per cent. The marketing cost incurred by the

Table 7: Price spread of Arunachal Orange in Roing market through marketing channel-II

Sl. No.	Particulars	Marketing costs and margins (₹ per quintal)	Share in consumers Rupee (%)
1	Net price received by the producer	2310	44.04
2	Cost incurred by the producer	265	5.05
3	Producer sale's price/ wholesaler purchase price	2575	49.09
4	Cost incurred by the wholesaler		
	(a) Cost of Packing	240	4.57
	(b) Transportation charges	350	6.67
	(c) Loading and unloading	180	3.43
	(d) Storage charges	—	—
	(e) Octroi charges	100	1.90
5	Total cost incurred by the wholesaler	870	16.58
6	Wholesaler's margin	1020	19.44
7	Wholesaler's sale's price/ retailer's purchase price	4465	85.12
8	Cost incurred by the retailer	300	5.72
9	Retailer's margin	480	9.15
10	Retailer's sale price/consumer's purchase price	5245	100.00

Table 8: Price spread of Arunachal Orange in Pasighat market through marketing Channel-III

Sl. No.	Particulars	Marketing costs and margins (₹ per quintal)	Share in consumers Rupee (%)
1	Net price received by the producer	2350	39.06
2	Cost incurred by the producer	280	4.65
3	Producer sale's price/ wholesaler purchasing price	2630	43.72
4	Cost incurred by the wholesaler		
	(a) Cost of Packing and grading	200	3.32
	(b) Transportation charges	300	4.98
	(c) Loading and unloading	180	2.99
	(d) Storage charges	—	—
	(e) Octroi charges	100	1.66
5	Total cost incurred by the wholesaler	780	12.96
6	Wholesaler's margin	940	15.62
7	Wholesaler's sale's price/ Trader's purchase price	4350	72.31
8	Cost incurred by the trader		
	(a) Transportation charges	275	4.57
	(b) Loading and unloading	180	2.99
	(c) Spoilage charges	—	—
9	Total cost incurred by the trader	455	7.56
10	Trader's margin	650	10.80
11	Trader's sale price/retailer's purchase price	5455	90.68
12	Cost incurred by the retailers	260	4.32
13	Retailers margin	300	4.98
14	Retailers sale price/ consumer purchase Price	6015	100.00

wholesaler, trader and retailer was about 12.96, 7.56 and 4.32 per cent respectively. The highest percentage of market margin i.e. 15.62 was received by the wholesaler followed by 10.80 per cent in case of trader and 4.98 per cent in case of retailer in this channel. The producer's share in consumer's rupee was comparatively low i.e. 39.06 per cent due to long chain of intermediaries in the channel-III. Move over, similar studies have been reported by Gandhi & Namboodiri (2004), Sharma & Singh (2008).

It was observed in table 9, that the total marketing cost increased from 23.96 per cent in channel-I to 27.35 per cent in channel-II and to 29.49 per cent in channel-III. The total marketing margin received by the market functionaries was the highest of 31.40 per cent in case of channel-III followed by 28.59 per cent in case of channel-II and 24.65 per cent in channel-I.

Table 9: Marketing costs, margins and producer's share in consumer's rupees in the marketing of Arunachal Orange through different channels (%)

Particulars	Marketing channels		
	I	II	III
Producer's share	51.36	44.04	39.06
Marketing costs	23.96	27.35	29.49
Marketing margins	24.65	28.59	31.40
Consumer's price	100.00	100.00	100.00

Marketing Efficiency: It was evident from the table 10 that the total marketing cost of channel-I, channel-II, channel-III, was ₹ 1050, ₹ 1435 and ₹ 1775, respectively. The value of goods (Arunachal Orange) sold in the channel-I was ₹ 4380, in channel-II it was ₹ 5245 and in case of channel-III it was ₹ 6015. The indices of marketing efficiency of 3.17 in channel-I was the highest as compared to rest of the channels due to existence of only one middleman. But in case of channel-II and channel-III the efficiency index was 2.65 and 2.38, respectively.

Table 10: Indices of marketing efficiency in different marketing channels

Items	Channel-I	Channel-II	Channel- III
Value of goods sold (V) in ₹	4380	5245	6015
Marketing cost (I) in ₹	1050	1435	1775
Index of marketing efficiency (E)	3.17	2.65	2.38

CONCLUSION

Arunachal Orange cultivation has got greater potentiality in generative income and employment at farm level. It was observed that increase in farm size is accompanied by higher productivity and remunerative price fetched by large farmers as compared to other categories of Arunachal Orange growers. The net price received by the all sample farmers was the highest when they sold their produce directly to consumers. It was evinced that the maximum extent losses of Arunachal Orange occur during the time of harvesting at the farm level. The highest benefit cost ratio was achieved by the large farms because of judicious expenditure in Arunachal Orange production and obtaining a sizeable amount of returns. During the production process, the Arunachal Orange growers experienced the problems of high infestation of pest and diseases, high input costs, scarcity of labour and poor quality of planting materials. Most of the Arunachal Orange growing areas are connected with kutcha and fair weather roads which are not suitable for better transportation of Arunachal Orange. In the Lower Dibang Valley, Arunachal Orange cultivation needs application of modern technology and proper management practices for better production. The study highlighted that the prospect of Arunachal Orange marketing in Arunachal Pradesh is bright as the trend of other traditional crop production in the potential areas is quite encouraging for the organic farming. There is enough scope of enhancing organic produce of Arunachal Orange.

- ◆ The market should be properly linked with sub yards in the producing regions as well as with outside markets through networking so as to achieve desirable transparency and efficiency in pricing.
- ◆ The Arunachal Orange storage and marketing can be improved by constructing the cold storage unit in the rural areas near production points and by improving the market intelligence services.
- ◆ To make available of reliable information on village level should require Arunachal Orange processing and value addition through small scale industries, cooperatives and village panchayats.

- ♦ In the study area, the Arunachal Orange growers and be small holders can also start their small enterprise of retailing the preserved Arunachal Orange products (Fresh juice, Bottled/canned juice, Jam, Jelly) through SHGs.
- ♦ Incentives in the form of crop insurance availability of improved cultivations and single window delivery system should be encouraged in the study area.
- ♦ There is need of adequate market support system as well as certification mechanism for the large-scale production of organic Arunachal Orange for export market.
- ♦ In concluding remarks, there is an urgent need for promoting producer's cooperative and providing adequate short term credit facilities particularly in the rural areas. In order to hedge risk of Arunachal Orange production, it is imperative to develop market intelligence services, formation of FPOs, introduction of support price and insurance scheme in the state of Arunachal Pradesh.

ACKNOWLEDGEMENTS

The improvements suggested by the anonymous referees and editors that helped me to improve the contents and quality of this paper are gratefully acknowledged.

REFERENCES

Acharya, S.S. and Agarwal, N.L. 1992. Agricultural Marketing in India, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

- Gandhi, V.P. and Namboodiri, N.V. 2004. Marketing of fruits and vegetables in India : A study covering the Ahmedabad, Chennai, and Kolkata Markets", Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad.
- Government of Arunachal Pradesh, Department of Horticulture, 2016-17.
- Hatai, L.D. 2018. Cost of Cultivation and Economic Returns Analysis of Cashewnut in West Garo Hills of Meghalaya, *Econ. Aff.*, **63**(2): 399-405.
- Indian Council of Agricultural Research (ICAR), New Delhi, 2006.
- Isabelle, V., Guy F. and Dennis L. 2009. Is there a pilot in the chain? Identifying the key drivers of change in the fresh Pineapple sector, *Food Policy*, **35**(2): 122-130.
- Jorge, B., Irene, B. and Guido, P. 2009. Realizing the gains from trade: Export crops, marketing costs and Poverty, *J. Int. Econ.*, **78**(1): 21-31.
- Kohls, R.L. 1955. Marketing of agricultural products, The Macmillan Co., New York, pp. 8-9.
- Oladapo, M.O., Momoh, S. , Yusuf, S. and Awyonika, Y. 2007. Marketing Margin and Spatial Pricing Efficiency of Pineapple in Nigeria, *Asian J. Marketing*, **1**(1): 14-22.
- Rai, M. 2006. Foundation of national strategy, *The Hindu Survey of Indian Agriculture*, pp. 24-31.
- Rangi, P.S. and Sidhu, M.S. 2004. Development of market infrastructure for globalization in India", *Ind. J. Agril. Marketing*, **18**(3): 1-22.
- Sharma M. and Singh, R. 2008. Post Harvest Losses in Fruits and Vegetables in Himachal Pradesh, *Ind. J. Agril. Marketing*, **22**(1): 13-24.
- Shikhamany, S.D. and Murti, G.S.R. 2007. Marketing reforms are critical, *The Hindu Survey of Indian Agriculture*, pp. 107-111.
- Singh, H.P. 2009. Triggering agricultural development through horticultural crops, *Ind. J. Agril. Econ.*, **64**(1): 15-39.

