Plant Archives Vol. 26, Supplement 1, 2026 pp. 34-42 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2026.v26.supplement-1.006

MARKETING PATTERN OF MAJOR HORTICULTURAL CROPS: A COMPARATIVE ANALYSIS FROM MOKOKCHUNG DISTRICT OF NAGALAND INDIA

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(Date of Receiving : 10-08-2025; Date of Acceptance : 14-10-2025)

ABSTRACT

The present study was undertaken to study the marketing pattern of major horticultural crops in Mokokchung district of Nagaland. For the said study, a comparative analysis was carried out during the agricultural year 2024-2025 to compare the marketing pattern of selected crops *viz;* Orange, Banana and Pineapple in the study area. To achieved the objectives of the study, both the primary and secondary sources was used. The data was collected through personal interview schedule from the the respondents of 40 for each crop where a stratified simple random technique was deployed making it a total of 120 respondents from the two blocks in Mokokchung district. CGR during 2006-2022 were analyzed for area, production and productivity of orange, which revealed a continuous decline in area with -16.63 per cent production with -17.98 per cent and productivity with -1.60 per cent; Pineapple showed a notable initial decline in area and production, but recent years reflected stabilization, with positive CGR of 0.13 per cent of area and 1.83 per cent of production. Banana exhibited a mixed trend, with severe declines during 2016 to 2022 in both area and production with CGR of 0.31 per cent in area and -2.63 per cent of production and productivity of -102.99 per cent, respectively. The total cost of Rs. 3,90,621.00 / ha was incurred in Pineapple cultivation, with 87.39 per cent of variable cost, maximum of labour cost. Banana had lowest net returns and incurred the lowest investment of Rs. 80,867.00 / ha. Orange incurred the highest cost, Rs. 4,73,142.00 / ha and offered the highest gross and net incomes, respectively. Two marketing channels were found, Channel- I was more efficient for all three selected crops; retailers had the highest margin share. Channel II was characterized by high cumulative marketing costs and lower producer margins, despite significantly higher consumer prices.

Keywords : Horticultural crops, CACP, CGR, Comparative, Marketing pattern

Introduction

Horticulture stands as a critical component of Indian agriculture, encompassing the cultivation of fruits, vegetables, flowers, spices and plantation crops. It significantly contributes to ensuring access to sufficient and nutritious food, elevating livelihoods in rural areas and promoting sustainable development (Sharma and Kalita, 2004). India holds the distinction of being the second position in the production of fruits and vegetables globally, playing a vital role in the nation's GDP and agricultural exports (Kumar and Sharma, 2023). The country's diverse agro-climatic conditions offer a conducive environment for the cultivation of a wide range of horticultural crops throughout the year (Bakshi *et al.*, 2022). Among these, Banana, Citrus and Pineapple are particularly important due to their economic value, widespread demand, and potential for export (Sharma, 2024). These crops thrive in the favourable climate and soil of the North-Eastern region, including Nagaland (Sharma, 2012). Specifically, Mokokchung district presents promising conditions for the growth of these fruits, supported by increasing farmer participation in commercial horticulture (Dhakre and Sharma, 2009; Sharma, 2013; Sharma, 2015).

Banana (*Musa spp.*), often regarded as one of the oldest cultivated fruits, is second only to mango in production across India. It spans roughly 8.30 lakh ha,

with an annual output of 46.26 lakh tonnes (Sharma and Sharma, 2023). Key Banana-producing states include Tamil Nadu, Maharashtra and Gujarat (Benjamin and Krishnan, 2020). A study conducted in Middle Gujarat showed a benefit-cost ratio of 2.06 for Banana cultivation over cost C_2, indicating considerable profitability (Pundir *et al.*, 2024). Pineapple (*Ananascomosus* L.), recognized for its sweet flavor and health benefits, is extensively cultivated in India's North-Eastern states (Sharma, 2018).

Manipur and Meghalaya are leading producers, with Manipur recording 12,119 ha under Pineapple cultivation and an annual production of 1.47 lakh Mt (Dimashree *et al.*, 2023). Citrus fruits, particularly Orange, form an integral part of the horticultural portfolio in Nagaland. These vitamin C-rich fruits are primarily grown in high-altitude regions such as Mokokchung, Tuensang and Mon. Citrus farming not only offers seasonal revenue but also has potential for processing into juices and concentrates (Vishandass et al., 2018). There is significant potential to improve citrus production through better extension services, farmer training, and cooperative marketing strategies (EPRA IJRD, 2021).

Materials and Methods

Data Base

The present study was based on both primary and secondary sources. It was conducted in the Mokokchung district of Nagaland because there has been a considerable area, production and contributed significantly to the state as a major horticultural crops. Two blocks namely; Changtongya and Chuchuyimlang was selected purposively because of the high engaged in the cultivation of major horticultural crops such as banana, pineapple and orange. There was a total of 10 villages in Changtongya and 11 villages in Chuchuyimlang blocks. From each block, 8 villages were randomly selected taking the crops cultivated into consideration, making it a total of 16 villages for the present study. Further, 40 respondents for each crop based on area by following the stratified random sampling technique was deployed making it a total of 120 respondents using pretested schedule for the purpose of the research study and also, the secondary data were collected from District's Economics and Statistics Office, District Rural Development Agency office, RD Block offices, and other published sources.

Analytical framework

The following analytical tools were used:

Estimation of growth rates by exponential form equation

Exponential function was applied to analyze the growth trends of the study. Accordingly, Compound Growth Rates (CGR) for the major horticultural crops in Mokokchung district of Nagaland was computed using the exponential function (Das and Sharma, 2018; Bey and Sharma, 2024.a&b).

The exponential function form:

$$Y = ab^t \quad (1)$$

Or

$$\ln Y = \ln a + t \ln b$$

Compound Growth Rates (CGR) was computed by using formula:

$$CGR = (\text{Antilog } b-1) \times 100 \quad (2)$$

Whereas: y = time series data on major horticultural crops

b = regression coefficient

t = time period (years)

Categorization of farm cost concepts

The farm costs concepts for major horticultural crops are as follows:

i) Cost A_1:

It included all the actual expenses in cash and kind incurred in production by the farmer:

a. Value of hired human labour,
b. Value of bullock labour (both hired and owned),
c. Value of machine power (both hired and owned),
d. Value of suckers / rhizomes (both owned and purchased),
e. Value of insecticides and pesticides, weedicides,
f. Value of manures (both owned and purchased),
g. Value of fertilizers,
h. Depreciation of implements and farm buildings,
i. Irrigation charges,
j. Land revenue and other taxes,
k. Miscellaneous expenses (electricity charges etc.),
l. Interest on working capital.

ii) Cost A_2: Cost A_1 + rent paid for leased in-land

iii) Cost B_1: Cost A_2 + interest on value of owned capital assets (land)

iv) Cost B_2: Cost B_1 + rental value of owned land

v) Cost C_1: Cost B_1 + imputed value of family labour

vi) Cost C_2: Cost B_2 + imputed value of family labour

vii) Cost C_3: Cost C_2 x 1.10, (10 percent of cost C_2 is added to cost C_2)

This provided allowance for managerial functions undertaken by the farmer and represents the Total Cost or comprehensive cost of cultivation.

Cost of production = (Cost C_3 - Value of by-product) / Yield

Variable cost

It included the cost of human labour, machinery, plants material, manures and fertilizers, irrigation charges, marketing costs and interest on working capital.

Fixed cost

It included the depreciation costs on fixed assets, land revenue, interest on fixed capital and rental value of owned land.

Total cost = fixed cost + Variable cost

Gross return / income

It is the value of the addition of main product and by-product. The main products and by-products were imputed, taking into account the actual marketed prices or the village level prices prevalent at the time of enquiry.

i. Farm business income = Gross return - Cost A_1

ii. Owned farm business income = Gross return - Cost A_2

iii. Family labour income = Gross return - Cost B_2

iv. Net income = Gross return - Cost C_3

v. Intensive income = Net income + rental value of owned land + interest of fixed capital

vi. Farm investment income = Farm business income - Imputed value of family labor

Benefit-cost ratio

On variable cost = Gross income / Variable cost

On total cost = Gross income / Total cost

Price Spread

The price spread is the difference between the price paid by the consumer and the price received by the farmer for a unit of quantity.

$$PS = RP - PNP$$

Whereas: PS = Price Spread

RP = Retailer's Selling Price

PNP = Producer's Net Price

Marketing Efficiency

Shepherd's formula was used for calculating marketing Efficiency and is given by:

$$ME = V / I - 1$$

Whereas: ME = Marketing Efficiency

V = Value of goods sold (consumer's price)

I = Total marketing cost

Results and Discussion

Area, production and productivity of major horticultural crops in Mokokchung district of Nagaland

Table 1 revealed a consistent trend of decline across area, production and yield of Orange, although the rate of decline varied across the different periods. During the first period, there was a significant and sharp decline in area, with a Compound Growth Rate of -23.14 per cent. This suggested that the area under cultivation or the sector's scale reduced drastically during these years. Similarly, production also faced a severe decrease, declining at a rate of -26.21 percent. The yield, however, showed a smaller decline of -4.00 per cent. The R^2 values for this period further reinforced these conclusions. For area and production, the R^2 values of 0.63 and 0.59, respectively. However, the yield's R^2 value of 0.10 indicated that changes in yield were poorly explained by the time factor.

In the second period, the decline in both area and production slowed down, with a CGR of -10.28 percent for area and -13.33 per cent for production. While there was still a downward trend, it was less pronounced than in the first period. The yield also declined at a more moderate rate of -3.38 per cent. However, the R^2 value for area was 0.10, which suggested that the relationship between area and time changes appeared weak. The R^2 values for production and yield was 0.26 and 0.16 respectively.

Combination of the two periods from 2006 to 2022, the overall trend showed a continuous decline in area of -16.63 per cent, production of -17.98 per cent and yield of -1.61 per cent, though the rate of decline was less extreme in the first period. The negative growth rates for area and production were concerning, but the relatively smaller decline in yield suggested that productivity per unit of land had been more resilient than overall production levels.

The R^2 values for this combined period showed a stronger relationship with time for both area and production which was 0.68 and 0.66 respectively. On the other hand, the very low R^2 value of 0.07 for yield indicated that yield changed largely during this period of time.

Table 1 : Compound growth rate (CGR) of area and production of Orange

SL. No.	Years	Area (ha)		Production (t)		Productivity (t/ha)	
		CGR (%)	R^2	CGR (%)	R^2	CGR (%)	R^2
1.	Period- 1 (2006-17)	-25.97	0.69	-22.91	0.68	4.12	0.23
2.	Period- 2 (2018-22)	-20.85	0.54	-21.63	0.68	-0.98	0.038
3.	Period -3 (2006-22)	-16.63	0.68	-17.98	0.66	-1.61	0.07

Table 2 revealed that the CGR for area during the period 1was -18.71 per cent suggesting a sharp decline in the area under Pineapple cultivation. And the R^2 value was 0.51. Similarly, the CGR of -18.65 per cent for production in this period showed that the decline in production was nearly identical to the decline in area with a value of 0.39. The relationship between production and time was weaker than that of area, suggesting that while the decline in production over time was noticeable, other factors may have been at play, aside from just the passage of time influencing production outcomes. And the CGR of 0.07 per cent for yield suggested a very slight increase in yield during this period with the R^2 value of 5.23.

Table 2 : Compound growth rate (CGR) of area, production and yield of Pineapple

SL. NO.	Years	Area (ha)		Production (t)		Productivity (t/ha)	
		CGR (%)	R^2	CGR (%)	R^2	CGR (%)	R^2
1.	Period- 1 (2006-17)	-26.10	0.57	-29.61	0.54	4.75	0.10
2.	Period- 2 (2018-22)	0	0.03	15.78	0.065	2.86	0.26
3.	Period -3 (2006-22)	0.13	3.81	1.83	0.04	1.69	010

Similarly, in the period 2, the CGR of -15.76 per cent for area showed a declining trend with the R^2 value of 0.03 which was extremely low, indicating very weak correlation between changes in area and time. And the CGR of -8.92percent for production was still negative, but the rate of decline was much slower compared to the previous period. The R^2 value of 0.01 was extremely low and the CGR of 8.12 per cent for yield had a positive growth rate, meaning there was a significant improvement in yield during this period with the R^2 value of 0.71 suggesting a strong relationship between yield and time.

Finally, in the period 3, the CGR of 0.13 per cent for area was almost neutral, indicating that over the long term from 2006 to 2022, the area had remained relatively stable with very little change with the R^2 value of 3.81. The CGR of 1.83 per cent for production was slightly positive, suggesting a small recovery or stabilization in production over the entire period from 2006 to 2022 with the R^2 value of 0. And, the CGR of 1.69 per cent for yield represented a slow growth in the overall yield over the entire period with the R^2 value of 10.

Table 3 revealed that during Period-1, there was a noticeable decline in both area and production of Banana with CGR of -15.62 per cent and -15.87 per cent, respectively. The R^2values for area was 0.48 and production was 0.18 indicating a weak relationship. Yield showed a very slight negative growth of -0.29 with R^2 value of 0.00, implying no significant trend over this period.

Similarly, in Period-2, the decline became even more pronounced with area contracting at a higher rate of -21.48 per cent and production decreased even further by -27.77 per cent. However, the R^2 values for both remained quite low with 0.18 for area and 0.16 for production. Yield declined sharply by -8.02 per cent, with a low R^2 of 0.11, indicating weak consistency in yield changes.

For the entire duration, Period-3, a mixed trend was observed. While area exhibited a marginal positive growth rate with 0.31per cent, the production declined slightly by -2.63 percent. Yield showed an anomalously high negative CGR of -102.99 per cent, which indicated a data inconsistency or a sharp fall over a particular year. However, R^2 values across all variables were 0.00 for area, 0.01 for production and 0.05 for yield.

Table 3 : Compound growth rate (CGR) of area, production and yield of Banana

Sl. No.	Years	Area (ha)		Production (t)		Productivity (t/ha)	
		CGR (%)	R^2	CGR (%)	R^2	CGR (%)	R^2
1.	Period- 1 (2006-17)	-21.40	0.50	-28.49	0.31	-9.01	0.066
2.	Period- 2 (2018-22)	3.02	0.00	-5.79	0.01	-8.57	0.24
3.	Period -3 (2006-22)	0.31	00	-2.63	0.01	-102.99	0.05

Table 4 revealed that the total cost of cultivation for Pineapple was Rs. 390,621.10/-, with variable costs accounting for 87.39 per cent and fixed costs -12.61 per cent. Major contributor to variable cost was hired labour at Rs. 128,123.70/- with 32.80 per cent, while owned labour at 15.90 per cent, fertilizer at 6.80 per cent and plant protection at 4.70 per cent also contributed significantly. A notable portion of 5.98 per cent was spent on miscellaneous, indicating possible hidden or unplanned operational costs. On the fixed cost, depreciation at 5.30 per cent and rental value of owned land at 4.40 per cent were the major contributors.

Similarly, the total cost of Banana was Rs. 80,867.65/-, with variable costs forming a higher share of 89.31 per cent and fixed costs at 10.69 per cent. Hired labour at 29.90 per cent and owned labour at 15.80 per cent were again prominent, which indicated the labour-driven nature of Banana farming. Unique costs included digging pits at 0.28 per cent and staking at 2.98 per cent, specific to Banana cultivation practices. Other significant expenses included fertilizer at 5.32 per cent, manures at 5.76 per cent and miscellaneous at 5.44 per cent. On the fixed costs, depreciation was at 4.40 per cent and rental value of land was at 3.80 per cent.

The highest total cost among the three was for Orange at Rs. 473,142.90/-, with 87.68 per cent as variable cost and 12.32 per cent as fixed cost. Hired labour at 31.30 per cent and owned labour at 17.00 per cent were major cost components, which confirmed the labor-intensive nature of orange farming as well. A notable cost was seen in plant protection at 6.20 per cent, harvesting and transportation at 6.45 per cent, and miscellaneous at 6.32 per cent, showing higher post-production and handling expenses. Interestingly, Orange cultivation included cost of planting at 1.10 per cent, unlike Pineapple and Banana. In fixed costs, depreciation at 5.98 per cent and rental value at 4.10 per cent were major components, which reflected capital investment in long-term orchard maintenance.

Cost benefit ratio of major horticultural crops

Table 4 : Cost of Pineapple, Banana and Orange production (Rs./ha)

Particulars	Pineapple	Banana	Orange
A. Variable cost:			
Labour Hired	128123.70 (32.80)	24179.43 (29.90)	148093.73 (31.30)
Labour Owned	62108.75 (15.90)	12777.09 (15.80)	80434.29 (17.00)
Land preparation	9140.53 (2.34)	2692.89 (3.33)	15850.29 (3.35)
Digging pits	0.00 (0.00)	226.43 (0.28)	2129.14 (0.45)
cost of plant	0.00 (0.00)	0.00 (0.00)	5204.57 (1.10)
Cost of suckers	14843.60 (3.80)	1536.49 (1.90)	0.00 (0.00)
Cost of plant protection	18359.19 (4.70)	4205.12 (5.20)	29334.86 (6.20)
Cost of fertilizer	26562.23 (6.80)	4302.15 (5.32)	24698.06 (5.22)
Cost of manures	12578.00 (3.22)	4657.97 (5.76)	18310.63 (3.87)

Irrigation expenses	8203.04 (2.10)	1512.22 (1.87)	9368.23 (1.98)
Stakes and staking	0.00 (0.00)	2409.85 (2.98)	0.00 (0.00)
Interculture	11640.51 (2.98)	2159.16 (2.67)	15708.34 (3.32)
Harvesting, Load. and unload. + transportation	18163.88 (4.65)	4569.02 (5.56)	30517.72 (6.45)
Miscellaneous	23359.14 (5.98)	4399.20 (5.44)	29902.63 (6.32)
Interest on working capital	8281.166 (2.12)	2595.85 (3.21)	5299.20 (1.12)
Total variable cost	341363.70 (87.39)	72222.90 (89.31)	414851.70 (87.68)
B. Fixed cost			
Depreciation	20702.92 (5.30)	3558.18 (4.40)	28293.95 (5.98)
Land revenue	7538.99 (1.93)	1293.88 (1.6)	6008.91 (1.27)
Rental value of owned land	17187.33 (4.40)	3072.97 (3.80)	19398.86 (4.10)
Interest on fixed assets excluding land	3828.09 (0.98)	719.72 (0.89)	4589.49 (0.97)
Total fixed cost	49257.31 (12.61)	8644.75 (10.69)	58291.20 (12.32)
Total cost	390621.10 (100.00)	80867.65 (100.00)	473142.90 (100.00)

Table 5 revealed that Cost A_1 and A_2 for Pineapple were similar and was Rs. 299,215.70/-, reflecting the paid-out cost which included hired labour and material inputs, without accounting for owned resources. Cost B_1 was Rs. 311,325.00/- and B_2 was Rs. 328,512.30/- which included interest on fixed assets and rental value of owned land, respectively, showing the cost of capital use and land. Cost $C_1$was Rs. 373,433.70/- adding family labour and Cost C_2 was Rs. 390,621.10/- representing the total cost including all fixed and variable inputs. Cost C_3 was Rs. 429,683.21/-and included managerial charges.

Similarly, for Banana, Cost A_1 and A_2 was Rs. 61,702.02/-, which was the lowest among the three crops, highlighting lower paid-out costs. Cost B_1 was Rs. 65,017.59/- and B_2 was Rs. 68,090.56/-which remained quite close, showing a modest land rental component. Cost C_1 was Rs. 77,794.68/- and C_2 was Rs. 80,867.65/- showing inclusion of family labour and full costs. Cost C_3 was Rs. 88,954.42/-, which was again the lowest among all.

Lastly, for Orange, Cost A_1 and A_2 was Rs. 363,421.10/-, which was much higher than that of Banana and Pineapple, reflecting higher paid-out expenses, including labour, inputs, and plant protection. Cost B_2 was Rs. 392,708.60/- and C_2 was Rs. 473,142.90/-which showed a steep rise, indicating heavy dependence on owned land, fixed assets and family labour. Cost C_3 was R. 520,457.20/- marking orange production costs as the highest among all the three crops, reflecting significant managerial and operational intensity.

Table 5 : Cost of Pineapple, Banana and Orange (Rs./ha)

Sl. No.	Cost Concept	Pineapple	Banana	Orange
1.	Cost A_1	299215.70	61702.02	363421.10
2.	Cost A_2	299215.70	61702.02	363421.10
3.	Cost B_1	311325.00	65017.59	373309.70
4.	Cost B_2	328512.30	68090.56	392708.60
5.	Cost C_1	373433.70	77794.68	453744.00
6.	Cost C_2	390621.10	80867.65	473142.90
7.	Cost C_3	429683.21	88954.42	520457.20

Table 6 revealed that the production for Pineapple was 172.60 q @ Rs. 4,300.00/q with a gross income of Rs. 742,180.00 and net income of Rs. 351,558.95/-. Farm labour income was Rs. 413,667.70/- which indicated a solid return after deducting Cost B_2. Farm business income was Rs. 442,964.30/-, which suggested a strong profitability even with only cash expenses. Incentive income was Rs. 372,574.36/- reflecting compensation for family labour and managerial inputs. Benefit-Cost Ratio of 1.90, showed that for every Rs. 1.00/- spent, Rs. 1.90/-was earned which indicated good profitability.

Similarly, for Banana, production was 61.10 q @ Rs. 2,250.00/q with a gross income of Rs. 137,475.00/- and net income was Rs. 56,607.35/- which was the lowest among the three, indicating lower profitability. Farm labour income was Rs. 69,384.44/- which was modest, reflecting limited returns after accounting for fixed costs and owned resources. Farm business income was Rs. 75,772.98/- which was slightly better, showing decent returns over direct cash expenses. Incentive income was Rs. 60,400.05/-, which reflected low but positive returns to unpaid family efforts. And, Benefit-Cost Ratio of 1.70 indicated that for every Rs. 1.00/-invested Rs. 1.70/-was returned.

However, for orange production, the cost was 82.80 q @ Rs. 12,000.00/q with a gross income of Rs. 993,600.00/-. Net income was Rs. 520,457.14/-; which was the highest among all crops, showing excellent return over full costs. Farm labour income was Rs. 600,891.40/-, which was significantly higher, indicating strong compensation after deduction of fixed and rental costs. Farm business income was Rs. 630,178.90/-, showing excellent profitability over paid-out costs. Incentive income was Rs. 544,445.49/-, indicating a robust return for both managerial and family labour. Benefit-Cost Ratio of 2.10, which was the highest, indicated the best investment efficiency among the three crops taken into study.

Table 6 : Returns from Pineapple, Banana and Orange

SL. No.	Particulars	Pineapple	Banana	Orange
1.	Main production (in q)	172.60	61.10	82.80
2.	Rate of main product (Rs. /q)	4300.00	2250.00	12000.00
3.	Value of main product (in Rs.)	742180.00	137475.00	993600.00
4.	Gross income (in Rs.)	742180.00	137475.00	993600.00
5.	Farm labour income (in Rs.)	413667.70	69384.44	600891.40
6.	Net income (GI- Cost C_3)	351558.95	56607.35	520457.14
7.	Incentive income (in Rs.)	372574.36	60400.05	544445.49
8.	Farm business income (in Rs.)	442964.30	75772.98	630178.90
9.	Benefit-cost ratio	1.90: 1	1.70: 1	2.10: 1

Table 7 revealed that for Pineapple, Channel I (Producer → Retailer → Consumer) was used by 57.50 percent of farmers, which was represented by 23 respondents out of 40 and on Channel II (Producer → Wholesaler → Processor/Retailer → Consumer) was chosen by 42.50 percent which was represented by 17 out of 40 respondents, respectively.

Similarly, for Banana, Channel II dominated, with 55.00 per cent of farmers which was 22 respondents out of 40, using the route involving wholesalers and processors and only 45.00 per cent (18 out of 40) respondents marketed directly through retailers.

Finally, for Orange, 52.50 per cent of respondents (21 out of 40) followed direct marketing through retailers, while 47.50 per cent of respondents (19 out of 40) used the longer channel involving wholesalers and processors.

Table 7 : Marketing channels of Pineapple, Banana and Orange

Sl. No.	Identified channels	Pineapple		Banana		Orange	
		No's	%	No's	%	No's	%
1.	Producer-Retailer-Consumer	23	57.50	18	45	21	52.50
2.	Producer- Wholesaler -Processor Retailer- Consumer	17	42.50	22	55	19	47.50
Total		40	100.00	40	100.0	40	100.00

Table 8 revealed that for Pineapple, Channel-I (Producer → Retailer → Consumer), the retailer earned the highest margin at 38.75percent. This channel provided nearly 53.00 per cent of the consumer price back to the farmer, making it more efficient for the producer. In Channel-II (Producer → Wholesaler → Processor → Retailer → Consumer), although the farmer earned Rs. 43.00/-, the consumer paid Rs. 130.00/-. More middlemen in Channel-II led to higher cumulative costs and reduced producer share.

Similarly, for Banana, in Channel I, the retailer captured a larger share of the margin at 41.11percent, with the consumer paying Rs. 45.00/- and the farmers receiving Rs. 21.50/-. In Channel II, the consumer paid Rs. 180.00/-, while the farmer still got just Rs. 22.00/-, indicating high inefficiency and low producer benefit. The processor and retailer dominated the margin in Channel II, with high handling and processing costs.

Finally, for Orange, margins of intermediaries were lower in both channels, indicating greater efficiency, with channel I still offering slightly better returns and a shorter marketing chain.

Table 8 : Price spread and marketing margin in the identified channels of Pineapple, Banana and Orange

Sl. No.	Particulars	Pineapple		Banana		Orange	
		Ch-I	Ch-II	Ch-I	Ch-II	Ch-I	Ch-II
1.	Farmer / Producer						
	Net price	42.00	43.00	21.50	22.00	115.00	116.00
	Cost incurred	-	1		1.50		2.00
	Per cent	-	0.77		0.83		1.14
2.	Wholesaler						
	Purchase cost		44.00		23.50		118.00
	Cost incurred		3.00		5.00		3.00
	Profit margin		5.00		6.00		2.00
	percent share of costs		2.31		2.78		1.71
	Per cent		3.85		3.33		1.14
3.	Processor						
	Purchase cost		52.00		34.50		123.00
	Cost incurred		28.00		77.50		27.00
	Profit margin		15.00		28.00		9.00
	Per cent share of costs		21.54		43.06		15.43
	Per cent		11.54		15.56		5.14
4	Retailer						
	Purchase cost	42.00	95.00	21.50	140.00	115.00	150.00
	Cost incurred	7.00	8.00	5.00	6.00	6.00	9.00
	Profit margin	31.00	27.00	18.50	34.00	19.00	16.00
	percent share of costs	8.75	6.15	11.11	3.33	4.29	5.14
	Per cent	38.75	20.77	41.11	18.89	13.57	9.14
5	Consumers price	80.00	130.00	45.00	180.00	140.00	175.00

Table 9 : Price spread in various marketing channels of Pineapple, Banana and Orange (Rs./ kg)

Sl. No.	Particulars	Pineapple		Banana		Orange	
		Ch-I	Ch-II	Ch-I	Ch-II	Ch-I	Ch-II
1.	Retailer's sale price (RP)	80.00	130.00	45.00	180.00	140.00	175.00
2.	Total marketing cost (MC)	7.00	40.00	5.00	90.00	6.00	41.00
3.	Total net margins of intermediaries (MM)	31.00	47.00	18.50	68.00	19.00	27.00
4.	Net price received by the producer (FP)	42.00	43.00	21.50	22.00	115.00	116.00

Table 9 revealed that for Pineapple in Channel I, the producer received over half of the consumer's rupee, making it more efficient. Channel II inflated the consumer price significantly by Rs. 50.00/- more, yet the producer's gain was only Rs. 1.00/- higher. Higher marketing costs and margins in Channel II reduced producer share and increased final prices.

Similarly, for Banana, Channel I again gave nearly half of the consumer's price to the farmer. In Channel II, while the consumer paid Rs. 135.00/- more, the producer earned just Rs. 0.50/- more. Excessive marketing costs and margins at Rs. 158.00/- in Channel II drastically reduced producer benefit and consumer value.

Finally, for Orange, both channels were reasonably efficient compared to Pineapple and Banana. The producer retained a larger share of the retail price, even in Channel II.

Conclusion

According to this study, among the three crops, orange offered the highest profitability and productivity despite its higher input cost, while Banana cultivation showed the weakest economic performance. Declining trends in area and production, especially in Banana and Orange, underlined the urgent need for policy and infrastructural interventions. The marketing system was heavily skewed against producers, especially in multi-intermediary channels like Channel-II, where producer margins drastically declined.

Policy Recommendation

1. Strengthen Input Supply Chains: Ensure timely and affordable availability of quality planting materials, especially suckers, and promote nurseries.
2. Improve Irrigation Infrastructure: Invest in small-scale irrigation schemes to reduce weather dependence.
3. Training programs on pest and disease control can reduce yield losses.
4. Upgrade Marketing Infrastructure: Establish rural storage and market yards, and subsidize transport costs to improve market access.

Conflict of Interest: The author declares that there is no conflict of interest

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