An Economic Analysis of Production and Marketing of Chilli in Mokokchung District of Nagaland

** Sashimatsung*
*** Giribabu M.*

Abstract

The present study was based on information collected from 50 chilli growers, 12 retailers, and eight wholesalers from the Mokokchung district of Nagaland in the crop year 2012-13 through a pre-tested well designed questionnaire. Purposively, the paper intended to discover the surplus, cost, margin, and price spread of chilli production and marketing in Longsa village. The study revealed that after holding 9.5% for domestic purpose, producers were left with 90.5% as marketable surplus of which the actual marketed surplus was 86.33% due to 4.17% loss in spoilage and wastage. Regression coefficient with and without the dummy factor showed that area and production were two major determinants having a positive impact on marketed surplus at the 1% probability level of significance. Furthermore, it was observed that a majority of the farmer-producers (52.3%) sold their produce to retailers, that is, channel – II, indicating the most prominent channel. The net price received by producers in consumer's rupee in channel – I was 97.63%, channel – II: 82.43%, and channel – III: 61.9%, signifying that the producer-consumer channel was the highest marketing efficiency channel according to Shepherd's and Acharya-Agarwal's methods. It further concluded that 93% of chilli was traded in the market by way of retailers and wholesalers, and only 7% within the village.

Keywords : **production, marketed surplus, cost, margin, price spread, efficiency, constraints**

JEL Classification: C81, C87, D24, M31, Q12, Q13, Y10

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In recent times, production and marketing of agricultural crops has received wide attention from policy makers, planners, and scholars due to its profitable enterprise and export potential (Srivastava, 1994). According to the Report of National Commission on Agriculture, Govt of India (1976), it is necessary to improve the marketing system to aid the process of agricultural development for two reasons: if the additional surplus does not move to the market to bring additional revenue to farmers, it may work as a disincentive to increase production; secondly, if the system does not supply food grains and other agricultural commodities, such as oils, fruits, vegetables, milk, fish, meat at reasonable prices to consumers at the time and place needed by them, increased production has no meaning in a welfare society. It further states that agricultural marketing is a process, it starts with a decision to produce a saleable commodity which includes all market aspects both in pre and post harvest operation like assembling, storage, and distribution.

Although considerable progress has been attained in agriculture technology by use of high-yielding variety seeds, chemical fertilizers, and plant protection measures, the rate of growth in farming has not reached the expected level. This has largely been attributed to the fact that not enough attention has been given to marketing facilities and services in the North-East Region of India, and particularly in the state of Nagaland [1]. There is a

* *Assistant Professor,* Department of Economics, Jubilee Memorial College, Near New Market, Salangtem Ward, P.O Mokokchung-798 601, Nagaland. E-mail: Sashimatsung@gmail.com
** *Assistant Professor,* Department of Economics, Nagaland University, Lumami -798 627, Nagaland.
Email: girichu@gmail.com

lack of institutional agencies involved in the distribution process; hence, farmer-producer sells directly to consumers and through retailers and wholesalers who, of course, take advantage of them. Thus, marketing conditions in Nagaland are largely unorganized and subjugated by private traders. The study, therefore, attempts an in-depth investigation on production, surplus, and marketing conditions of chilli in Mokokchung district of Nagaland state and suggests possible options to promote an effective, efficient, and integrated agricultural marketing system.

Review of Studies

Thakur (1973) examined the marketing margin and price spread of Indian apple, concluding that the marketing system was well integrated and that trader profit margins accounted for 45.5% of the price paid by consumers. The main implications of his study drew attention to scope for traders to earn high profits. Gupta and Ram (1979) analyzed the behaviour of marketing margin and cost of vegetables in Delhi and concluded that producers received only 38% of the price paid by the consumer and the rest was earned by the middlemen as margin.

Marothia, Gupta, and Chandrakar (1996) examined the marketing pattern of vegetables, marketing cost, margins, and price-spread in different marketing channels and thereby suggested policy measures to improve vegetable marketing. Their results showed that small farmers preferred to sell directly to consumers, while medium and large farmers sold their produce to retailers through commission agents.

Chole, Talathi, and Naik (2003) were of the opinion that marketable surplus was no different from marketed surplus because of its perishability, lack of storage, and price fluctuation, and that surplus was negatively related with farm size. Supplementary per quintal cost of marketing brinjal by producers was highest in channel II followed by channels I and III. Consequently, high marketing margin pocketed by intermediaries in channel II and III resulted in poor marketing efficiency of brinjal.

Jyothi and Raju (2003) purposively conducted a study on marketing pattern and price spread of crossandra, jasmine, and rose flowers in east Godavari district of Andhra Pradesh during 1995-96, and concluded that producers' share in consumers rupee was 63.38% for crossandra, 58.06% for jasmine, and 50% for rose.

Balappa and Hugas (2003) attempted to examine the economics of onion production and its marketing cost, marketing channels, producers' share in consumers' rupee, price spread in Karnataka State from 150 cultivators. Out of four channels, channel IV was not popular, that is, the producer-consumer channel. The share of producers in consumers' rupee was roughly equal in channels I and II, and further brought out that among the market intermediaries, share of retailers was greater than that of other market agents.

Chauhan and Chhabra (2005) conducted a study on the production and marketing of maize from 120 growers in the Hamirpur district of Himachal Pradesh during the agricultural year 2001-02. Accordingly, three marketing channels were identified of which channel II (producer-local traders-WS/commission agent-processor/consumer) was the main channel in the marketing of maize, where 71.93% of the farmers marketed around 70% of their produce through this channel. Their regression coefficient implied that only production had a positive effect on the size of marketed surplus, while family size and price had an inverse relationship with marketed surplus.

Sadhu (2011) found out that the average marketable surplus of potato was 83.1%. The average retention was 56.32 quintal (16.93%) of which home consumption was 2.38%, wage in kind was 7.37%, paid to artisans was 2.81%, seed requirement was 1.86%, and spoilage was 2.51%. Across farm size, wage in kind was high among the large farmers due to higher wage paid by them to labourers and village artisans.

Barakade, Lokhande, and Todkari (2011) in their studies on economics of onion cultivation found that maximum quantity of onion was transacted through channel IV (75.90%) followed by channel II (21.30%), channel III (12.98%), and channel I (2.88%). Share of producers in consumers' rupee was highest in channel I (93.06%) and lowest in channel IV (68.82%). Thus, channel I was the most efficient marketing channel. Joshi

(2011), in his study, found out three channels for disposing brinjal and found that producers' share in consumers' rupee was the highest where there were least number of intermediaries.

Dastagiri et al. (2013) conducted a study on Indian vegetables in eight states covering 20 crops and concluded that producer-wholesaler-retailer-consumer was the most common marketing channel followed by producer-retailer-consumer and producer-consumer channel. The most efficient channel was the producer-consumer channel, and marketing cost, margin, transportation, and labour cost were the factors that adversely affected marketing efficiency while open market price, volume of produce, and net price received are factors that increased marketing efficiency. Kalidas and Akila (2014) concluded that nearly all farmers sold their produce to wholesalers and further suggested that efforts should be made to espouse superior packing techniques and materials at the farm level.

Christian, Zala, and Gondalia (2015) attempted a study on marketing of lime in middle Gujarat considering the disposal pattern of marketable surplus, price spread, and marketing efficiency. They concluded that marketing cost and margins together accounted for about 64% of the retail price, limiting producers' share in consumers' rupee. Kaur and Sidhu (2015) examined the marketing system and the price spread of potato in Jalandar district of Punjab during the period from 2012-13. Their study revealed that average home consumption was 8.77%, and the actual marketed surplus was 91.23%. Three channels were identified of which channel I, that is, sale through wholesaler market was dominant; however, they concluded that direct sale (channel III) was the most efficient channel. Furthermore, in their study, they found that the farmer received 47.63% of the consumers' rupee, the wholesaler: 9.31%, and the retailer received 19.44%.

Research Questions

(1) How do farmer-producers sell their surplus and what are the costs involved?

(2) What is the marketing cost and marketing margin of market intermediaries?

(3) What is the price spread under various channels?

(4) What is the share of the producer in the consumers' rupee?

(5) Which channel is efficient for marketing of chilli?

(6) What are the main constraints perceived by the farmer-producer?

Objectives of the Study

The present study intends to achieve the following objectives:

- To estimate production, retention, marketable, and marketed surplus.
- To analyze the factors determining marketed surplus.
- To identify the existing channels in marketing of chilli and verify the foremost channel.
- To study the marketing cost, marketing margin, and price spread.
- To establish the producer's share in consumer's rupee.
- To determine marketing efficiency, that is, the efficient channel in marketing of chilli.
- To examine the selling behaviour and constraints of farmer-producer.

Methodology

Longsa [2] village under Mokokchung district of Nagaland was purposively selected for the present study because of its high economics in production and marketing of chilli. Information on production, retention, marketable, and marketed surplus, disposal pattern, price and cost were largely collected by means of a well structured questionnaire from 50 respondents. Throughout the survey, 12 retailers and 8 wholesalers were interviewed who were involved in chilli commerce. Field assessment was conducted during the crop year 2012-2013.

(i) Marketing Cost:

$$TC = P_c + \sum MC_{ith}$$

where,
TC = Total marketing cost,
P_C = Marketing cost of producers,
Mc_{ith} = Marketing cost of ith intermediaries.

(ii) Marketing Margin:

$$MM = Sp - (Pp + Mc)$$

where,
MM = Marketing margin,
Sp = Selling price,
Pp = Purchase price,
Mc = Marketing cost

(iii) Producers Share:

$$PS = \frac{P_r}{C_P} X100$$

where,

PS = Producers share,
P_r = Price received by producer-farmer,
C_p = Consumers price,

(iv) Price Spread:

$$PS = PC - PR$$

where,

PS = Price spread,
PC = Price paid by final consumer,
PR = Price received by ultimate producer.

(v) Farmer-Producer Net Price:

$$NP_P = GP_P - \{C_P + (ML_P \text{ x } GP_P)\}$$

Or

$$NP_P = \{GP_P\} - \{C_P\} - \{ML_P \text{ x } GP_P\}$$

where,

NP_P = Net price received by the producers,
GP_P = Gross price received by producers,
C_P = Marketing cost incurred by the producers,
ML_P = Marketing losses.

Marketing efficiency is determined by applying conventional, Shepherd's, and Acharya-Agarwal's methods.

(vi)Conventional Method:

$$CM = \frac{\text{Value added}}{\text{Total marketing cost}}$$

where,
CM = Conventional method
Value added - $(C_P - NP_P)$

Shepherd (1965):

$$ME = \frac{V}{I} - 1$$

where,

ME = Marketing efficiency,
V = Consumers price

Acharya and Agarwal (2001):

$$ME = \frac{NP_p}{MC+MM}$$

where,
ME = Marketing efficiency,
I = Total marketing cost,
NP_p = Net price of producers,
MC = Marketing cost,
MM = Marketing margin.

The factors affecting marketed surplus is expressed in the form of an equation as:

$$MS = f(X1, X2, X3, X4, X5, X6, X7 \ldots \ldots\ldots Xn)$$

where,

MS = Marketed surplus and *'f'* is the functional relationship, $X1$ - Family size, $X2$ - Age of the respondents, $X3$ - Education of the respondents in years, $X4$ - Area under the crop (in hectare), $X5$ - Production (kg/household), $X6$ - Self consumption of the farm (kg/household), $X7$ - Other use, that is, for gift and religious payments, $X8$ -

Post-harvest loss from producer till consumer (kg/household), *X*9 - Price of chilli (₹/kg), *X*10 - Storage facility (1-for adequate and 0-for otherwise), *X*11 - Weather condition (1-for adequate and 0-for otherwise), *X*12 - Transportation facility (1-for adequate and 0-for otherwise), *X*13 - Market linkage (1-for adequate and 0-for otherwise), *X*14 - Marketing facility (1-for adequate and 0-for otherwise), *X*15 - Availability of labour (1-for adequate and 0-for otherwise).

In view of analyzing the factors determining marketed surplus, a multiple linear regression model has been applied as specified below:

$$Y_t = \sum_{i=0}^{n} \beta_1 X_t = \mu_t$$

Also,

$$MS = a_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + \ldots + b_n x_n + \mu_t$$

where,
a_0 = Constant,
b_i = Regression coefficient of independent variables, where $i = 1$ to n
x_i = Determinants of marketed surplus, where $i = 1$ to n
μ_t = Error term

Results and Discussion

(1) Marketable and Marketed Surplus : The quantity of produce for selling by farmer-producer after holding for self-consumption, gifting to friends and relatives, including all payments in kind is the marketable surplus ; whereas, the actual quantity brought in the market for selling irrespective of home consumption, gift, and kind is the marketed surplus (Acharya & Agarwal, 2010). Farmer-producer surplus is the quantity which is actually made available to the non-producing population, and all market arrangements have to be made for this surplus available with the farmers. However, a mere increase in agricultural production is not important for agrarian economics, but marketable surplus must also increase simultaneously (Chole et al., 2003).

The Table 1 depicts that out of 470.17 quintals of production, the surplus available for marketing was 425.51 quintals (90.5%) after holding 44.66 quintals (9.5%) for home consumption and for other uses such as gifting to friends, relatives, labour, and religious payment. Similar results were obtained by Sadhu (2011) and Shiyani, Khunt, Thanki, Gondalia, Gajjar, Ardeshna, and Thumar (2007). However, the actual quantity of chilli marketed by farmer-producer was 86.33% of the total output. This was due to post-harvest loss (4.17%) caused by absence of storage facilities near the production area, lack of timely transportation and market link, & mishandling and spoilage.

The Table 1 also reveals that the production of chilli in June was 146.95 quintals ; in July, it was 197.08 quintals ; and in August, it was 126.14 quintals; maximum output was in July (peak season), and the lowest was in August (lean season). The retention for home consumption and other use was towering in July and waned as production plummeted in August. Consequently, the percentage of marketable surplus was higher in August followed by months of June and July. Also, better handling of crop was noted amongst the farmer-producer in August (3.62%) than in the subsequent months. This was due to smaller quantity of chilli to manage, rise in market price, and demand unlike the months of June and July when the market gets glut. As a result, the percentage of quantity actually marketed was about 90% in August followed by 85.56% in June and 84.79% in July, respectively.

Table 1. Production, Marketable, and Marketed Surplus of Chilli

Particulars	June (q)	July (q)	August (q)	Overall (q)
Production	146.95	197.08	126.14	470.17
	(100)	(100)	(100)	(100)
Total Retention [a+b]	15.05	21.1	8.51	44.66
	(10.24)	(10.71)	(6.75)	(9.5)
[a] Home consumption	3.73	5.3	3.16	12.19
	(2.54)	(2.69)	(2.51)	(2.59)
[b] Other use	11.32	15.8	5.35	32.47
	(7.70)	(8.02)	(4.24)	(6.91)
· Gift to friends	1.56	2.1	0.54	4.2
	13.78*	13.29*	10.09*	12.93*
· Gift to relatives	1.05	2.19	0.47	3.71
	9.28*	13.86*	8.78*	11.43*
· Gift to labours	0.61	0.81	0.16	1.58
	5.39*	5.13*	2.99*	4.87*
· Religious payment	8.1	10.7	4.18	22.98
	71.55*	67.72*	78.13*	70.77*
Marketable surplus	131.9	175.98	117.63	425.51
	(89.76)	(89.29)	(93.25)	(90.5)
Post-harvest loss	6.17	8.87	4.57	19.61
	(4.2)	(4.5)	(3.62)	(4.17)
Marketed surplus	125.73	167.11	113.06	405.9
	(85.56)	(84.79)	(89.63)	(86.33)

Source : Based on Field Survey, 2012-13

Note : Figures in parentheses are in percentage to respective month-wise and overall production *- are in percentage to other use

(2) Factors Affecting Marketed Surplus : The regression result of chilli with dummy variables is demonstrated in the Table 2. While area, production, storage, and transportation are positively significant at the 1% probability level, signifying that a unit increase in these variables will augment marketed surplus by 897.14 kg, 832.82 kg, 75.94 kg, and 105.85 kg, respectively. This means that with an increase in area, more crops will be brought under cultivation, accumulating output escalating surplus for marketing. Chilli being highly perishable, the storage capacity will increase marketed surplus and with appropriate transportation, it will eliminate the risk of post-harvest loss, thereby adding to surplus. Conversely, age of the farmer, self-consumption, and post-harvest loss have a negative impact on marketed surplus at *p*-value of 0.05. The negative coefficient of age indicates that as age increases, physical fitness of the farmer-producer slows, thus lowering working hours and decreasing output. Alike, post-harvest loss due to mishandling, spoilage and wastage, and increase in self consumption trimmed down marketed surplus by 47.75 kg and 92.68 kg, respectively. Thus, variables with dummy explain 99% of the variation in the marketed surplus.

Month wise inference of regression analysis indicates that in June, age, area, production, storage, transportation, and market facility are major determinants having a statistical significance at the estimated

Table 2. Regression Results of Chilli with Dummy Variables

Variables	June	July	August	Overall
	Coefficient (*t*-value)	Coefficient (*t*-value)	Coefficient (*t*-value)	Coefficient (*t*-value)
Constant	-1245.83	-2042.58	-1628.2	-4375.63
Family size	3.20	2.98	2.62	9.36
	(1.47)	(1.59)	(1.08)	(1.50)
Age	-0.95	-0.77	-0.56	-2.77
	(1.73)***	(1.58)	(1.05)	(1.78)***
Education	0.29	0.14	0.66	1.78
	(0.38)	(0.18)	(0.89)	(0.78)
Area	295.05	219.98	274.07	897.14
	(4.40)*	(3.13)*	(3.83)*	(4.19)*
Production	225.56	394.86	225.89	832.82
	(7.04)*	(10.14)*	(8.77)*	(7.69)*
Self consumption	-6.89	-15.93	12.28	-47.75
	(0.88)	(2.51)*	(1.62)	(2.17)**
Other use	-2.64	-32.41	-8.89	-68.48
	(0.22)	(2.70)*	(1.70)***	(1.54)
Post-harvest loss	-12.24	-32.14	-4.16	-92.68
	(0.89)	(2.02)**	(0.44)	(1.77)***
Price	4.22	4.87	11.26	0.83
	(1.43)	(1.71)***	(3.14)*	(0.13)
Storage (DV)	24.53	23.91	21.84	75.94
	(2.50)*	(2.70)*	(2.11)**	(2.68)*
Weather (DV)	-0.09	-1.24	-8.44	-8.25
	(0.12)	(0.25)	(1.52)	(0.53)
Transportation (DV)	40.97	29.59	27.16	105.85
	(5.03)*	(4.31)*	(3.28)*	(4.62)*
Market link (DV)	-5.43	-13.03	-9.75	-35.12
	(0.62)	(1.65)	(1.19)	(1.44)
Market facility (DV)	24.48	17.12	19.89	48.17
	(2.18)**	(1.69)***	(1.96)***	(1.49)
Labour availability (DV)	-4.39	3.32	-1.78	2.71
	(0.55)	(0.49)	(0.23)	(0.12)
R^2	0.983	0.988	0.983	0.985
F change	189.794	281.291	191.154	219.953
N	50	50	50	50

Source : Based on Field Survey, 2012-13

Note : DV-Dummy Variable

Figures in parentheses indicate *'t'* value of the estimates.

*, **, *** significant at 1%, 5%, & 10% probability levels, respectively.

p-value of 0.05 (see Table 2). Except for the age of the farmer, the other five variables show a positive relationship with marketed surplus. The 5% statistical significance of market facility means that with the provision and availability of marketing facility like storage, information on price, arrival, and rest room facility motivates the farmer-producer to produce more and thus, augment the marketed surplus. In July, area, production, price, storage, transportation, and market facility have a positive relationship with the dependent variable. Here, price is statistically significant at the 10% probability level of significance, indicating a unit increase in price will boost marketed surplus by 4.87 kg; this elucidates that enhanced price has a direct influence on the farmer-producer mind.

A similar result was confirmed by Dandekar (1964) and Rajkrishna (1962): a positive relationship between price and marketed surplus indicated that farmers are price conscious. On the contrary, Chauhan and Chhabra (2005) determined that price had an inverse relationship with marketed surplus. Self consumption, other use, and post-harvest loss showed a negative relationship with marketed surplus during the month (July). The negative significance of 'other use' to marketed surplus was that the increase in the need for gifting to friends, relatives, labourers, and religious payment directly reduced surplus. Therefore, marketed surplus of the respondents was significantly affected when there was an increase in other use. Likewise, in the month of August, the variables that

Table 3. Regression Results of Chilli Without Dummy Variables

Variables	June	July	August	Overall
	Coefficient (*t*-value)	Coefficient (*t*-value)	Coefficient (*t*-value)	Coefficient (*t*-value)
Constant	-1522.23	-1817.39	-2306.61	-4903.18
Family size	-2.24	-0.28	-2.79	-4.57
	(0.71)	(0.1)	(0.89)	(0.49)
Age	-0.23	0.31	0.28	-0.16
	(0.28)	(0.43)	(0.38)	(0.07)
Education	0.72	0.84	0.76	2.84
	(0.6)	(0.71)	(0.7)	(0.78)
Area	292.47	286.86	180.4	849.68
	(2.98)*	(2.69)*	(1.93)***	(2.59)*
Production	272.43	334.39	258.94	890.8
	(5.75)*	(5.73)*	(8.13)*	(5.50)*
Self consumption	3.01	-14.02	-3.89	-25.55
	(0.26)	(1.39)	(0.37)	(0.73)
Other use	-29.45	-34.41	-7.75	-126.32
	(1.72)***	(1.85)***	-1.03	(1.87)***
Post-harvest losses	-27.61	-7.55	2.75	-87.25
	(1.29)	(0.31)	(0.21)	(1.12)
Price	7.41	5.47	21.02	7.72
	(1.6)	(1.2)	(4.55)*	(0.74)
R^2	0.956	0.969	0.962	0.959
F change	118.409	171.967	140.28	129.968
N	50	50	50	50

Source : Based on Field Survey, 2012-13

Figures in parentheses indicate *'t'* value of the estimates.

*, **, *** significant at 1%, 5%, & 10% probability levels, respectively.

have a positive statistical significance are area, production, price, storage, transportation, and market facility, while the variable 'other use' has a negative significant impact on the marketed surplus.

The regression coefficient of chilli plummeting all dummy variables depicts that area and production predominant at the 1% probability level of significance suggest that a unit increase in these factors will augment surplus by 849.68 kg and 890.80 kg, correspondingly (Table 3, overall column). Whilst 'other use' has a negative relationship (statistically significant at the 10% level), surplus drops by 126.32 kg for a unit increase in gift and kind. Similarly, in June and July, area and production are major factors that increase surplus, whilst an increase in 'other use' decreases surplus. In August, variables having statistical significance at the estimated value of 0.05 are all positively related with marketed surplus. R^2 explains 96% variation without dummy variables.

(3) Marketing Channel : Marketing channels are a combination of agency and intermediary through which the producer disposes his products in the market to the ultimate consumer. Increase in area and production augment marketable surplus: now, if there is no sufficient demand or appropriate marketing facility to absorb this increased production or the failure of markets to transmit price would result in frequent market glut and associate price crash. The main factor that determines in decision making of the producer is the price offered by the trader at the harvest time (Sreenivasa, Gajanana, Sudha, & Subramanyan, 2002). Far and distant marketing channels indicate how market intermediaries are set to accomplish the movement of a product from producer to the final consumer. The most common channels used by the farmer-producer detected in the present study are:

Channel I : Producer – Consumer
Channel II : Producer – Retailer/Vendor – Consumer
Channel III : Producer – Wholesaler – Retailer – Consumer

(4) Disposal Pattern : The total quantity of chilli marketed by farmer-producer in channel I, II, and III are 28.17, 212.09, and 165.64 quintals, respectively as presented in the Table 4. This shows that 52.25% of the total marketed surplus was disposed through channel II followed by channel III (40.81%) and channel I (6.94%). Therefore, marketing of chilli was more significant through channel II (i.e. via retailer) and less significant through channel I in the study area during the reference year. The study, however, shows results contradicting Kaur and Sidhu (2015), Christian et al. (2015), Kalidas and Akila (2014), Dastagiri et al. (2013), Barakade et al. (2011), and Chauhan and Chhabra (2005) who found that selling through a wholesaler and commission agent was prominent; although, similar conclusions resulted in case of direct marketing.

(5) Marketing Cost, Marketing Margin, and Price Spread : Marketing cost varies from commodity to commodity and changes overtime depending on the nature of commodity, consumption, storage, transportation, market distance, packing, labour, tax, and price (Acharya & Agarwal, 2010). Marketing cost and marketing margin differ considerably from channel to channel and are related directly to the length of the channel, that is, longer the channel, the higher the marketing cost and marketing margin. Marketing margin is the profit earned by

Table 4. Disposal Pattern of Chilli

Marketing Channel	Channel No	Quantity sold (q)	In %
Producer - Consumer	I	28.17	6.94
Producer - Retailer/Vendor - Consumer	II	212.09	52.25
Producer - Wholesaler - Retailer - Consumer	III	165.64	40.81
Total		**405.9**	**100.00**

Table 5. Marketing Cost, Margin, and Price Spread of Chilli in Channel - I

Particulars	Chilli (₹/q)	Producer's share in consumer's rupee (%)
Producer's Level		
Sale price	1,298.92	100.00
Marketing cost		
• Labour cost	28.17	2.17
• Plastic bags	2.6	0.2
Total marketing cost of producer	30.77	2.37
Net price received by producer	1,268.15	97.63
Consumer's price	**1,298.92**	**100.00**

different intermediaries involved in moving the product from the point of production until it reaches the ultimate consumer. The difference between the price paid by the consumer, and the price received by the producers for an equivalent quantity of farm produce is the price spread. In the view point of marketing efficiency, this gap has to be reduced to the closest minimum (Gunwant, Hussain, Purohit, Ali, & Rana, 2012).

Channel wise analysis of marketing cost, marketing margin, price spread, and net price received by farmer-producer of chilli [3] is presented in the Table 5 , Table 6, Table 7, Table 8, and Table 9. In channel I, the farmer-producer gathered the produce in the daily local market or travelled through streets as a vendor and sold the fresh chilli directly to consumers, incurring the total outlay entire cost of marketing. The Table 5 shows that the total marketing cost incurred by farmer-producer was ₹ 30.77 per quintal, which was 2.37% share in consumer's rupee and is accounted by high labour expense and purchase of plastic bags. The farmer-producer received ₹ 1268.15 per quintal as the net price. Thus, producer's share in consumer's rupee of chilli was 97.63% in channel I (Barakade et al., 2011).

The information on marketing cost, margin, and price spread of chilli in channel – II is given in Table 6, where retailers subsisted as an intermediary between the producer and consumers. In this channel, the farmer-producers sold their surplus produce to the retailers and gained on transportation, packing, and labour costs. The total marketing cost in this was ₹ 623.52 per quintal, of which the farmer-producer obtained 53.7% of the total cost, while the percentage cost obtained by retailers was 46.3% (Table 7). This indicates that cost of producer's share in consumer's rupee was higher among the farmer-producers than among the retailers. At the retailer's level, cost of items included labour cost, plastic bags, market fee/tax, marketing loss, and other miscellaneous costs, of which losses due to spoilage and wastage accounted for 1.5% of the producers' share in consumer's rupee. The farmer-producer received 82.43% of the consumer's rupee and the remaining 12.87% was obtained by the retailers as business margin after deducting 4.69% in cost. The difference in price paid by the consumer and the price received by the farmer-producer was ₹ 2000.01 per quintal, showing more spread of price with additional mediator.

Correspondingly, the Table 8 shows that out of ₹ 926.86 per quintal, out of the total marketing cost in channel III; the wholesaler incurred 62.09% of the total cost followed by retailer and farmer-producer. High marketing cost at the wholesaler's level was on transportation (2.19%) because all the necessary things needed to take the commodity to different stakeholders from the place of production are arranged by them. However, the low cost of farmer-producer was the only reason of assembling the commodity (using manual labour or by motor) to a point within the village or near the production area accessible for wholesalers. The net price received by producers was ₹ 6425.88 per quintal (61.9%) and the net margin of wholesalers and retailers were ₹ 1350.86 per quintal (13.01%) and ₹ 1677.06 per quintal (16.16%), respectively which ensured that a greater share in consumer's rupee is pocketed by market intermediaries in channel III (Chole et al., 2003; Gupta & Ram, 1979 ; Kaur & Sidhu, 2015).

Table 6. Marketing Cost, Margin, and Price Spread of Chilli in Channel - II

Particulars	Chilli (₹/q)	Producer's share in consumer's rupee (%)
Producer's Level		
Sale price	11,291.67	84.95
Marketing cost of producer		
• Total Transport cost	242	1.82
• Packing cost	32.8	0.25
• Labour cost	60	0.45
[A] Total marketing cost of producer	334.8	2.52
Net price received by producer	10,956.87	82.43
Retailer's Level		
Purchase price/sale price of producer	11,291.67	84.95
Marketing cost of Retailer		
• Labour charge	30	0.23
• Plastic bags	25.45	0.19
• Market fee/Tax	21.25	0.16
• Miscellaneous cost	12.73	0.1
• Marketing Loss	199.29	1.5
[B] Total marketing cost of Retailer	288.72	2.17
Net margin of Retailer	1,711.29	12.87
Total marketing cost [A+B]	**623.52**	**4.69**
Consumer's price	**13,291.68**	**100.00**
Price spread	**2,000.01**	**15.05**

Table 7. Overview of Marketing Cost of Chilli Met by Various Stakeholders

Intermediaries	Channel-I (₹/q)	Channel-II (₹/q)	Channel-III (₹/q)
Producer	30.77 (100.00)	334.8 (53.7)	123.53 (13.33)
Retailer	-	288.72 (46.3)	22.78 (24.58)
Wholesaler	-	-	575.53 (62.09)
Total cost	30.77 (100.00)	623.52 (100.00)	926.86 (100.00)

Note : Figures in parentheses is in percentage to total cost

In Table 9, the analysis further reveals that marketing cost across marketing channel increases while producer's share in consumer's rupee declines with an increase in market intermediaries (Joshi, 2011). Hence, as the number of traders increase as marketing costs increase, the share of producers in consumer's rupee declines, profit margins of the market intermediary increase, and the price gap between producers and consumers amplify.

(6) Marketing Efficiency : Marketing efficiency is essentially the degree of market performance. It is the ratio of market output to marketing input; higher is the ratio, greater the efficiency. Any increase in this ratio results in good marketing efficiency, while a decrease shows poor marketing efficiency. A reduction in the cost for the same level of output or an increase in the output at a given cost results in the efficiency of marketing (Kohls & Uhl,

Table 8. Marketing Cost, Margin, and Price Spread of Chilli in Channel - III

Particulars	Chilli (₹/q)	Producer's share in consumer's rupee (%)
Producer's Level		
Sale price	6,549.41	63.09
Marketing cost of producer		
• Assembling and handling charge	123.53	1.19
[A] Total marketing cost of producer	123.53	1.19
Net price received by producer	6,425.88	61.9
Wholesaler's Level		
Purchase price/sale price of producer	6,549.41	63.09
Marketing cost of Wholesaler		
• Transport cost	227.5	2.19
• Packing cost	19.5	0.19
• Labour cost	1.95	1.88
• Miscellaneous cost	6.63	0.06
• Marketing Loss	126.9	1.22
[B] Total marketing cost of Wholesaler	575.53	5.54
Net margin of Wholesaler	1,350.86	13.01
Retailer's Level		
Purchase price/sale price of Wholesaler	8,475.8	81.65
Marketing cost of Retailer		
• Plastic bags	19.88	0.19
• Market fee/Tax	21.25	0.2
• Miscellaneous cost	9.94	0.1
• Marketing Loss	176.73	1.7
[C] Total marketing cost of Retailer	22.78	2.19
Net margin of Retailer	1,677.06	16.16
Total Marketing cost [A+B+C]	**926.86**	**8.93**
Consumer's price	**10,380.66**	**100.00**
Price spread	**3,831.25**	**36.91**

Table 9. Overview per-Quintal Price Spread and Returns of Chilli

Intermediaries	Channel-I (₹/q)	Channel-II (₹/q)	Channel-III (₹/q)
Net price received by Producer	1,268.15	10,956.87	6,425.88
	(97.63)	(82.43)	(61.9)
Net margin of Retailer	-	1,711.29	1,677.06
		(12.87)	(16.16)
Net margin of Wholesaler	-	-	1,350.86
			(13.01)
Cost of marketing	30.77	623.52	926.86
	(2.37)	(4.69)	(8.93)
Consumer price	1,298.92	13,291.68	10,380.66
	(100)	(100)	(100)

Note : Figures in parentheses are in percentage to consumer price

Table 10. Marketing Efficiency Index of Chilli in Different Marketing Channels (₹/q)

Particulars	Marketing Channels		
	Channel - I	Channel - II	Channel - II
Net price received by producer	1,268.15	10,956.87	6425.88
Marketing cost	30.77	623.52	926.86
Marketing margin	0.00	1,711.29	3,027.92
Value added by the marketing system	30.77	2,334.81	3,954.78
Consumer price	1,298.92	13,291.68	10,380.66
Marketing Efficiency			
• Conventional method	1.00	3.74	4.27
• Shepherd's method	41.21	21.32	10.20
• Acharya- Agarwal method	41.21	4.69	1.62

1980). The improvement in marketing efficiency means the reduction of marketing cost without reducing the quantum of services to the consumer (Thamizhselvan & Murugan, 2012). Thus, a higher level of consumer satisfaction even at higher cost of marketing indicates marketing efficiency. Efficient marketing system ensures increase in farm production, increase in real income, and consumer's satisfaction at the lowest possible cost. Therefore, an efficient marketing system is a pre-requisite for all-round development as it enables a farmer-producer to secure better price and in return, gives incentives to produce more. Conventional Shepherd's and Acharya-Agarwal's methods are adopted in the present study to evaluate the marketing efficiency of chilli.

The Table 10 depicts the marketing efficiency index ratio according to Shepherd's method: in channel I, it is 41.21 ; it is 21.32 in channel II ; and 10.20 in channel III; according to Acharya and Agarwal (2001), in channel I, it is 41.21 ; it is 4.69 in channel II ; and it is 1.62 in channel III. However, the conventional [4] method results reveal the figures to be 1.0 in channel I, 3.74 in channel II, and 4.27 in channel III. The results from Shepherd's and Acharya-Agarwal's methods equally signify that channel I is the most efficient channel for marketing of chilli (Barakade et al., 2011; Kaur & Sidhu, 2015) followed by channel II and III. Efficient marketing of channel I indicates absence of any mediator, whilst efficiency was low in channels II and III, where profit margins were pocketed by retailers and wholesalers.

(7) Selling Behaviour of Farmer- Producer : Most of the crops have to change hands three to four times before they reach the final consumers from the producers. There are no village merchants, commission agents, and itinerant dealers in the present study; therefore, producers were found to sell directly to consumers within the village as vendors or in the market by means of retailers and wholesalers. Consequently, the existing market is unorganized with no standardization of weights and measures, and no grading of commodity. Selling behaviour of farmer-producer in the present study was categorized into 'place of sale' and 'marketing channel'.

The behaviour of the farmer-producer according to place of sale was further split into 'within village' and 'in market' as illustrated in the Table 11. It indicates that 93% of the chilli was traded by the farmer-producer in the market by means of retailers and wholesalers, and only 7% was sold within the village. Month-wise magnitude of sale shows that in June, sales within the village were about 8.26%, which declined to 4.91% in July due to peak period and being highly perishable, the farmer-producers preferred to sell through agents in bulk, even at low prices during this month. As a result, during July, sales in the market were more than 95% of the surplus. However, a slight rise in sales within village and a drop in the market in August were because of low surplus, referring to lean harvest, increase in consumption demand, and rise in consumer's prices.

Secondly, selling behaviour of farmer-producers through different marketing channels or to agencies based on

Table 11. Magnitude of Sales Within Village and in Market (in Quintal)

Place of sale	Month-wise			
	June	July	August	Overall
Within village	10.39	8.2	9.58	28.17
	(8.26)	(4.91)	(8.47)	(6.94)
In market	115.34	158.91	103.48	377.73
	(91.74)	(95.09)	(91.53)	(93.06)
Total	125.73	167.11	113.06	405.9
	(100)	(100)	(100)	(100)

Note : Figures in parentheses are in percentage to total

Table 12. Disposal of Surplus Chilli by Respondents Through Different Channels (in %)

Category	June	July	August	Total
Consumer	8.26	4.91	8.47	6.94
	43.72*	43.75*	49.59*	46.11*
Retailer	49.79	45.9	64.37	52.25
	51.08*	50.8*	57.83*	53.24*
Wholesaler	41.95	49.19	27.15	40.81
	37.24*	36.88*	45.82*	39.54*

Note : * - average selling price per kg

the market price is discussed in the Table 12. The Table 12 reveals that where 52% of the farmer-producers sold through retailers (channel-II) at an average price of ₹ 53.24/kg, 41% sold through wholesalers (channel-III) at ₹ 39.54/kg, and only 7% of the respondents sold directly to consumers (channel-I) at ₹ 46.11/kg. Thus, the study concludes that more than 52% of the respondents adopted the retailer channel for marketing of chilli in Mokokchung district followed by wholesaler and direct to consumer channels. However, in July, it was noted that most respondents (49.2%) marketed the surplus through wholesalers owing to peak time with no cold storage to harvest the surplus, perishability, and to avoid the risk of wastage, sold at flat prices to wholesalers who bought in large quantities

(8) Constraints : Despite being blessed with an ample range of agro-climatic conditions for growing chilli and other agricultural crops, there are still numerous constraints confronted by the farmer-producers, adversely affecting sound production, financing, and marketing in Mokokchung district.

The study concludes that 94% of the sample respondents required storage facility in the vicinity of production, which is the foremost constraint. Correspondingly, lack of extension services (86%), risk of surfeit rain (82%), destruction of crop pre-maturely, lack of technical know-how (72%), lack of resources (68%), and shortage of physical labour (52%) are the major constraints faced by the farmer-producers on the production side which reduce output. Availability of physical labour becomes more acute at the harvesting stage as it gets in sync with paddy weeding and other agricultural activities. Consequently, wage per labour rises during this season as revealed by 42% of the respondents. Furthermore, on the financial side, only 16% of the respondents reacted to the availability of credit, of which 6% revealed problems such as unsatisfactory bank support as procedures are time consuming. This reveals that 84% of the respondents were still ignorant or were not availing agricultural credits. Thus, 42% of the respondents borrowed from friends and relatives at exorbitant interest rates to maintain the orchard.

In an agrarian economy, the immediate sale of a commodity after post-harvest results in producers receiving low price and this phenomenon of concentration of market arrivals at a short period of time has been termed as 'Market getting choked' by Tyagi (1990). High perishability of chilli with no cold storage facility forces farmer-producers to dispose the surplus immediately after the harvest (when the chillies are fresh) was expressed by all the respondents on the marketing side. Taking benefit of the market situation, exploitative middlemen negotiate cheap rates. Thus, the farmer-producers have a weak bargaining power [5] due to the constraints. This was expressed by 98% of the respondents. Subsequently, want of market link and lack of regulated and cooperative marketing societies, high transportation cost, and absence of market information were positively responded to by more than 76% of the respondents. Band, blockage, strikes, and malpractices were other common constraints in marketing of chillies.

Policy Implications

(1) Extension officers working with ministries are often good at production, but neglect marketing. Therefore, extension services need to be streamlined in order to disseminate technical know-how about the crops, and producers should be given intensive training by the government related to post harvest handling of the produce. Such training should cover improved technologies including grading, packaging, pre-cooling, storage, transportation, and marketing.

(2) Post-harvest loss of 4.17% was caused by spoilage and wastage. This requires detailed evaluation of the post-harvest loss throughout production and marketing: to identify the critical gaps and implement remedial measures. To minimize this loss, proper storage facilities need to be created near the production area in order to store the surplus, thus reduce intra-seasonal price variation and risk of loss. So, research on post-harvest management is important.

(3) Eighty four percent of the respondents were ignorant of credit facilities. Therefore, provisions for credit facilities for farmer-producers should be encouraged, whilst the procedure of financing should be made easy and convenient for the farmers to make it popular among them.

(4) Channel I was found to be the most efficient for marketing in which producers sold directly to consumers at minimum cost. For this, a farmer's market model may be developed with basic infrastructure such as store house, weighing, night halt facilities, and so forth. The system will successfully integrate many producers with consumers: eliminate middlemen, reduce marketing cost, and provide good return to the producers of consumer's rupee.

(5) The surplus produce was confined to only one market, Mokokchung. Farmer-producers, therefore, must opt for collective marketing, so that they can better transport greater volumes, access more distant markets, and benefit from economies of scale to reduce transportation costs.

(6) To develop entrepreneurial skills and facilitate farmers to acclimatize to changing market situations, developing the marketing and entrepreneurial skills of the farmers is important. This requires training and capacity building. Access to market information about market demand and price in different markets that allows farmers to judge the productivity of different marketing options is imperative.

Conclusion

Thus, it is inferred that 90.5% of the output was left as surplus after retaining 9.5% for consumption and other

uses, and the actual quantity market was 86.33% due to spoilage and wastage. Across months, July was the peak time for harvest, while percentage of marketed surplus was highest in August followed by June and July.

Furthermore, regression results with dummy variables show that area, production, storage, and transportation were main determinants augmenting marketed surplus; whilst age of the farmer, self-consumption, and post-harvest losses were factors negating the dependent variable at the estimated *p*-value. Similarly, without dummy factors, only area and production were dominant factors having a positive relationship with surplus at the 1% probability level of significance. Regarding marketing of chilli, it was concluded that channel II is the dominant channel followed by channel III and channel I. However, applying Shepherd's and Acharya-Agarwal's methods, channel I was found to be the most efficient channel. This means that producers received 98% share of the consumer's rupee in channel I, and this dropped with additional intermediaries. In relation to selling behaviour, it was found that 93% of the chillies were traded by the farmer-producers in the market by means of retailers and wholesalers, and only 7% was sold within the village. Lack of cold storage, extension service, agricultural-credit and subsidy, exploitative middlemen, unregulated market, and absence of market information were found to be the major obstacles in production and marketing of chillies in the district.

Limitations of the Study and the Way Forward

The study is first of its kind relating to Nagaland state, though a pioneering study in India was made by Dharam Naraian in 1950s in India based on NSS data. However, relevant literature pertaining to Nagaland could not be availed, which is a limitation of the present study. The data relating to production, consumption, other uses, and marketed surplus was collected on the basis of the recall memory of the respondents. In the absence of the head of the family during interviews, other responsible members of the households were questioned for extracting the requisite information. Due to time and financial constraints, the study was further limited to only one district of Nagaland, Mokokchung. One crop and one village were selected for it.

Though the study is limited, it shall provide opportunity for the growers, traders, policy makers, and researchers for it includes area under crop production, home consumption, payment in kind, marketed surplus, marketing channel and functionaries, price, cost, margin, price spread, net price received by farmer-producers in achieving efficiency, and understanding policy implications. This will widen the market, help the growth of agro-based industries, and create more employment opportunities; raise farm income and living standards, thereby reducing poverty in the economy as a whole.

End Notes

[1] Located between 25°6'N – 27°4'N latitude and between 93°20'E – 95°15'E longitude, Nagaland is bounded by Assam on the North and West, Manipur on the South, Arunachal Pradesh on the North East, and shares international boundary with Myanmar on the East. Historically, the people are called 'Naka' in Burmese meaning 'people with pierced ears'. Total population according to the census of India 2011 was 1,978,502, with 71.2% of the people living in rural villages, with an overall population density of 119 per sq.km. The total work force is 49.2%, of which 60% are absorbed in agriculture. During 2012-13, about 40% of the GSDP was contributed by the primary sector, while 45% was contributed by the tertiary sector, resulting in a poor agrarian economy.

[2] The total geographical area of the village is 53.43 sq. km situated about 30 km away from the District Head Quarters (HQs). Its percentage share to total geographical area of the District is about 3.31%. The village was composed of 505 households with the total population of 2,603 people, of which male population constituted 50.50% and females 49.50%. The overall literacy of the village is 80.97% with male population being more literate than females. The total workforce participation rate of the village is 58.27%, of which the percentage of cultivators to total workers is 47.75%; other workers: 8.17%; household industries: 1.18%, and agricultural labourers: 1.15%.

[3] Producers sold @ ₹ 46.11/kg in channel I; @ ₹ 53.24/kg in channel II , and @ ₹ 39.54/kg in channel III. In channel III, wholesalers disposed to retailers at ₹ 51.17/kg. The consumer price in channel II & III was settled at ₹ 62.67/kg.

[4] This method ensues channel III to be the most efficient channel; that is, more the intermediaries involve in the marketing process, the higher is the marketing efficiency. However, inference from conventional method is not applicable in India, especially in Mokokchung district of Nagaland, where more than 60% of the working population is engaged in growing food for self sustenance.

[5] The first is, farmer-producers do not have information about market arrival and prevailing market price; and second is, produce being perishable, fear of spoilage and wastage (lack of storage to harvest surplus) makes them sell at prices offered by intermediaries.

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