Agricultural Marketing Efficiency in Mizoram

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Abstract

This article assesses marketing efficiency of two important agriculture products of Mizoram - Ginger and Squash, on the basis of their institutional arrangements.It is revealed that the non-institutionalisedginger market is characterised by market imperfections with high degree of market instability and lack of market integration in terms of price. However, despite the unavailability of basic market infrastructures, the squash market under domain of a producer society has exhibited a system with elements of market efficiency. The paper suggests that a well-functioning institutionalisedmarket could benefit the farmers.

I. Introduction

Marketing of agricultural products is a process which starts with a decision to produce a saleable farm commodity and involves a chain of operations to deliver the products at the hand of final consumers (Acharya and Agarwal, 1987). The entire process involves technical and economic considerations in the fronts of pre and post-harvest operations, assembling, grading, storage, transportation and distribution. In addition there are issues of ensuring fair return tothe efforts made by the farmers, for which an efficient marketing chain and supportive infrastructures are required.

Pricing of the agriculture produces assumes the critical role in the production initiatives and marketing. An important indicator of the efficiency of marketing is the trend and behaviour of prices at the markets (Dave, 1980). A marketing structure is considered as efficient if the prices generate enthusiasms and provide positive signals to the producers as well as the consumers (Jasdanwalla, 1977). The price guides the movement of commodities through the marketing system, and directs the intermediaries to the location of sources and availability of supplies. For the farmers too, prices act as determinant of the nature, time and the quantity to be produced.

Agriculture occupies a prominent place in the economy of Mizoram. According to the census data of 2001 in Mizoram about 60 percent of the total workers was engaged in agriculture and allied sector. The state at present has serious deficiency in marketing infrastructure, leading to uncertainty and wastage of the productions. The problem is

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more among the farmers not under the domain ofinstitutionalised supports. This paper tries to assess the scenario of marketing of Ginger and Squash and the prevailing institutional arrangements. While the marketing of Ginger is considered to be unorganised, with no institutional support, marketing of Squash on the other hand is carried on under the supervision of a Growers' Society.

Ginger is one of the most important cash crops in Mizoram, andis generally grown in *Jhum* land. The agro-climatic condition of the state is favourableand Ginger is cultivated without the use of manures, fertilisers or pesticides. Its cultivation as a cash crop in the state is known to have started in late 1970s. There are three major varieties of Ginger grown in the state namely *Thingpui, Thinglaidum*and *Thingria,*of which *Thinglaidum*is the most popular. However, this variety of ginger does not seem to have any implication in the price fetched; and hence, most of the farmers are unaware of the quality of the variety they grow.

Cultivation of Squash in Mizoram is known to have started with the coming of western Christian missionaries and locally it is named *Iskut*. Squash being a minor cucurbit was not cultivated extensively and was not a commercialised vegetable in other parts of the country at the time of its introduction in Mizoram. It is a semi-perennial crop, and the soil and conditions of the state are ideal for its successful cultivation. There are different varieties of Squash classified according to the fruits shape and colour, i.e. *Round white, Long white, Pointed green, Broad green* and *Oval green*. A well-grown plant of about one year yields 500-600 fruits per year and each weigh 200-450 grams; and lasts for 3-4 years. Extensive cultivation started only since the 1980's when farmers of Sihphir village of Aizawl district initiated its cultivation, as an alternative to the practice of *jhumming*. According to the records of the State's Horticulture Department, there are around 1200-1600 families engaged in Squash cultivation in Mizoram. The farmers are located in the villages in and around Sihphir in Aizawl and Kolasib districts, viz. SihphirVengthar, SihphirNeihbawih, Lungdai, Serkhan, Nisapui and in other villages at smaller scale. To facilitate marketing of Squash, an association 'Mizoram Iskut (squash) Growers' Association' (MIGA) was formed in 1982 with its headquarters at Sihphir.

Data Sources

This paper uses two sets of data. Along with the secondary data collected from the horticulture department of Mizoram government, a sample survey was conducted to understand the issues from the ground. Primary data in case of Ginger cultivators for the study is collected from the Aizawl district. The district has 12 agricultural circles, from which two circles were randomly selected. Altogether six villages, namely Mualpheng, Rulchawm, Ruallung, Sateek, Tachhip and Thiak, were selected from the two circles (three each from Saitual and Sialsuk) and a total of 301 farmers were interviewed in the villages.The six villages are selected based on the information that Ginger is cultivated in large scale in these villages of Aizawl district. The farmers were selected to represent at least 50 per cent of the farmers engaged in Ginger cultivation in these Six Villages.

The Squash cultivators were interviewed at the Sihphir area, one of the dominant clusters of squash in Mizoram. A sample of 48 farmers was drawn randomly from the member's list of MIGA. To the record of MIGA there are altogether nine clusters of more than 500 squash growers.

II. Area and Production of the Crops

Mizoram ranks fifth in terms of area and production of ginger in the country with a share of 7.8 percent of the country's total production. The yearwise of area, production and yield of ginger during last 10 years is presented in Table 1. The sudden increase in area coverage in 2008-09 is because of implementation of Horticultural Technology Mission (HTM), but emphasis was not placed on yield.

Table 2 presents the area and production of Squash. There had been gradual increase in the total area and production of squash, but a noticeable jump in the year 2008-09 is observed following the implementation of HTM. However, at the post 2008-09 period productivity has declined drastically. Interaction with the MIGA indicated that concerned department put more emphasis on area expansion or overstated the area to avail funds under HTM. The same reason may apply in case of Ginger.

Table 1: Area and production of Ginger in Mizoram (2001-2011)

Year	Area (In Ha)	Production (M T)	Yield/ Ha (MT)
2001-02	7287	46648	6.40
2002-03	5097	31136	6.11
2003-04	4481	29582	6.60
2004-05	4532	38068	8.40
2005-06	4654	45143	9.70
2006-07	3426	55432	16.18
2007-08	3587	57010	15.89
2008-09	10391	34290	3.30
2009-10	6200	31000	5.00
2010-11	6500	32500	5.00

Source: Department of Horticulture, Government. of Mizoram, 2012

Table 2: Area and production of Squash in Mizoram (2003-2013)

Year	Area(in Ha)	Production(in MT)	Yield /Ha (MT)
2003-04	580	20949	36.12
2004-05	583	19886	34.11
2005-06	604	21593	35.75
2006-07	664	24455	36.83
2007-08	714	26418	37
2008-09	3200	48000	15
2009-10	2250	34875	15.5
2010-11	3500	56350	16.1
2011-12	4000	66500	16.63
2012-13	4250	73525	17.3

Source: Department of Horticulture, Government of Mizoram, 2012

III. Marketing Channel and Stakeholders

Harvesting time of Ginger in Mizoram starts from November and continues till May with January-April being the peak season. The month of November also sees arrival of traders from neighbouring states in search of Ginger. The farmers do not make any arrangement in respect of grading and sorting by the varieties or size. The produce is simply packed in gunny bags whatever may be the status - clean or unclean, broken or whole, transported and piled up at the nearest roadside, and farmers wait for the prospective buyers.

Ginger is an important cash crop of the state, but the state does not have an organised support system to market the produce. The petty traders or collectors of Ginger (both local and non-local) fromtrading establishments located in the neighboring state of Assam come to the village to collect the commodity. These marketing agents located in the towns of southern Assam (Karimganj, Bagha, Silchar) would forward the material to terminal marketsof Kolkata, Azadpur (Delhi), Amritsar and Mumbai. The agents also route Ginger to Bangladesh through the Karimganj.

Interaction with the farmers in the six sampled villages revealed three existing marketing channels of Ginger (Table 3). Among the three channels, number II and III assume prime importance. The interaction revealed that more than 69 percent of the farmers with more than 70 percent of the produces directly sell to the Local Commission Agent (Channel III). About 30 per cent farmers sell through local traders (who is also the producer) constituted about 29 percent of output.

Table 3: Marketing Channels for Ginger in Mizoram

Channel I	Producers - Retailers at local market - Consumers
Channel II	Producer - Local Trader -Wholesaler/Traders (Cachar/Siliguri) - Exporter in Terminal market (Bangladesh,Kolkata and Delhi)
Channel III	Similar to the channel II, but local commission agents and itinerants traders, local and non-locals, play the role in collection Ginger

Table 4: Marketing channel of Squash

Channel I	Producer -Wholesale commission agent (local) - Retailer (Local market) - Consumer
Channel II	Producer-Local Trader- Wholesaler/Traders (Cachar Areas)- Retailer (Cachar areas)
Channel III	Producer—Local (Commission) agent- Itinerants traders (Local and Outside)- Wholesaler/ Traders (Cachar Areas)- Retailer (Cacher areas)

As indicated earlier marketing of Squash to an extent is marketed through an organised process under the supervision of MIGA. This association, though is hardly involved in marketing of the commodity, is trying to prevent price crash on account of abundant supply at the market. Farmers on the other hand, have clear knowledge about market destinations and about the prospective buyers who would come to the villages. The produce of the state is normally disposed at the retail and wholesale markets of Cachar District in Assam (Table 4).

An interview with the farmers indicated that more than 80 percent of the total quantity of Squash produced is exported to Assam. There are two major ways of procurement done by wholesalers of Assam viz. (i) direct procurement from the farmers and (ii) procurement through local commission agents and itineranttraders. Itinerant tradersare those middlemen, who facilitate the local commission agent with fund and material to procure the commodity by offering certain margin. These traderswould collect and forward the produces to the wholesalers operating in Cachar District of Assam.

The share of Squash disposed at the local retail markets is about 10 percent. The main actors in this channel are local wholesale commission agents (sometimes acting as retailers), who have direct contact with the producers. They procure the produce from the farmers and brought to various market places of Mizoram. Interestingly, these agents are organised in the form of an association, named 'MahniThlaiZuar Association (MZTA)' (Own Produced Vegetable Marketing Association); who function as wholesalers in addition to marketing their own produces. The MZTA has strong influence on the retail price. To prevent unhealthy competition among its member, the association set the wholesale price limits (minimum and maximum) to be followed by the members.

Seasonal arrivals of the products and the prices

The quantity of arrival and prices of Ginger and Squash for a period of 3 years are presented in Table 5 and 6.

Table 5: Month-wise market arrival and Prices of Ginger during 2010-13

Months	2010-11		2011-12		2012-13	
	Arrival (In Qtl)	**Price/Qtl**	**Arrival (In Qtl)**	**Price/Qtl**	**Arrival (In Qtl)**	**Price/Qtl**
November	701.8	500	307	300	773	1100
December	1423.7	650	986.5	350	1513.4	1500
January	3515	700	2228.5	500	3916	1700
February	4500.3	1150	1327.7	400	5132.1	1850
March	1784.4	1400	706	500	2347.5	3000
April	815	1600	390	550	1023	3400
May	370	1950	406	700	308	3800
June	274	2400	233	700	136.5	5000

Source: Sample survey, 2013

Table 6: Month-wise market arrival and Prices of Squash during 2010-13

Months	2010-11		2011-12		2012-13	
	Arrival (In Qtl)	Price/Qtl	Arrival (In Qtl)	Price/Qtl	Arrival (In Qtl)	Price/Qtl
April	250.6	2200	248.7	2150	231.95	3000
May	723.7	1500	639.45	1100	717.6	1900
June	1456	800	1483.04	750	1482.8	750
July	4788.7	700	4813.52	600	5043.99	650
August	8125.9	500	8333.12	400	8588	600
September	9124.8	300	8874.04	250	9577.35	275
October	6007	375	5754.37	350	6471.1	320
November	3323.8	400	3356.44	400	3392.49	400
December	1867.3	500	1923	450	1865.96	450
January	1256.3	550	843	500	737	500

Source: Sample survey, 2013

Table 5 indicates that the price of Ginger has been consistently show an upward trend with the start of the harvesting season and reached its peak towards the end of the season in each of the years under consideration. A comparative examination of market arrivals and price trends of Ginger in the study areas revealed that there is no clear relationship between the two, considering the peak marketing season being January-February, and against this, the peak price period is June. The situation suggests weak price response to arrivals in case of Ginger in the study areas.

Squash has a longer marketing season which starts in the month of April and ends in January the next year; August and September being the peak season. The price also changes according to the volume of market arrivals that it is highest at the beginning of the marketing season and decline continuously to a minimum point at the peak month of quantity arrival.

IV. An Analysis on Marketing Efficiency of the Crops

To test the status of Ginger and Squash on marketing efficiency, log-linear regression model is estimated with price being dependent variable and arrivals in the current and previous year as explanatory variables. The results are presented in Table 7 and 8.

Table 7: Estimated Log-Linear Regression Equation Indicating Price Response to Arrival of Ginger

Dependent Variable: Log(Price)
Method: Least Squares
Included observations: 24
Log(Price)= C1+C2*Log(Arrival)+C3*Log(One Year Lagged Arrival)

Parameters	Coefficient	Std. Error	t-Statistic	Prob.
C1	6.12	1.22	5.03	0.000
C2	-0.42	0.22	-1.93	0.068
C3	0.55	0.24	2.31	0.032
R-squared	0.22	Adjusted R-squared		0.14

Table 8: Estimated Log-Linear Regression Equation Indicating Price Response to Arrival of Squash

Dependent Variable: Log(Price)
Method: Least Squares
Included observations: 30
Log(Price)= C1+C2*Log(Arrival)+C3*Log(One Year Lagged Arrival)

Parameters	Coefficient	Std. Error	t-Statistic	Prob.
C1	10.40	0.44	23.86	0.000
C2	-0.25	0.08	-3.13	0.004
C3	-0.27	0.07	-3.65	0.001
R-squared	0.77	Adjusted R-squared		0.75

The estimated log-linear regression for Ginger suggests the unresponsiveness of price to the arrivals, with uncertainty on the real determinants of current price.This is given the fact that arrivals (current and lagged) contribute only 22 percent of the total price variation[1]. The situationis in support of the existence of market imperfection that the price of Ginger is not determined by market forces but by the Oligopolistic buyers hailing from the outside state.

In contrast to the case of Ginger, Squash is showing a more impressive condition of price response to market arrivals[2]. The crop shows an impressive R-square of 0.77 implying that 77 percent of the existing price variation is determined by the existing market supply (arrival). The estimated coefficients for the current and lagged arrivals are highly significant. That is, a unit percentage increase in the volume of current arrival would have negative impact on the existing price to the extent of 25 percent of that increase. Similarly, the increasing stock of the commodity[3] in the market in

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[1]   The arrival/harvesting of Ginger in Mizoram market depend on the price quoted by the prospective buyers, which continue to remain uncertain for the Ginger growers from season to season. Ginger can be left unharvest for a period of 2 to 3 years, if the price offered by the buyers is not considered to be remunerative. The marketing of Ginger, therefore, remained depended on demand from the prospective buyers from outside the state and an unpredictable price offered which has link to world market price.

[2]   At certain level of demand, the volume of arrival plays a dominant role in determining prices of agricultural produces. On the basis of the extent to which arrival has causal effects on market prices, one can examine the level of marketing efficiency for the products.

[3]   Squash is a perishable product. Despite the absence of storage facilities, MIGA occasionally use to controls supply by introducing quota system,particularly during the peak period. The quota system also compels the farmers to harvest their crops rationally. This also set the condition of marketing efficiency.

the current period would be accompanied by 27 percent price reduction in the next period (i.e. next month). So, the estimated model implicated arrivals having systematic and significant bearing on the prevailing market price of Squash in Mizoram. The situation may be taken as a sign of marketing efficiency for Squash.

Earlier we have indicated the role of MIGA in stabilisation of the price of Squash. In addition to this role of MIGA, there is a more or less organised wholesale transaction in respect to procurement and disposal of Squash by large big wholesalers and intermediaries at the farm gate as well as at the immediate market terminals located in Cachar District of Assam. All these observations indicate existence of an organised marketing structure and subsequent efficiency in the system.

Market Stability

Stability of a market is the characteristic of good and efficient market (Rhodes, 1978). If prices are not stable, it poses uncertainty not only to the farmer but also for the consumers. To examine the stability of both Ginger and Squash market, ANOVA is conducted on market arrivals and prices across the marketing seasons. The resultsarepresented in Table 9.

The ANOVA results do not show significant differences of quantity arrivals for Ginger and Squash between the marketing seasons. While the prices of Squash do not show any significant difference between the seasons, the prices of Ginger on the other had showed highly significant difference between each of the marketing seasons[4].

Market Integration

Efficient market function requires the integration of market over space and time; and there should be significant interrelationship in price movements over space and time. Market integration or association of prices is the interrelationship between price movements in two markets (Lele, 1971). If different markets are not integrated, there will be wide price differentials on these markets resulting in unequal prices realised by the farmers. An analysis on the extent of market integration in the context of the agriculture of the state would give us additional information on the status of marketing efficiency.

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[4]   Having observed that the price of Ginger is determined by the uncertainty decision of the prospective buyers and that the price of Squash by the volume of market arrival, one way ANOVA is presented to examine the differences in arrivals and prices across the three marketing seasons viz. 2010-11, 2011-12, 2012-13.

Table 9: Analysis of Variance for Testing Variability Differences between Marketing Seasons

Items	Factors	Sum of Squares	dF	Mean Square Effect	F-Ratio	Sig.
Ginger	**Quantity Arrivals**					
	Between Seasons	5112720.141	22	2556360.07	1.2606	0.3041
	Within Season	42585638.39	221	2027887.543		
	Total	47698358.53	223			
	Prices					
	Between Seasons	19264375	22	9632187.5	12.5428***	0.0003
	Within Season	16126875	221	767946.4286		
	Total	35391250	223			
Squash	**Quantity Arrivals**					
	Between Seasons	173858.1303	22	86929.06516	0.0082	00.9919
	Within Season	287937124.2	227	10664337.93		
	Total	288110982.3	229			
	Prices					
	Between Seasons	1799901.6667	22	89950.83333	0.1855	00.8318
	Within Season	13094435	227	484979.0741		
	Total	13274336.67	229			

***significant at 1 percent level of significance

Earlier we have noted that the main buyers of Ginger are traders from the state of Assam. These traders collect the commodity from different parts of Mizoram through their associated commission agents or itinerant dealers. In such situation, one cannot expect much price differentials at different collection points. At the same time, since Squash is cultivated at a cluster in and around Sihphir village and no other area in the state cultivates in an extensive manner, a reliable farm harvest price can easily be assessed from Sihphir market, though there may be other collection points in its vicinity. Here an attempt is made to examine the extent of price integration or association between current year price and prices in the previous years. This analysis is based on the official price records of government of Mizoram. Table 10 presents the trends of farm harvest prices of Ginger and Squash in Mizoram.

Table 10: Prices of Ginger and Squash in Mizoram in Rs./Kg.

Year	Ginger	Squash
1998-99	4	4
1999-00	6	4.25
2000-01	8	4.5
2001-02	8	5.87
2002-03	8	6.5
2003-04	8.23	7.24
2004-05	9.83	8.33
2005-06	7.5	7.5
2006-07	8.88	7.36
2007-08	8.1	7.35
2008-09	10.05	6.58
2009-10	13.69	7.14
2010-11	13.85	7.15
2011-12	14.02	7.15
2012-13	26.7	9.27

Source: Planning & Programme Implementation Department, Govt. of Mizoram, Economic Survey of various years

To study the extent of price integration over the years, the time series method of *unit root test* is adopted. If the price trend has unit root, current price is purely random and has no integration with the previous years. The trend is called non-stationary series. On the other hand, stationary process would indicate integration of current price with the previous years. Under the Null Hypothesis of non-integration of prices, Augmented Dickey-Fuller (ADF) Test is applied to test price integration over time. The analysis results up to 3 lags length is presented in Table11 and 12.

Table 11: Results of ADF Unit Root Test for the Price of Ginger

Null Hypothesis: D (Ginger Price) has a unit root
Lag Length: 2 (Automatic based on SIC, MAXLAG=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.194934	0.7237
Test critical values:	1% level	-2.792154	
	5% level	-1.977738	
	10% level	-1.602074	

Table 12: Results of ADF Unit Root Test for the Price of Squash

Null Hypothesis: D (Squash Price) has a unit root
Lag Length: 3 (Automatic based on SIC, MAXLAG=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.152024	0.0363
Test critical values:	1% level	-2.816740	
	5% level	-1.982344	
	10% level	-1.601144	

The calculated t-statistic for Ginger turned out to be 0.195 which is highly insignificant. On the other hand, the t-statistic for Squash is -2.152 and is significant at 5 percent level of significance. That is, the price of Ginger shows non-stationary or random trends, while price of Squash shows stationary process over time. Thus, the result showed that there is no market integration in case of Ginger, while there is significant integration in case of Squash market over the years. In other words, price of Ginger is erratic following the pattern of random series. At the same time, price of Squash follows consistent pattern over time.

Market/Price information

The availability of prompt and reliable information about quantities arrivals and prices quotations for different commodities improve the decision-making capacity of the farmers and strengthen their bargaining powers. To assess the existing status of market information system in place for the farmers in the study area, they were asked to recollect the sources of market information during the recalled period. The results are presented Table 13. While majority of Ginger producers obtained market information from traders and their local agents, it is interesting to know that growers association played the role in disseminating market information to the Squash farmers.

Table 13 : Sources of market information (market price) in the study area

Sl. No	Information Sources	No of farmers	Percentage
	Ginger		
1	Social media i.e. Radio/Television/Newspaper	11	3.65
2	Other farmers	76	25.25
3	Growers' society	51	16.94
4	Traders and their local agents	162	53.82
5	Govt. Sources (MAMCO, Trade& Commerce etc)	1	0.33
	Total	*301*	*100*
	Squash		
1	Other farmers	5	10.42
2	Growers' society (MIGA)	25	52.08
3	Traders and their local agents	18	37.5
	Total	*48*	*100*

Source: Sample survey 2013

V. Conclusion

Based on the analysis of various indicators of marketing efficiency, it may be concluded thatthe unorganised ginger market is characterised by market imperfection, asymmetric information high degree of market instability and lack of market integration in terms of price. However, despite the unavailability of basic market infrastructures, the organised squash market hasexhibited elements of efficient marketing system, even with very limited public interventions in its operation. This has suggested that a well institutionalised and organisedmarket could greatly benefit the farmers and enhance market sustainability. However, one would not deny the fact that organised market does not emerge on its own, but with facilitations and accommodating effortsmade by the State and society.

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