ANALYSIS OF PRICE VARIATION IN RAGI IN SELECTED MARKETS OF TAMIL NADU AND KARNATAKA

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Abstract: Agriculture supply is uncertain and this leads to fluctuations in prices. The study investigates the analysis of price variation in the selected markets of Tamil Nadu and Karnataka through co-efficient of variance. The data analyses the price of ragi over the years 2003 and 2017 and calculated in series of monthly basis and yearly basis. The study investigates the price details, market integration of ragi in selected markets of Tamil Nadu and Karnataka. The results indicated a positive secular trend from the year 2003 - 2017 and due to larger arrivals, the price reduced in certain periods that may vary upon the market area. In month wise analysis of Co-efficient of variation, except Vellore market others has the highest variability during harvest period.

Keywords: Price Analysis, Coefficient of Variation, Ragi, Market structure.

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Introduction

Since pre historic times, agriculture and allied sectors continued to be the important sector in the Indian economy. It is quiet important economic base of the country that 60 percent people depending on their livelihood on it. Strengthening of this sector is highly critical to cope with the challenges of rural poverty, food insecurity. Agriculture sector provides very good opportunities in raising the income of the farmers even in dry land areas. Nature has endowed the country with biodiversity of land, soil and various agro climatic conditions which is enabled us to give various types of crops. The price variations occurred for various essential agricultural commodities continue to maintain the major concern for policy makers. The agriculture output anyhow depends on monsoon as nearly as 60 per cent of areas sown depend on rainfall. The average total area of food grains in 2011-2012 to 2015-2016 has been reported 123.61 million hectares, production about 257.01 million tonnes with 2.07 tonnes per hectare of yield (Ministry of Agriculture and Farmers Welfare, Govt. of India (2017).

Ragi (*Eleusine coracana*) also known as African millet, is widely grown in Africa and Asian countries. It is originally native to the Ethiopian Highlands though it was introduced in India a long time ago. Ragi has important component of protein (7.3g), minerals (2.7g), calcium (344mg), iron (3.9mg), fibre (3.6g) and amino acid methionine and substantial amount of carbohydrate. Ragi has the energy of 328 KCal is provided by 100g of Ragi(Sateesh, 2010). The majority of these advantages reinforce Ragi with a possibility to enhance sustenance, nourishment security, and also to cultivate rural advancement and boost supportable land utilize (The Hindu, 2014).

Indian Scenario of Ragi

India is the largest producer of different kinds of millets. In India, Ragi was contributed for about 85 per cent in terms of production (2014). Karnataka accounted over two-third of the country's total Ragi production, followed by Uttarakhand, Maharashtra and Tamil Nadu. Leading states of Ragi growers in India are presented in Table 1.

Table 1. Leading States of Ragi Growers in India

States	Percentage (%)
Karnataka	57.83
Maharashtra	11.05
Uttarkhand	10.63
Tamil Nadu	7.04
Odisha	4.67
Andhra Pradesh	3.57
Others	5.21

(**Source:** ICRISAT, 2012)

Objectives

i.   To analyze the price variations of Ragi in selected markets.
ii. To suggest policy measures for market integration of Ragi.

Limitations

- The research finding was applied only in Tamil Nadu and Karnataka.
- Time was the major constraint in collecting the data.

Review of literature

Engle and Yoo (1987) analysed the behavior of forecasts of granger, granger and Weiss, Engle and granger co-integrated systems. He took a forecast model for time series. Then he made a simulation study to compare the multistep forecast model, but the vector autoregressive model (VAR) is not suitable and it has some error variance. The forecast model made on estimated parameters is not up to the standard level in multi-step horizons. So he used Engle and granger model to nullify the error and achieved the multi-forecast gains.

Goletti *et al.* (1995) studied the aspect "marker integration and its determinants in Bangladesh". They regressed the measures of market integration on the hypothesized determinants. Marketing infrastructure, volatility of policy and dissimilarity of production are the three broad structural considered for the study purpose. Study finding revealed that telephone density, labour strikes and telephone density affects negatively integration. Integration was positively affected by more dissimilarity in production and road density.

Rajesh (2002) used Johansen's and Juselius method of multiple co-integration analysis for assessing the market integration of major spices such as pepper, cardamom, turmeric, chillies and ginger in pre and post liberalization period. The markets were integrated in post liberalization period for pepper, turmeric and ginger here chillies and cardamom markets are not co integrated in the post liberalization period.

Ohen *et al.* (2007) studied the price integration between producer's prices, export and retail price of live catfish in Nigeria. Methodology used for this study was Augmented Dickey Fuller test for stationary of the data and Johansen's Co-integration analysis for testing the level of significance. Results indicated that producer's and export prices were co integrated & formed part of same market. It suggested a causal relationship of retail prices with producer prices.

Reddy (2008) analyzed the market integration of the price series of soybean and soy oil by using of co-integration technique. Augmented Dickey Fuller test used analyzed the soybean markets for stationary of the markets. He concluded that the critical value and ADF value was found to be -5.0054 and -4.993 for soybean spot and soybean futures respectively. Hence markets were integrated.

Ghosh (2011) in this paper he analyze the improvisation of the spatial integration of wheat and rice price in Indian market during post reform related to pre reform period. In pre reform period he found that to be strongly integrated. Spatial market integration is based on trade flow includes demand, supply cost in different markets but in market integration is about tradability. During policy reforms it helps to improve the extent of spatial integration in food market and promotes market liberalization so that private traders have the willingness to invest. The extension of spatial integration regulates price of a product even in all regional markets. It improved the regional marketing. So he made a conclusion that food grain market gains the high growth in post reforms compared to pre reform period.

Sekhar (2012) reported that there was no sufficient integration of markets in all over the India. Analysis of market prices of edible oils and grams were done by correlation coefficients. Gonzalo and Granger model was used to conclude whether the markets were integrated. The results indicated there was no restriction for interstate movement of edible oils and grams whereas the rice markets were integrated with in the states and it faces more restriction while interstate movement. The edible oils and oilcakes were integrated with domestic markets and also integrated with international markets.

Varela *et al.* (2013) studied that "Determinants of market integration and price transmission for five major commodities in Indonesia". In a setting where product costs have been evolving significantly, it is especially pertinent for common asset plentiful nations, similar to Indonesia, to comprehend what drives the transmission of value signals. From one perspective, this will enable the administration to take proper measures to encourage value transmission crosswise over areas so makers can take ideal generation choices. Then again, it will enable the administration to better focus on its arrangements topographically to moderate the effect of a specific value stun on the poor population.

Ilyasov *et al.* (2016) analysed the gap between price stability and over all food security by examining wheat market integration and price transmission in Tajikistan. Using price transmission analysis and asymmetric price relationships used to know how price changes in food shortage markets compared to market located zones with abundant local production. Results showed that local Tajik wheat market prices co integrated with international and regional markets as well as across domestic markets.

Research Methodology

a. **Selection of Study Area:** In Tamil Nadu, Vellore and Krishnagiri districts were selected and in Karnataka, Tumkur and Kolar districts were selected. Selectively, Hosur market, Vellore Market, Denkanikottai market from Tamil Nadu and Chintamani market, Tumkur Market from Karnataka were involved for data collection in this study due to its large area of cultivation and production level.

b. **Tools used:** The coefficient of variation also known as relative standard deviation (RSD), was considered as a standardized measure of dispersion of a probability distribution or frequency distribution (Bedeian and Mossholder, 2000). It was expressed as a per centage, and is defined as the ratio of the standard deviation to the mean.

The formula for coefficient of variation is as follows,

$$C_v = (\sigma / \mu)*100$$

Where,

σ – Standard deviation

μ – Mean

Coefficient of variation was calculated for the items under each competence. The higher CV percentage indicated more dispersion and vice versa.

Results and Discussion

1. **Co-efficient of variation in Chintamani market**

Table 1 Co-efficient of variation in Chintamani market

Month	Price of Ragi per kg over the years		Average price of Ragi per kg of 2003-2017	CV
	2003	2017		
January	5.03	26.30	10.25	59.71
February	4.40	27.25	10.55	61.06
March	4.85	28.10	10.74	62.58
April	5.25	26.15	10.69	60.28
May	5.00	25.80	10.54	59.65
June	5.00	26.00	10.42	59.32
July	4.30	26.00	10.46	59.79
August	3.65	28.75	10.82	64.88
September	5.00	26.15	10.87	60.23
October	5.40	24.75	10.97	56.53
November	4.60	23.20	11.15	61.09
December	4.35	20.30	11.18	57.93

The co-efficient of variation in Chintamani market was given in the below Table 1. If the coefficient of variation was less, it indicted that there was less price variation and higher coefficient of variation reflected higher price variation over the years (2003-17). The coefficient of variation in the month August was 64.88 per cent. It showed that price had higher variation (i.e. extend of price variation from the average price was maximum) in that month because of no harvesting during the month. Whereas, the CV in the month of October was comparatively

lower than other months. It showed that the price variation over the years (2003-17) was low at 56.53 per cent. (*viz.*,extend of price variation from the average price was minimum). Due to the larger arrivals of Ragi in the market, during the month of December the price variation was low.

2. Co-efficient of variation in Tumkur Market

Table 2 Co-efficient of variation in Tumkur market

Month	Price of Ragi per kg over the years		Average price of Ragi per kg of 2003-2017	CV
	2003	**2017**		
January	4.65	29.60	10.78	62.58
February	4.65	28.85	11.20	60.95
March	4.50	28.90	11.32	61.27
April	4.75	28.20	11.35	60.06
May	4.80	25.45	11.39	58.75
June	5.20	25.30	11.38	56.35
July	5.65	28.05	11.59	57.85
August	5.45	31.85	11.87	62.66
September	5.55	32.50	12.06	61.87
October	5.75	24.10	11.95	55.89
November	5.30	23.00	12.08	64.13
December	5.00	23.80	12.08	61.60

The co-efficient of variation in Tumkur market was given in Table 2. If the coefficient of variation was less, it indicted that there was less price variation and higher the coefficient of variation reflected higher price variation over the years (2003-17). The coefficient of variation in the month November was 64.13 per cent. It showed that the price had higher variation because of no harvesting during the month. Whereas, the CV in the month of October was (55.89 per cent) comparatively lower than other months showed that the price variation over the years (2003-17) was low. Due to the larger arrivals of Ragi in the market during the month of October the price variation was low.

3.   Co-efficient of variation in Denkanikottai market

Table 3 Co-efficient of variation in Denkanikottai market

Month	Price of Ragi per kg over the years		Average price of Ragi per kg 2003-2017	CV
	2003	2017		
January	4.85	22.95	11.33	62.37
February	4.90	22.65	11.29	65.68
March	4.40	35.00	12.27	73.89
April	4.70	35.30	12.18	76.23
May	4.45	33.85	12.40	74.18
June	4.40	22.25	11.98	66.78
July	4.45	22.45	12.18	66.04
August	4.05	24.05	12.34	67.59
September	4.60	23.85	12.54	65.56
October	4.25	23.40	11.48	60.17
November	3.85	20.55	11.59	58.81
December	3.95	19.00	11.87	59.88

The co-efficient of variation in Denkanikottai market was given in Table 3 if the coefficient of variation was less, it indicted that there was less price variation and higher the coefficient of variation reflected higher price variation over the years (2003-17). The coefficient of variation in the month of April was 76.23 per cent, showed that the price had higher variation (i.e. extend of price variation from the average price was maximum) because of no harvesting during the month. Whereas, the CV in the month of November was (58.81per cent) comparatively lower than other months showed that the price variation over the years (2003-17) was low. (i.e. extend of price variation from the average price was minimum). Due to the larger arrivals of Ragi in the market during the month of November the price variation was low.

4.   Co-efficient of variation in Hosur market

Table 4 Co-efficient of variation in Hosur market

Month	Price of Ragi per kg over the years		Average price of Ragi per kg 2003-2017	CV
	2003	2017		
January	4.30	22.95	10.97	64.76
February	4.35	22.65	11.10	63.50
March	4.20	35.00	12.03	74.98
April	4.25	35.30	12.24	76.02
May	4.00	33.85	12.61	73.51
June	4.10	22.15	11.97	71.40
July	3.90	22.45	11.97	69.77
August	4.15	24.10	12.21	68.76
September	4.15	23.80	12.34	67.93
October	4.03	23.45	11.66	60.15
November	3.95	20.55	11.61	59.72
December	3.95	19.00	11.86	61.46

The co-efficient of variation in Hosur market was given in Table 4 If the coefficient of variation was less, it indicted that there was less price variation and higher the coefficient of variation reflected that the price showed higher variation over the years (2003-17). The coefficient of variation in the month April was 76.02 per cent. It showed that the price had higher variation (i.e. extend of price variation from the average price was maximum) in that month because of no harvesting during the month. Whereas, the CV in the month of November was (59.72) comparatively lower than other months showed that the price variation over the years (2003-17) was low. (i.e. extend of price variation from the average price was minimum). Due to the larger arrivals of Ragi in the market during the month of December the price variation was low.

5. Co-efficient of variation in Vellore market

Table 5 Co-efficient of variation in Vellore market

Month	price of Ragi per kg over the years		Average price of Ragi per kg 2003-2017	CV
	2003	**2017**		
January	4.30	23.10	12.66	55.04
February	3.50	28.15	13.28	60.18
March	4.65	30.30	13.60	60.56
April	4.30	26.65	13.23	58.39
May	4.20	26.10	12.82	56.50
June	4.25	25.40	11.97	53.25
July	3.60	26.25	12.18	55.34
August	4.10	28.90	12.13	59.49
September	3.95	26.55	12.16	56.04
October	4.55	24.00	12.22	52.56
November	3.75	23.85	13.05	54.04
December	4.50	24.00	13.73	52.80

The co-efficient of variation in Vellore market was given in Table 5 if the coefficient of variation was less, it indicted that there was less price variation and higher the coefficient of variation reflected higher price variation over the years (2003-17). The coefficient of variation in the month March was 60.56 per cent. It showed that the price had higher variation (i.e. extend of price variation from the average price was maximum) in that month because of no harvesting during the month. Whereas, the CV in the month of October was (52.56 per cent) comparatively lower than other months showed that the price variation over the years (2003-17) was low. (i.e. extend of price variation from the average price was minimum). Due to the larger arrivals of Ragi in the market during the month of March the price variation was low.

6. Comparison of month wise co-efficient of variation across the markets

Table 6 Month wise co-efficient of variation across the markets

Month	Chintamani	Tumkur	Hosur	Denkanikottai	Vellore
January	0.597	0.626	0.648	0.624	0.550
February	0.611	0.609	0.635	0.657	0.602
March	0.626	0.613	0.750	0.739	0.606
April	0.603	0.601	0.760	0.762	0.584
May	0.597	0.588	0.735	0.742	0.565
June	0.593	0.563	0.714	0.668	0.532
July	0.598	0.578	0.698	0.660	0.553
August	0.649	0.627	0.688	0.676	0.595
September	0.602	0.619	0.679	0.656	0.560
October	0.565	0.559	0.601	0.602	0.526
November	0.611	0.641	0.597	0.588	0.540
December	0.579	0.616	0.615	0.599	0.528

Month wise co-efficient of variation across the market were given in Table 6 from the Table highest variability coincides with harvesting seasons except Vellore, Hosur. This may be due to the five month duration crops mostly cultivated in this Vellore catchment (vazhaipoo variety)

7. Comparison of year wise co-efficient of variation across the market

Table 7 Year wise co-efficient of variation across the market

Year	Chintamani	Tumkur	Hosur	Denkanikottai	Vellore
2003	0.104	0.085	0.036	0.076	0.090
2004	0.079	0.023	0.049	0.071	0.076
2005	0.156	0.051	0.030	0.084	0.100
2006	0.106	0.115	0.038	0.074	0.113

2007	0.046	0.051	0.082	0.053	0.167
2008	0.043	0.085	0.058	0.228	0.079
2009	0.064	0.034	0.068	0.090	0.060
2010	0.024	0.050	0.057	0.132	0.096
2011	0.013	0.049	0.211	0.101	0.064
2012	0.188	0.187	0.219	0.188	0.146
2013	0.073	0.133	0.111	0.105	0.082
2014	0.054	0.056	0.205	0.229	0.086
2015	0.034	0.035	0.117	0.100	0.121
2016	0.202	0.305	0.121	0.092	0.128
2017	0.087	0.114	0.227	0.227	0.085

Year wise co-efficient of variation across the market were given in Table 7, it is inferred that more rice variability occur in Tamil Nadu markets rather than Karnataka market. This is based on the more than 10 per cent of co-efficient of variation occurred in a particular year.

Conclusion

The study revealed that comparison of month wise co-efficient of variation across the markets highest variability coincides with harvesting seasons except Vellore, Hosur. This may be due to the five month duration crops mostly cultivated in this Vellore catchment (vazhaipoo variety) and Comparison of year wise co-efficient of variation across the market, more price variability occur in Tamil Nadu markets rather than Karnataka market. This is based on the more than 10 per cent of co-efficient of variation occurred in a particular year.

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