

**Research Article**

## **SPATIAL INTEGRATION AMONG MAJOR WHOLESALE MARKETS OF PIGEONPEA AND CHICKPEA IN ANDHRA PRADESH**

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### **ABSTRACT**

India is the largest producer and consumer of pulses in the world. Andhra Pradesh is one of the major contributors for pulses in India with pigeonpea and chickpea as the major pulse crops grown in the state. To provide goods at reasonable prices to the innumerable consumers as well as to provide remunerative prices of the produce to the farmer-sellers, efficient functioning of markets is an essential prerequisite which is indicated by high degree of integration in them. Thus an attempt has been made to study the spatial market integration among major wholesale markets for pigeonpea and chickpea in the state of Andhra Pradesh. Zero order correlation matrixes were used to identify the extent of spatial market integration. In case of pigeonpea, Khammam-Suryapet (0.824) markets reported maximum level of integration. Though all the selected market pairs had positive relationship four out of six selected market pairs showed significant relationship. Market integration for chickpea was more in case of Medak-Karimnagar (0.666) markets. Market integration was affected negatively by the distance between markets because the greater the distance between two markets, the more costly it was to undertake trade, and thus opportunities with closer markets were explored. Negative association between arrivals and prices was observed for the commodities as heavy arrivals led to depression of prices especially during peak months after harvest.

**Keywords:** *Pigeonpea, Chickpea, Spatial Market Integration, Zero-order Correlation Matrix*

### **INTRODUCTION**

India is the largest producer and consumer of pulses in the world accounting for 33 per cent of world's area, 22 per cent of global production and about 30 per cent of consumption. Pulses complement cereals in both production and consumption (Joshi and Saxena, 2002). Andhra Pradesh is one of the major contributors for pulses in India. Pigeonpea and chickpea are the major pulse crops grown in the state. Out of 19.30 lakh hectares of total area under pulses in the state during 2011-2012, the area under pigeonpea and chickpea alone accounted for 54.20 per cent. Pigeonpea was grown on 4.81 lakh hectares with a production of 1.46 lakh tonnes and chickpea was grown on 5.65 lakh hectares with a production of 5.20 lakh tonnes. Being a drought tolerant crop, pigeonpea is being cultivated both as a sole and intercrop in Andhra Pradesh. Chickpea is an important source of protein for millions of people in the developing countries.

In order to provide goods at reasonable prices to the innumerable consumers as well as to provide remunerative prices of the produce to the farmer-sellers, efficient functioning of markets is an essential prerequisite. One of the common indicators of an efficient functioning of the markets is the existence of high degree of integration in them (Balappa and Hugar, 2002). Spatial market integration refers to a situation in which prices of a commodity in spatially separated markets move together due to arbitrage and the price signals and information are transmitted smoothly across the markets. With free flow of information in a competitive market, difference in prices of a product in the two markets would be equal to or less than transportation cost between them (Vasciaveo *et al.*, 2013). Hence, spatial market performance may be evaluated in terms of the relationship between the prices in spatially separated markets. An integrated market can mitigate the effect of price shocks because it induces trade between surplus and deficit areas (Ojo *et al.*, 2013). Most of the studies on integration pertained to major food grains like rice (Nga and Lantican, 2009; Sanogo, 2008; Jayasinghe-Mudalige, 2006) but not many are

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available on pulses. An attempt has been made to examine the extent of integration among different wholesale markets for pigeonpea and chickpea in Andhra Pradesh. The study on integration can suggest to the farmers as to where, when and how much to sell, which in turn will have bearing on their production strategies and hence resource allocation.

## MATERIALS AND METHODS

The study on market integration was carried out in different markets of Andhra Pradesh. The markets for each crop were selected based on the maximum arrivals of the selected agricultural commodities in various regions of the state during the period 2006-2010. The data pertaining to the arrivals and prices of the selected commodities viz., pigeonpea and chickpea were collected from the Commissioner and Directorate of Agricultural Marketing, Andhra Pradesh.

To study the extent of market integration, zero order correlation matrixes was employed. Correlation coefficients for monthly wholesale prices were computed for each sample market and for each crop separately. The degree of association between arrivals and prices of the selected agricultural commodities was also evaluated by employing correlation analysis technique. The correlation coefficient was worked out using the following formula.

$$r = \frac{\sum (X_t - \bar{X})(Y_t - \bar{Y})}{\sqrt{\sum (X_t - \bar{X})^2 \sum (Y_t - \bar{Y})^2}}$$

Where,

$r$  = Correlation coefficient

$X_t$  = Market arrivals in month 't'

$Y_t$  = Price of the commodity in month 't'

## RESULTS AND DISCUSSION

### Market Integration for Pigeonpea

The correlation coefficients of monthly prices for pigeonpea between the selected market pairs were found to be positive. The zero order correlation matrixes between average wholesale prices are presented in Table 1. The values of correlation coefficients were highest for Khammam-Suryapet (0.824) markets. This may be because of the proximity of these two markets as the distance between them was 57 km. Better transportation facilities, easy accessibility to the market and faster dissemination of information regarding arrivals and prices might have contributed to high integration among these markets. The next highest value of integration was noticed between Kurnool-Tandur (0.720) followed by Kurnool-Suryapet (0.645) and Suryapet-Tandur (0.543). These market pairs were moderately integrated and inter-dependent on each other for price movements. In the case of Khammam-Kurnool (0.457) and Khammam-Tandur (0.450) though the correlation coefficients of prices were positive, there was no significant relationship between them. In case of pigeonpea, it was clearly seen that as the distance between the markets increased, the extent of market integration decreased.

**Table 1: Zero order correlation matrix between average prices of pigeonpea in different markets**

|          | Tandur                       | Kurnool                      | Suryapet        | Khammam |
|----------|------------------------------|------------------------------|-----------------|---------|
| Tandur   | 1                            | -                            | -               | -       |
| Kurnool  | 0.720**(167 km)              | 1                            | -               | -       |
| Suryapet | 0.544* (217 km)              | 0.645* (225 km)              | 1               | -       |
| Khammam  | 0.450 <sup>NS</sup> (273 km) | 0.457 <sup>NS</sup> (276 km) | 0.824** (57 km) | 1       |

Note: \*\* Significant at 1 per cent level of probability, \*Significant only at 5 per cent level of probability  
 NS- Non significant

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### Market Integration for Chickpea

In case of chickpea, the correlation coefficients between average monthly prices of chickpea in selected markets were found to be positive for all the selected market pairs. There was a strong integration among Medak-Karimnagar (0.666) markets which were 130 km apart. Medak-Kurnool markets also showed moderate integration (0.547). The value of integration was least for Kurnool-Karimnagar (0.402) market pairs. The distance between the selected markets was the most important factor which decided the extent of market integration. The distance between the markets was inversely related to the value of integration. The results are given in Table 2.

**Table 2: Zero order correlation matrix between average prices of chickpea in different markets**

|            | Medak            | Kurnool                      | Karimnagar |
|------------|------------------|------------------------------|------------|
| Medak      | 1                |                              |            |
| Kurnool    | 0.547* (250 km)  | 1                            |            |
| Karimnagar | 0.666** (130 km) | 0.402 <sup>NS</sup> (315 km) | 1          |

Note: \*\* Significant at 1 per cent level of probability, \*Significant only at 5 per cent level of probability  
 NS- Non significant

These results on market integration are in conformity with those of Goletti *et al.*, (1995) who reported that the market integration was affected negatively by the distance between markets because the greater the distance between two markets, the more costly it was to undertake trade, and thus opportunities with closer markets were explored.

The results are also in line with those of Keller and Shiue (2007) who concluded that prices in provinces that were relatively far away did not matter but price movements in markets at intermediate distances accounted for about half of the variation in local prices.

### Degree of Association between Arrivals and Prices of the Agricultural Commodities

The degree of association between arrivals and prices of the selected agricultural commodities was studied to understand the long run relationship between prices and arrivals. The correlation coefficients indicated that there was a negative relationship between the arrivals and prices of pigeonpea in all the selected markets. The results are presented in Table 3.

The relationship was negative and significant in case of Suryapet (-0.553) and Khammam (-0.516). Negative and non-significant relationship was found in Tandur (-0.391) and Kurnool (-0.282) markets. In case of chickpea the correlation analysis revealed that there was negative relationship between the arrivals and prices of chickpea in two out of three selected markets. Significant correlation coefficients were found in Medak (-0.812).

In Kurnool, the value was negative but non-significant (-0.195). Karimnagar market showed a positive but non-significant (0.199) relationship between prices and arrivals.

**Table 3: Coefficient of correlation between arrivals and prices**

| Crop      | Markets              |                      |                     |         |
|-----------|----------------------|----------------------|---------------------|---------|
| Pigeonpea | Tandur               | Kurnool              | Suryapet            | Khammam |
|           | -0.391 <sup>NS</sup> | -0.282 <sup>NS</sup> | -0.553*             | -0.517* |
| Chickpea  | Medak                | Kurnool              | Karimnagar          |         |
|           | -0.812**             | -0.195 <sup>NS</sup> | 0.199 <sup>NS</sup> |         |

Note: \*\* Significant at 1 per cent level of probability, \*Significant only at 5 per cent level of probability  
 NS- Non significant

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### **Conclusion**

The distance between the markets played a significant role in determining the extent of integration. The level of market integration increased as the distance between the markets decreased. The price information about price changes in one market was delivered to the other markets to a great extent due to proximity of the markets. This was due to quick absorption of price signals, logistical advantage, good communication facilities and transport facilities. The extent of market integration can be improved by focusing on the development of roads, improvement of existing roads, better communication facilities and other market related infrastructure. This would help to transfer the price signals faster thereby stabilize prices and create a healthy competitive environment. This would also help to protect the interests of producer-sellers.

Negative association between arrivals and prices was observed for the commodities as heavy arrivals led to depression of prices especially during peak months after harvest. Hence there is a need to develop adequate infrastructure like scientific storage facility in market yard and dissemination of market information. These results of negative relationship between prices and arrivals of the agricultural commodities are in conformity with the findings of Pawar and Misal (2005), Wadhwani and Bhogal (2003), Rao *et al.*, (2003), Dhillon and Goel (1993) and Hazarika and Talukdar (1992) who reported that there was an inverse relationship between prices and arrivals in pomegranate, cole crops, sorghum, onion and rice.

### **REFERENCES**

- Balappa SR and Hugar LB (2002).** A study of integration of markets for onion and potato in Karnataka State. *Agricultural Marketing* **45**(2) 30-32.
- Dhillon PK and Goel V (1993).** An Analysis of the seasonal pattern of market arrivals and prices of onion in Ludhiana market of Punjab. *Indian Journal of Agricultural Marketing* **7**(1) 125-130.
- Goletti F, Ahmed R and Farid N (1995).** Structural determinants of market integration: The case of rice markets in Bangladesh. *The Developing Economies* **33**(2) 185-202.
- Hazarika C and Talukdar KC (1992).** Farm level storage, market arrivals and prices of rice in Titabor development block of Jorhat district of Assam. *Economic Affairs* **37**(1) 59-63.
- Jayasinghe-Mudalige UK (2006).** An Economic analysis on spatial integration of regional rice markets in Sri Lanka. *Sri Lankan Journal of Agricultural Economics* **8**(1) 51-65.
- Joshi PK and Saxena R (2002).** A profile of pulses production in India: Facts, trends and opportunities. *Indian Journal of Agricultural Economics* **57**(3) 326-339.
- Keller W and Shiue CH (2007).** Market integration and economic development: A long-run comparison. *Review of Development Economics* **11**(1) 107-123.
- Nga NTD and Lantican FA (2009).** Spatial integration of rice markets in Vietnam. *Asian Journal of Agriculture and Development* **6**(1) 13-28.
- Ojo AO, Tanko KM, Adeniji OB and Ojo MA (2013).** Spatial integration of rice markets: The case of Kwara and Niger States, Nigeria. *IOSR Journal of Agriculture and Veterinary Science* **2**(4) 15-21.
- Pawar ND and Misal DH (2005).** Behaviour of prices and arrivals of pomegranate in Western Maharashtra. *Agricultural Marketing* **47**(4) 22-24.
- Rao BD, Kumar KAB and Mathew B (2003).** Trend in production, prices and market arrivals of sorghum vs competing crops - A critical analysis. *Indian Journal of Agricultural Marketing* **17**(1) 84-92.
- Sanogo I (2008).** Spatial integration of the rice market: empirical evidence from mid-west and far-west Nepal, and the Nepalese-Indian border. *Asian Journal of Agriculture and Development* **4**(1) 139-156.
- Vasciaveo M, Rosa F, Weaver R (2013).** Agricultural market integration: price transmission and policy intervention. Paper presented at the 2nd AIEAA Conference on Between Crisis and Development: which Role for the Bio-Economy at Parma, Italy.
- Wadhwani MK and Bhogal TS (2003).** Economics of Production, Post-Harvest Management and Price Behaviour of Cole Crops in Western U.P.—An Empirical Analysis. *Agricultural Marketing* **46**(1) 10-20.