CHAPTER V
SUMMARY AND CONCLUSION

It is well known that agricultural prices and arrivals have a tendency to display wider inter and intra year fluctuations. Three main factors responsible for such wide fluctuations are: (a) relatively low price elasticity of demand for agricultural commodities, (b) biological nature of the agricultural productions and (c) seasonal nature of the agricultural industry the output becomes available at particular time/times in a year. The knowledge of co-integration between Gondal and Rajkot APMC helps to know actual fluctuation of prices and arrivals between two markets. Thus, the present study on “Market Co-integration between Gondal and Rajkot APMC” was undertaken.

Keeping all these in view, the present study has been undertaken with following objectives:

1. To analyzed growth rate, trend and instability in price of groundnut, sesame and garlic in Gondal and Rajkot APMC.
2. To examine the seasonal variation in price of groundnut, sesame and garlic in Gondal APMC.
3. To study the degree of market co-integration and causality between Gondal APMC with Rajkot APMC in groundnut prices.
4. To identify the problems faced by farmers in Gondal APMC.

In order to study trends and growth rate in crop prices, secondary data on yearly index numbers of prices of Gondal and Rajkot APMC for groundnut, sesame and garlic were compiled for the period from 2001 to 2015. For the study of instability of crop prices and changes in prices over time, secondary data on monthly index numbers of prices of Gondal and Rajkot APMC for the period from January 2001 to December 2015 was collected. Gondal and Rajkot APMC are the largest markets and hence both APMC were selected based on highest arrivals of crop. Data on groundnut, sesame and garlic prices and arrivals were obtained from Gondal and Rajkot APMC.
To find out the variability in the prices of crops under study, coefficients of variation were worked out for monthly and yearly prices. To estimate trend, the linear model was fitted, while Compound Annual Growth Rate (CAGR) was employed to work out the growth in prices and arrivals was employed. The seasonal variations in the prices were worked out by assuming a moving average method. Irregular variation and inter relationship between prices of crops were also worked out for the period from 2001 to 2015. To examine the co-integration and subsequently, the causal relationship and its direction(s) between the prices and arrival of both APMC were analyzed using the Johansen’s Co-integration test and Granger Causality test. The major findings that emerged from the study are summarized below:

5.1 Growth rate, trend and instability index

5.1.1 Growth rate

Compound growth rate of groundnut, sesame and garlic in Gondal APMC during the period of 2001 to 2015 was 8.68 per cent, 12.20 per cent and 5.33 per cent, respectively. The result revealed that average prices of groundnut, sesame and garlic were considerably increased from 1288 to 4607, 2052 to 11864 and 878 to 5797 rupees per quintal, respectively. In case of sesame compound growth rate was high 12.20 per cent and garlic compound growth rate was low 5.33 per cent in Gondal.

5.1.2 Trend

5.1.2.1 Estimation of linear trend

The linear models have explained a large part of variations in the prices of all the three crops under study explained quite high (more than 12 per cent) annual rate of increase in all the selected markets. Co-efficient of multiple determination ($R^2$) was more than 75 per cent for all the three crops, indicating that most of the variation in the prices of the crops could be explained through linear trend. Thus, from the above results, it could be revealed that linear models have explained a large part of variations in the prices of crops during the period under study.

5.1.2.2 Estimation of quadratic trend

The co-efficient of multiple determination ($R^2$) explained that higher variations $i.e.$ more than 73 per cent in the prices of both markets of crop could be explained by
quadratic trend. The co-efficient of multiple determination ($R^2$) were found to be higher in case of all crops of both markets in liner model. So that the liner model was found better fit for all crops in both APMC.

5.1.3 Instability index

The instability index of monthly prices of garlic of Gondal and Rajkot APMC found high 73.79 and 73.71, respectively. In Rajkot and Gondal APMC, groundnut found under the low instability index i.e. 15.68 and 16.35, respectively, while sesame crop and their respective markets observed medium level of instability index i.e. 27.00 and 27.90.

5.2 Seasonal indices

5.2.1 Indices of seasonal variations

The seasonal variations in crops prices were analyzed by assuming a multiplicative model using secondary data of monthly wholesale prices for the period from 2001 to 2015. The prices of all the three crops under study indicated downward trend in post-harvest period and upward trend in pre-harvest period, so our second hypothesis is accepted. The garlic and sesame each crop showed two intra-year cycles in Gondal and Rajkot markets, while, groundnut showed three intra-year cycles in their respective markets under study. So, seasonal variations were found to be moderate in case of garlic as well as sesame and marginally higher in case of groundnut.

5.2.2 Coefficients of average seasonal variations

The maximum value of the coefficient in seasonal variation was found in case of garlic in Gondal market (52.65%). Whereas, in case of Gondal market, groundnut showed minimum seasonal variation (6.18%).

Thus, it was observed that during the period 2001 to 2015, each crop under study had showed moderate coefficient of average seasonal variation except sesame in Gondal and groundnut and sesame in Rajkot market, which experienced seasonal variation of a greater magnitude.
5.3 Co-integration and causality test

The descriptive statistics indicated that mean of the groundnut monthly price and arrival in Gondal market was Rs. 2624.42 and 22271.39 per quintal, respectively and Rs. 2626.66 and 47461.31 per quintal, respectively in Rajkot market. In case of sesame mean of the monthly price and arrival was Rs. 5502.45 and 5893.86 per quintal, respectively in Gondal market and Rs. 5421.34 and 22408.25 per quintal, respectively for Rajkot market.

For garlic, the mean of the monthly price and arrivals was Rs. 2399.36 and 35519.77 per quintal, respectively for Gondal market and Rs. 1465.12 and 17416.23 per quintal, respectively in Rajkot market. All the market prices and arrivals were positively skewed. The Gondal market’s standard deviation value was greater than that of Rajkot market price and arrival for groundnut, sesame and garlic crops.

The results of the Augmented Dickey-Fuller (ADF) unit root test for crops revealed that the level data were non-stationary, but their first differences were stationary. Hence, all market price series and arrival series were integrated of the order 1 i.e. I (1).

Johansen’s co-integration test for crops indicated that the model variables had a long-run equilibrium/co-movement among all the crops and their markets price and arrival series during the period under study. The existence of co-integration is necessary for long-term market efficiency.

The results of Pairewise Granger Causality test indicated that there was a bidirectional influence on prices of Rajkot and Gondal markets in sesame. There was a unidirectional influence on prices of Rajkot and Gondal markets in groundnut and garlic. Gondal and Rajkot had unidirectional influence on arrivals of groundnut, sesame and garlic.

5.4 Problems faced by farmers

There are no major problem faced by farmers in Gondal APMC. The only major problem faced by farmers was lower price of product i.e. 36 per cent farmers. The second problem faced by farmer was higher loading and unloading charges of produce and Unavailability of labours i.e. only 6 per cent farmers. The other constraints such as lack of proper storage facility, improper management of auction, improper grading system and other constraints (Residency and food) were reported from 4 per cent farmers.