CHAPTER - II

REVIEW OF LITERATURE

A brief review of studies, which have a direct or indirect bearing on the objectives of the present study, is attempted in this chapter. Commensurate with the objectives of the present study, the available literature was scanned and is briefly reviewed and presented under following heads.

2.1 To examine the extent of market integration between spot and future market prices for coriander.

2.2 To understand the behaviour and pattern of causality between spot and future market for coriander.

2.3 To assess the efficiency of coriander future market in its role of price discovery and risk management function.

2.4 Forecasting of spot and future prices for coriander.

2.1 To examine the extent of market integration between spot and future market prices for coriander.

Bhardwaj and vashist (2009) studied integration of futures and spot markets of gram. The co-integration technique was used to examine whether the future market was integrated with spot market. The Lead lag relationship between spot and futures market prices was also examined using Granger causality as the same was not available in co-integration analysis. The analysis of cross correlations of error terms of both spot and future prices provides information on mutual feedback relationship between the two prices. The price series of Gram crop in spot and futures market shows that level data was non-stationary but at their first differences it became stationary. The occurrences of unit roots in the price data gives a preliminary indication of shocks having permanent or long lasting effect.

Elumalai et al. (2009) studied the futures and spot price linkages for pepper, guar seed and chana by using Johansen Cointegration analysis and Vector Error Correction Model. With the opening up of commodity futures trading in large number of
commodities in 2003. The results of vector error correction model revealed unidirectional lead-lag relationship existing for actively traded guar seed and thinly traded pepper and chana. The results of the study broadly revealed that these three agricultural commodity futures influenced the spot prices indicating its better hedge efficiency for producers to hedge their price risk in the futures platform of the exchange.

Bhardwaj (2011) studied two important components of market intelligence to examine the extent of market integration. And to estimate error correction coefficients of price transmission. The prevailing large difference between wholesale and retail price of Gram in the country indicated towards delayed or lack of information flow and not following the market efficiency criterion. The study revealed that Gram markets in the country are distorted and not following the market efficiency criterion. The two statistical tests Trace test and Eigen value statistics indicated that there existed cointegrating vectors and cointegrating equations which confirms a long run relationship in the gram market.

Vijaykumar et al. (2013) examine the relationship between spot and futures prices for selected five agricultural commodities, namely, Chilli, Coriander, Jeera, Pepper and Turmeric. All the contracts of the above commodities over a period of 36 months, from Jan 2008 to Dec 2010. The study examined the existence of unit root in the data series by employing Augmented Dickey-Fuller (ADF) test and it found the existence of long run relationship between selected spot and futures market using Johansen cointegration test and the presence of disequilibrium between markets in short run by employing Vector Error Correction Model (VECM).

Anjana et al. (2013) examine the extent of market of market integration and estimate error correction coefficient of price transmission. And analyze the market margins for different functionaries. It’s concluded from the analysis that there exists high degree of co-integration between different markets. Though a long run equilibrium relationship existed between all the studied markets.

Pangayar et al. (2014) studied long-run and short-run integration of domestic and international maize markets using Co-integration approach within the framework of Vector Error Correction Mechanism (VECM). A sample of five domestic maize markets
comprising two from the traditional maize growing states of Madhya Pradesh, and Rajasthan and three from the non-traditional Andhra Pradesh, Karnataka, and Tamil Nadu were selected along with two international maize markets comprising from United States and Argentina. Analysis was carried out using the monthly price data between January 2003 and Dec 2013. Findings revealed that the prices became stationary only upon first differencing. The existence of integration was confirmed among markets implying that there is price transmission. The estimated error coefficients revealed that in Tamil Nadu market disequilibrium got corrected within a month by changes in its own prices with speed of convergence at 28 per cent in the long-run path. But for other markets the speed of convergence ranged from 20 per cent to 57 per cent for short-run price movements to become stable along long-run equilibrium path in one or two-month lagged period.

Anjana et al. (2015) studied degree of intra state market integration through co-integration analysis on wholesale monthly prices of rapeseed and mustard. Kota market from Rajasthan and Agra from Uttar Pradesh were selected. Augmented- Dickey Fuller (ADF) test was used to check the stationarity of price series data. Thereafter the Johansen’s co-integration test was used in order to examine the long run relationship between the two markets. The Vector Error Correction Model was used to estimate the acceleration speed of the short run deviation to the long run equilibrium.

Vivek (2015) studied performance and efficiency of pepper futures market for its role of price discovery and risk management functions. The performance assessment methods of extent of liquidity, price volatility and basis risk have been employed as analytical variables. Using the econometrics techniques such as cointegration, VECM, Granger causality, impulse response and variance decomposition, the study seeks to generate empirical results to evaluate the level of development of pepper futures market as an efficient mechanism of risk management and price discovery. Study revealed that in India pepper has not done well as performance and efficiency. Hedgers find futures market useful to manage price risk and can be very useful in risk management functions. In the presence of an expected increase of price risk.
Dhandhalya et al. (2016) studied co-integration for Arhar and Gram. And pair wise Granger’s Causality test for gram markets indicated unidirectional influence between the pigeon price of Dahod and Junagadh market. Based on Johansen’s multiple co-integration analysis, the integration between the Dahod, Gondal and Rajkot markets of Gujarat was analyzed using E-views7 software. And it is found that two co-integration equations at 5 per cent level of significance were obtained. And estimate linear and quadratic trend for Arhar and Gram in Gujarat.

Raghavendra et al. (2016) examine the market which reacts first in India by assessing the relationship between spot and future prices of agricultural commodities such as Soya bean, Chana, Maize, Jeera and Turmeric for a period from January 2010 to March 2015 traded in NCDEX, Empirical results suggest the existence of long-run equilibrium relationships between futures and spot prices for all the 5 agricultural commodities that were taken for this study. Regression model pertaining to Lead-Lag relationship between Spot and Future markets suggests that for the commodities Maize, Jeera and Turmeric, both the spot and future markets price plays the leading role in the price discovery process and said to be informationally efficient and reacts more quickly to each other.

2.2 To understand the behaviour and pattern of causality between spot and future market for coriander.

Jabir and Kriti (2011) studied efficiency of agricultural commodity markets by assessing the relationships between futures prices and spot market prices of major agricultural commodities in India. The efficiency of the futures market for 12 agricultural commodities, traded at one of the largest commodity exchanges of India, i.e. National Commodity & Derivatives Exchange Ltd, has been explored by using Johansen’s cointegration analysis and Granger causality tests. Unit root test procedures such as Augmented Dickey-Fuller and non-parametric Phillips-Perron were initially applied to examine whether futures and spot prices are stationary or not. The hypothesis, that futures prices are unbiased predictors of spot prices has been tested using econometric software package.
Jackline and Malabika (2011) examined the relationship between the futures market and spot market for the lean hogs and pork bellies markets during the sample period January 2001 through May 2010 and quantifies the price discovery function of commodity futures prices in relation to spot prices of the sample markets. The econometric tools like Unit root tests and Pairwise Granger Causality tests were employed in the study. The Augmented Dickey Fuller tests and Phillips-Perron tests employed in the study proved that both the selected markets were stationary series and the Granger Causality test proved bi-causality relationships among these markets. Hence, it was concluded that the profitable arbitrage does not exist in both of these markets and they are said to be in perfect equilibrium.

Chauhan et al. (2013) studied market efficiency of the Indian commodity market and volatility spillover effects between the spot and future market with reference to agriculture commodities guar seed and chana. The result indicate that the commodity futures markets effectively serves the price discovery function in the spot market implying that there is a flow of information from future to spot commodity markets.

Paul et al. (2013) studied how efficient US futures prices have predicted future spot prices since 2006. It used cointegration and causality methods to assess the efficiency of US commodity futures markets. The cointegration between the spot and futures price is a necessary condition for market efficiency. It ensures that there exists a long-run equilibrium relationship between the two prices. Causality assists in examining the existence of lead or lag relationships between futures and spot prices in order to make inferences on the directions (unidirectional or bidirectional) of information flow.

Viswanathan and Sridharan (2014) examined the causal relationship between the price of Pepper in the spot and future market. The relationships between the two series are analyzed by applying Pairwise Granger Causality test. Descriptive statistical analysis and Jarque Bera Test are applied to study the nature of distribution of the time series data of spot and future price of Pepper. Correlogram analysis is applied to test the presence of auto correlation in the series. The Augmented Dickey Fuller test (ADF) shows the data series of spot and future price of Pepper are stationary at first order level. Granger Causality is applied to examine the relationship between spot and future price of Pepper.
The test results indicate bilateral causality between the price of Pepper in the spot and futures market.

Bhavani et al. (2015) studied market integration of different cotton markets in India. And to know the direction of causation between selected cotton markets, Granger causality test was employed. Spatial market integration analysis indicated that all the market pairs exhibited bi-directional causality and prices were transmitted vice versa. The study is confined to domestic markets. Based on the volume of transactions and the availability of data for cotton, four market were selected for the study. The econometric tools like ADF test, Johansen’s multiple co-integration test, Granger causality test and Vector Error Correction Model were used to analyze integration of markets across locations. The econometric analysis was carried out using the E-views7 software package.

Jyothi and Kotreshwar (2017) examined efficiency of Maize futures market in terms of price transmission, price discovery and extent of volatility. To find out long term and short term relationship between spot and futures market by empirically testing through Stationarity test, Cointegration analysis and Granger Causality test. Daily closing spot and futures prices of Maize was collected from NCDEX website for two kharif seasons’ contracts. The empirical tests and analyses revealed that maize spot and futures market are cointegrated in a long run and have causal relationship in short run from spot to futures market.

Dhandhalya et al. (2018) studied performance of Indian spot and futures market for major cotton commodities of transaction. To determine the existence of long-run relationship between spot and futures market prices for cotton fibre and cotton seed oil cake. To capture the price deviations in the short run between spot and future market prices and to estimate the degree of convergence towards the long run relationship. And causality between spot and future markets. And efficiency of cotton futures market.
2.3 To assess the efficiency of coriander future market in its role of price discovery and risk management function.

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2.5 Forecasting of spot and future prices for coriander.

Nochai and Nochai (2006) studied ARIMA model of forecasting oil palm price of Thailand in three types as farm price, wholesale price and pure oil price for the period of five years, 2000 – 2004. The objective of the research is to find an appropriate ARIMA Model for forecasting in three types of oil palm price by considering the minimum of mean absolute percentage error (MAPE). The results of forecasting farm price of oil palm is ARIMA (2,1,0), ARIMA Model for forecasting wholesale price of oil palm is ARIMA (1,0,1) or ARMA(1,1), and ARIMA Model for forecasting pure oil price of oil palm is ARIMA (3,0,0) or AR(3).

Pant et al. (2011) studied price of coriander in the Kota regulated market of Rajasthan. Monthly time series data on wholesale prices of coriander for particular period were collected and used to calculate price forecast with the help of an ARIMA model. It was found that on ARIMA model of order (1,1,0) fits the data well with lowest percentage error. For the impact assessment of price forecast, two village from Kota district namely Umerhedi and Khandgaun of Sangod tehsil were purposively selected. From these villages, 26 farmers were randomly selected for the impact study.

Yeri (2011) studied four commodities cotton, cumin, Soya oil and Tur. The compound growth rates of prices of the selected agricultural commodities under study were computed. Volatility can be measured using the ARCH and GARCH models. The co-integration technique was employed in the study to analyse the long and short run relationship between spot price and future price of selected agricultural commodities. Two variables can be co-integrated, when they converge in the long run despite short run divergences. The long run convergences between spot and futures prices were verified using Johansen’s co-integration technique. Forecasting of spot and futures prices was done using the ARIMA model.

Bhardwaj et al. (2014) studied time series models which are non-structural-mechanical in nature. The Box Jenkins Autoregressive integrated moving average (ARIMA) and Generalized autoregressive conditional heteroscedastic (GARCH) models are studied and applied for modeling and forecasting of spot prices of Gram at Delhi market. Augmented Dickey Fuller (ADF) test is used for testing the stationarity of the
series. ARCH-LM test is used for testing the volatility. It is found that ARIMA model cannot capture the volatility present in the data set whereas GARCH model has successfully captured the volatility. Root Mean square error (RMSE), Mean absolute error (MAE) and Mean absolute prediction error (MAPE) were computed. The GARCH (1, 1) was found to be a better model in forecasting spot price of Gram. The values for RMSE, MAE and MAPE obtained were smaller than those in ARIMA (0,1,1) model. The AIC and SIC values from GARCH model were smaller than that from ARIMA model. Therefore, it shows that GARCH is a better model than ARIMA for estimating daily price of Gram.

Burark et al. (2015) studied price forecasts well in advance of sowing of major commodities and during harvesting thus helping the farmers in taking better sowing and selling decision. Provide other market intelligence such as product qualities, high price markets for the different commodities, etc. And studied different market intelligence aspects being made available to farmers in different countries and explore possibilities of replicating the same in India. And developing commodity out-look along with NCAP-NAIP for selected commodities at state level besides providing commodity market research reports.

Borkar and Tayade (2016) studied forecast model for time series data of Cotton Production in India. The Box Jenkins ARIMA methodology has been used for forecasting. The diagnostic checking has shown that ARIMA (2, 1, 1) is appropriate. The forecasts from 2015-16 to 2020-2021 are calculated based on the selected model. These forecasts would be helpful for the policy makers to foresee ahead of time the future requirements of grain storage, import and/or export and adopt appropriate measures in this regard.

Murugananthi et al. (2016) studied impact of price forecast on income of maize farmers in Tamil Nadu. Hence farmers were advised to store and sell maize. The time series data used were 25 years of Udumalpet market price, a major market for maize in Tamil Nadu. Auto Regressive Integrated moving Average model (ARIMA) was used to predict the price of maize in Tamil Nadu. Model selection was based on minimum absolute percentage error criterion. ARIMA (111) was selected as the best fit model. The
difference between actual and predicted price is compared and the results revealed 98 per cent accuracy in the forecasted price.

Verma *et al.* (2016) studied forecast the coriander prices for Rajasthan by using the time series data of monthly wholesale prices for the period from May 2003 to June 2015 of Ramganj mandi Rajasthan. To forecast the coriander prices ARIMA models introduced by Box and Jenkins were used. To test the reliability of model $R^2$, Mean Absolute Percentage Error (MAPE), and Bayesian Information Criterion (BIC) were used. The best fitted model was ARIMA (0, 1, 1). On comparing the alternative models, it was observed that AIC (2141.14), SBC (2147.09) and MAPE (6.38) were least for ARIMA (0, 1, 1) model therefore it was considered the most representative model for the price of coriander in Ramganj mandi of Rajasthan. Thus the study focus the estimated coriander prices during near future which help the farmers to take appropriate sowing and selling decisions.

Vijaya *et al.* (2017) forecasting of the area and production of cotton in India using the univariate autoregressive integrated moving average (ARIMA) model. The time series data on area and production of cotton in India for the period of 65 years from 1950-51 to 2015-16 was analyzed for the study. The best models were selected by comparing Akaike Information Criterion (AIC), Schwartz’s Bayesian Criterion (SBC), Normalized BIC; Mean Absolute Percentage Error (MAPE) and maximum values of $R^2$. The study revealed that ARIMA (0, 1, 0) and ARIMA (1, 1, 1) were the best fitted models for forecasting area and production of cotton in India respectively. Selected models were used to forecast area and production of cotton for four years from 2017-18 to 2020-21. The analysis showed an increasing trend in area and production of cotton. If the present trend continues, the cotton area in India in the year 2020-21 would be 123.83 lakh ha with upper and lower limits of 146.51 and 101.16 lakh ha, respectively and the production of cotton would be 316.16 lakh bales (170 kg each) with upper and lower limits of 412.70 and 219.63 lakh bales, respectively.