In order to have a healthy growth in agriculture sector, it is necessary to keep a watch on the price movement of agriculture commodities. This also ensures the economic interests of a nation and assures the food security to its people. Detailed studies are required from time to time to assess the current situations and assist in the formation of price policy that affects the future of the market. Although few such studies were conducted in India, rarely we find such study been carried out in Gujarat.

Reviews of such studies carried out have been made in order to aid the research. Most of the empirical studies in the context of India are found to be motivated by policy orientation rather than academic curiosity. Reviews of a few of such studies were carried out under following heads.

2.1 Growth rate, trend and instability index in price
2.2 Seasonal variation
2.3 Market Co-integration and Granger Causality test
2.4 Problems faced by Farmers

2.1 Growth rate, trend and instability in price

Grover et al. (1996) found that compound growth rate for production, employment and capital for the 14 major agro-industries. Except the village the ghani oil, production in all the agro industry showed significant increase. However the significant higher growth in production was observed in the case of bee keeping, handmade paper, village pottery and fiber industry registering compound growth rate. For all agro-industries except village ghani oil and Gur-Khandasari, positive significant growth rate in employment were observed. Village pottery, processing of cereal and pulses, C & B industry, lime stone, bee keeping, fruit preservation and lather industry experienced compound growth rate of 18.35, 16.50, 14.32, 13.84, 12.03, 10.80 and 10.13 percent per annum respectively.

Pawar and Misal (2004) studied the behaviour of prices and arrivals of pomegranate in Solapur market at Maharashtra from 1991 to 2000 and found that the arrivals of pomegranate were maximum during July, August, September and December while lowest in the month of April. The co-efficient of correlation between arrivals and
prices exhibited negative relationship. Trends in arrivals increased at 9.80 per cent per annum while prices increased at 8.20 per cent annually during the study period.

Kathiravan and Selvam (2011) studied the compound growth rate of livestock productivity in Southern Peninsular state of India, Tamil Nadu. Studied the spatio-temporal productivity dynamics of livestock in different districts of Tamil Nadu, using exponential growth equation. The average productivity of milk in cross bred cows and buffaloes in Tamil Nadu was less than the national average, while the productivity desi cows were a bit more. The annual compound growth rate of milk productivity among crossbred cows of Tamil Nadu was at meager 0.54 per cent during the period between 1998-1999 and 2006-2007, whereas the productivity of milk in desi cows had improved from at an annual compound growth rate of 1.29 per cent. Notably, the milk productivity in buffaloes had declined at a rate of 0.29 per cent during the period under study. The annual compound growth rate of egg productivity in improved hens of Tamil Nadu was 20.87 per cent. The average annual productivity was 109.531 eggs, which improved from 70.623 in 1998-1999 to 197.084 in 2004-2005. Correspondingly, the productivity of desi hens also had a positive swing from the year 2003-2004 onwards.

Wasim (2011) analysed the trend, growth and variability of major fruit crops (apple, grapes, pomegranate, dates, apricot, peach, plums and almonds) in two different period of Balochistan. The study revealed that in period I in the majority of fruit crops, the increase in production growth was mostly due to its area growth rather than productivity growth. The study also concluded that the growth of production of apple, grapes, pomegranate, dates, apricot, peach, plums and almonds decelerated in period II compared to period I. The study also revealed that the productivity growth of all the fruits except plums recorded negative and significant growth in period II compared to period I.

Kaur and Bhullar (2012) conducted study in Punjab state has shown tremendous growth in terms of milk production from 3.22 million tonnes (1980-81) to 9.38 million tonnes (2009-10). The contribution of number of milch animals and productivity of animals has been studied with a view to analyze the relative importance of these determinants and their interactions towards the increase in total milk production in the state. The distribution of animals has shifted from low to high milk yield levels. A structural change in the composition of milk production has taken place in the state. The dominant factor contributing to the growth in milk production was the productivity
of animals. The relative contribution of yield effect in the growth of cow and buffalo milk production increased and that of population declined overtime.

Narala and Reddy (2012) estimated the growth and instability of cotton production in India for period of 1951-52 to 2010-11. The growth of cotton area and production was significant during 1950s, 1990s and 2001-10. While cotton production and productivity was the highest during the period 2001-10. Cotton productivity was recorded positive growth during all the periods except during 1961-70, which has showed a negative growth rate. Among all the decades, the positive growth rate was found statically significant except the 1971-80 periods.

Paul et al. (2013) analyzed the trends, growth and variability of groundnut crop in Andhra Pradesh for a period of 1995-96 to 2010-11. The compound growth rates of area production and productivity of groundnut over the period shows negative trend of 0.019, 0.036 and 0.017 per cent per annum respectively and found non-significant.

Sitarambabu et al. (2014) analysed the trends in area, production and productivity of Bengal gram in Andhra Pradesh over a period of 1987-88 to 2006-2007. Decomposition of output growth of groundnut was examined by fitting component analysis model. The compound growth rates of area production and productivity of Bengal gram over the period shows positively significant. The study also confirmed the magnitude of variability in production of Bengal gram. The synchronized movements in area and productivity both was responsible for low instability/variability in Bengal gram of Andhra Pradesh. The decomposition analysis revealed that in the total production of Bengal gram was completely due to the change in area under the crop as the yield and interaction effects were very small.

Patted and Mitrannavar (2015) studied that the Temporal Variations in Prices and Arrivals of Dry Chilly in Byadgi Market from 2000-2014. In Karnataka the most important market of chilly is byadgi trends in arrivals and prices was found to be increasing. The pattern of trend in arrivals and prices was similar in increasing trend. There was an increase in 3422 quintal every year with the time variable explained to the extent of 72 per cent.

2.2 Seasonal variation

Bhatt et al. (1988) studied the arrivals and prices of important vegetable crops in Ahmadabad regulated market of Gujarat and they found that higher seasonal and cyclical variations in prices were found as compared to arrivals in all the crops, except
chillies. The irregular fluctuation was higher in respect of arrivals as compared to the prices of all the crops except brinjal.

Borah and Dutta (1991) in their study in Assam, observed that the seasonal indices of rapeseed and mustard are found higher in pre harvest months as compared to post harvest period. The existences of positive trend were found in all the five major market in Assam. The coefficient of variation in prices had a range from 3.35 to 24.1 per cent.

Brahm Prakash et al. (2001) studied the effect of seasonality in market arrivals on price of wheat in Uttar Pradesh. They came to the conclusion that the annual variability in prices were more than that of arrivals of wheat. Inter year variation in market arrivals ranged from 88.53 to 113.33 per cent, while intra year variation ranged from 52.36 to 278.14 per cent. Negative coefficients of correlation between market arrivals and price were observed. Thus, prices of wheat decreased in postharvest months and increased with the advancement of the time.

Kumar et al. (2005) made an attempt based on market arrivals and wholesale prices of different vegetable crops collected from the Azadpur market of Delhi and Agricultural and Processed Food Products Export Development Authority (APEDA) for the period 1990-2001. The result publicized that extent of variability in the arrivals of cabbage was lower in Bangalore and higher in Mumbai. The prices were relatively stable in Mumbai but were more volatile in Bangalore. For cauliflower, the variability in the market arrivals was more pronounced in Kolkata; however the price variability was, more marked in Delhi. The results confirmed the negative relationship between market arrivals and prices. Based on the trend analysis of prices over the years, direction showed relatively higher prices for cabbage in the Kolkata and Delhi markets during July to December months. So far trend of cauliflower is concerned; it was relatively high in the months of May to October in Delhi and October and November in Bangalore and Mumbai.

Navadkar et al. (2005) in their study on seasonal indices of monthly arrivals and prices of vegetables in Pune, Maharashtra (1990-2000) observed that the lowest coefficient of variation of arrivals for tomato and it was more than 50 per cent during remaining months. Whereas, the price was the highest during the month of March and below 50 per cent during April to June. In case of okra, the coefficient of variation of arrivals was far below 50 per cent for the period from April to October, while it was more than 50 per cent in all the months except in November and May. It was noticed
that the coefficient of variation were ranged from 22 to 79 per cent and for prices these were in the range of 31 to 69 per cent for cabbage. While for cauliflower the same were 31 to 69 per cent and 24 to 54 per cent, respectively. Furthermore, it was indicated that when the arrivals of vegetables were at the higher side, the prices are at the lower side.

Yogisha et al. (2007) revealed that there was a mixed trend in arrivals and prices of potato in all the selected markets of Kolar district for a period from 1994-95 to 2004-05. The monthly seasonal indices for arrivals of potato, onion, ragi and groundnut were found higher immediately after the harvest in all the markets and the price indices were found to be maximum during lean period and minimum during harvesting period. Hence, the dissemination of information on market arrivals, prices prevailing in the market, crops to be grown in the season, etc. will result in maintaining uniformity in supply and demand of the produce.

Ravindra (2011) analysed that the behaviour of market arrivals and prices of tomato and their nature of relationship in selected markets of north India over the years. It had been found that both market arrivals as well as prices of tomato have shown increasing trends in all the markets during 1991 to 2003. The seasonality in prices of tomato was higher than the seasonality in market arrivals in all the selected markets emphasizing the improvement in the production and protection technologies and imperfection in markets and marketing system of tomato. The selected markets seem not to be well integrated as reflected by monthly price variations. The prices of tomato in Delhi and Jalandhar markets were highest in September while in low range in Shimla and Chandigarh markets. A similar situation prevails in case of arrival of tomato also. Therefore integrating markets by providing information on market arrivals and prices can help to reduce seasonality in tomato markets.

Chaudhari and Tingre (2012) studied the price movement of pigeonpea, i.e., seasonal variation, price volatility and cointegration among the major pigeonpea markets in India. Data related to monthly average prices of pigeonpea were collected from major markets for the period 2003–2011 across different states, viz., Akola and Latur (Maharashtra), Alwar (Rajasthan), Sedam (Karnataka) and Thandur (Andhra Pradesh). Moving average method was used to study seasonal variation. The results of the study showed that the prices of pigeonpea were higher in the months from June to August in all the selected markets.

Rao et al. (2014) analyzed of trends, seasonal variations and in market prices of rice in Guntur district and Andhra Pradesh and forecast the same for the period 1990-
The seasonal variations in market prices and 12 months moving average method was used to construct the seasonal indices and Box-Jenkins model was used to forecast the future prices. The annual increase in wholesale prices of rice in Andhra Pradesh was Rs. 44.53 per quintal whereas in Guntur market it was Rs. 49.38 per quintal. The month wise seasonal index was lowest on the month of April, May and highest in the month of September, October in Andhra Pradesh and Guntur district respectively. Thus, the farmers could receive the better price by postponing the sale of produce during the month of January to June to later months of the year.

2.3 Market co-integration and granger causality test

Singh et al. (2005) made an attempt to look into the mechanism of movement of spot and futures prices for two important food crops in Indian agriculture. Augmented Dickey Fuller (ADF) test has been used for both the crops to check the stationarity of the time series data. Most of the series have been observed to follow the stationary pattern at the first difference. The co-integration test has been attempted to find out whether there exists a long run relationship between spot and futures prices of various contract months for maize and wheat crops. However, there exists a short run disequilibrium between these two. It has been observed that the futures contract behave in an expected manner and there exists a mechanism for long-run equilibrium in the maize as well as wheat crops. This phenomenon of price convergence for both maize and wheat crops clearly stated that the farmers were mitigating price risk as spot prices and future prices converges.

Lohano and Mari (2006) analyzed spatial market integration using monthly wholesale real price of onion in four market located in each of the four provinces of Pakistan. Unit root test indicates that the price series in each location are stationary, and the series are represented as autoregressive model for location. Spatial price linkages between locations are evaluated by estimating the error correction model in the presence of stationarity. Result reveal that onion trading markets are spatially integrated as indicated by strong spatial price linkages among markets.

Ali (2009) studied the performance of commodity markets for pulses in India and tried to find out whether futures trading could help in improving the market efficiency. He found that a long-term equilibrium relation existed between futures and spot prices for three commodities, i.e. gram, urad and lentil, under the study. Lack of co-integration for tur might be due to partially developed futures commodity
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exchanges, market manipulation by large traders, and greater market intervention by the Government for minimum support price (MSP) and procurement. The finding of no co-integration between futures and spot prices was normally interpreted to imply either market inefficiency or that the (spot and futures) markets do not represent the same underlying asset. Therefore, information dissemination might be a viable option for making futures trading a great success in the country.

Bhardwaj and Vasisht (2009) studied the price volatility and integration in spot and futures market of gram using Johansen’s co-integration and Granger causality tests. They found that the future volatility was greater than that of spot market volatility. The statistically significant coefficient for zero lag indicated that there was instantaneous transmission of price signals between the markets.

Peter and Valerie (2012) compared a Site Adjusted Land Price Index with an equivalent Quality Adjusted Housing Price Index developed for Adelaide, the state capital of South Australia for the period 1985 to 2010. They used a Granger causality estimate to assess whether the theoretical Ricardian understanding of the relationship between house and land prices is valid in a dynamic urban land market. The study clearly identifies the increasing gap in the rate of growth between vacant land and detached house prices for a metropolitan area and concluded that house prices Granger cause land prices but not that land prices Granger cause house prices.

Reddy (2012) studied assesses the market integration of chickpea in India from 2003 to 2010. Monthly prices of twelve markets in north India were taken. Out of twelve markets, only three markets are co-integrated, indicating weak integration of chickpea markets in India. However, the terminal markets located in major consuming (Delhi) and export/import locations (Dahod/Gujarat) clearly play an important role in price discovery and influences other domestic markets indicating the relevance of the import prices and large consuming centers on local market prices. Overall, there is evidence of weak co-integration in the chickpea markets in North India and imports and major consuming centers are playing an important role in price discovery in domestic chickpea markets.

Ajjan et al. (2013) studied the market integration using monthly modal prices of chana in six regional markets in Andhra Pradesh, Tamilnadu, Maharashtra, Rajasthan, Karnataka and Gujarat. For each market seasonal index, ADF text, Johansen’s Co-integration and pair wise Granger causality tests were carried out and the result showed that the markets had price linkages and thus were integrated.
Debaniyu (2013) investigated cowpea market integration in Niger state, Nigeria. Data were analysed through the use of the Augmented Dicky Fuller unit root test, Johansen co-integration test, Error correction model and Granger causality tests. Results from the market integration study revealed that markets in Niger state present a relatively long run integration in cowpea prices. A strong spatial price linkage exists between Kontagora vs. Sabonwuse and Bida vs. Sabonwuse markets. This was adduced to the ease, flow and use of market information, competition among market participants and the presence of arbitrage. Results from the Granger causality tests indicated both bidirectional and unidirectional causation.

Beag and Singla (2014) studied market integration across five major wholesale apple markets, viz. Ahmedabad, Bengaluru, Delhi, Hyderabad and Kolkata, of the country by adopting Johansen’s multivariate co-integration approach. The result of the test was significant among these market which implies long-run price association among the markets. Granger causality test was used in the order to quantify the direction of change between markets. Hyderabad was found comparatively more efficient as it had depicted bidirectional causal relations with other markets. The market pairs: Ahmedabad - Kolkata and Bengaluru - Kolkata did not show any causal relation between them. The impulse response functions were also conducted which have confirmed the results of co-integration and Granger causality, but the magnitude of price transmission has been found relatively low in some market pairs that are spatially integrated. The major implication of the study is for the designing of a network of agricultural wholesale markets across the country at almost equal distance from each other to enhance the market integration and better price transmission among them.

2.4 Problems faced by farmers

Petrovic et al. (2009) analysed that Farmers’ needs differ due to different modernization level, structure of agricultural population and production, characteristics of farms and historical background and development levels of the two regions that have been surveyed. Similar problems in extension service are present and they are mostly related to the general lack of trust in the government that reflects itself on the extension service and their work. Extension services in both of the surveyed regions have similar problems regarding finance, management, technical support and overload with non-extension activities of the advisors. This should be the indicator for the government to start dealing with these problems in order to create adequate support for farmers even
if this implies greater investments of economic, human and social capital into the service.

Borah et al. (2013) analyzed that the problems faced by the members of the farmers’ groups organized under Agricultural Technology Management Agency (ATMA) in Jorhat district of Assam. The major problems faced by the group members includes non-availability of different irrigation facilities, lack of special market for organic produce, lack of need based training, lack of electricity, non-availability of seed in the village at proper time, non-availability of own vehicle, unavailability of raw materials needed for storage construction, too costly infrastructure, unavailability of organic manures and high cost of pump sets and other equipments required for irrigation.

Goodwin and Gouldthorpe (2013) analyzed that a needs assessment of Florida small-scale farmers’ production challenges and training needs. The purpose of this research was to discover the challenges and needs of small-scale farmers in Florida. Six focus groups were conducted throughout the state of Florida to identify perceived challenges that small-scale farmers believe affect their operations, as well as their current needs. The data collected suggest that the small farmer population in Florida represents a diverse array of individuals with varying needs. This research concluded the challenges and needs of the small farm clientele within Florida, giving agents greater insights to this clientele group. The challenges identified by the small farmers included personal challenges, economic challenges, natural challenges, marketing challenges, information access challenges, and agricultural knowledge challenges. The small farm participants indicated that they needed information/resources, improved and accessible training, consumer education, and Extension involvement and knowledge.

Vadivelu and Kiran (2013) found that there was a need to create awareness among the farmers through the agricultural extension agencies like the State Department of Agriculture, Krishi Vigyan Kendras so that the marketing information on agriculture commodities are incorporated in the extension services along with production aspects to the farmers.

Jaynthi and Vaideke (2014) analyzed that the problems of farmers in cultivation and marketing of onion in sulur taluka, Coimbatore District. Marketing of agricultural goods is more complicated when compared to marketing of non-agricultural goods. Farmers are facing many problems in both cultivation and marketing of onion. Agricultural production is generally depends on fertility of land, climate condition, and
rain fall. Onion is one of the important agricultural commodity and spice crop. Onion is a perishable agricultural product it requires proper storage facility.

Ekhande and Patil (2015) found that in the recently years farmers turned towards pomegranate production due to its high returns in Maharashtra. But 69% farmers they don’t get reasonable prices for their pomegranates, 31% farmers said they get reasonable prices for their pomegranates in the APMC market. As farmers not decide the rates of pomegranates in the market so sometimes they won’t get good prices because of excess supply. In case of primary processing fruits, 62.70% farmers don’t know the primary processing on fruits like cleaning, grading. 37.30% farmers know about primary processing. It is need important to provide marketing facilities to the farmers so as to improve the present conditions in the pomegranate marketing and that may fetch better returns to the farmers.