CHAPTER- II

THEMATIC REVIEW OF LITERATURE

A number of studies have been conducted in India and abroad on various aspects of rice. These studies have been taken up for reviewing literature in the field of rice. The present review of literature has been made under the classifications of

2.1 Neo-Classical Theories.
2.2 Studies in Post-1990s.
2.3 Impact of Compound annual growth rate of rice.
2.4 Price of rice.
2.5 Demand for rice.
2.6 Supply of rice.

2.1. Neo-Classical Theories:

As theoretical reference, the Ricardian (classical), theory of comparative advantage and Heckscher-Ohlin (neo-classical) theory explains international trade within a two-country and two commodity world. This simple analysis becomes very difficult and even impossible when trade takes place among many countries and many commodities. To overcome this restriction Balassa (1965 and 1977) developed an index of “Revealed Comparative Advantage”. Jebuni et al. (1988) have used the Balassa Revealed Comparative Advantage (RCA) index to analyze the comparative advantage in exports for twelve less countries. Yeats (1997) studies the possible distortions in trade patterns on account of discriminatory trade barriers that are characteristic of the regional trade agreements (RTAs). He uses the index of revealed comparative advantage in
conjunction with the changes in the orientation of exports to identify any apparent inefficiency in trade patterns for the Mercusor group of countries.

2.2. Studies in Post-1990s:

**Gulati and Sharma (1990),** have explored the issues of like in procurement prices of wheat and paddy and their impact on open market prices etc. The authors have explored these issues in an empirical framework. The authors have found from their study that procurement prices are largely influenced by movements in cost of production and logged open market prices with occasional bonanza emanating from non-economic considerations. It is found from their study that procurement prices have decisive influence on current market price formation with other factors like stocks with government and zoning playing only marginal roles. The authors have found from their study that the volume of procurement is significantly affected by level of output and difference between procurement and open market prices weekly supported by administrative measures. The authors further conclude that the supply of wheat and rice is influenced by their open market prices, suitably deflated and non-price variables like irrigation. The elasticity with respect to shifter variables is much greater than price elasticity. The authors conclude that results reveal greater diversity. The authors have suggested a supportive role for prices which becomes critical when non-price factors are in place.

**Setty et al. (1990),** conducted an experiment on cropping system at Agricultural Research Station, Siraguppa during 1987-88 to find out suitable cropping sequences for Tungabhadra project area in Karnataka. Among the various sequences tried, maize-bengalgram yielded the highest net return (Rs.6370/ha), followed by maize-wheat sequence (Rs.3693/ha).

**Hideki IMAOkA (1992),** in his study has observed that Asia is the largest rice exporting and importing region in the world. About 4 million metric tonnes of milled rice, about 50 per cent of the world total is annually imported by the Asian
countries. On the other hand the Asian exporting countries annually supply about 4.3 million metric tonne in milled has is to the world market. The author has observed that the Asian market is an independent market with US export, and exogenous factor in the sense that a unique international price is determined solely by the condition that the Asian importing demand for Asian exports is equal to the Asian export to Asia. The author considers that the Asian rice market is in perfect competition in the sense that every exporter and importer is too small to affect the determination of international price; consequently there is unique international price for the commodity bundle rice. The Asian rice market highly distorted by fluctuations in domestic production. The author feels that in order to stabilise the Asian rice market, priority should be given in each country to controlling the fluctuations in domestic rice production.

Gail L Cramer et al (1993), have estimated the impact of trade liberalisation in twelve exporting and forty six importing countries and regions. The authors have used global rice spatial equilibrium model structural to account for 1986 and 1987 rice trade flows in Japonica, high quality indica and low quality indica. The study has revealed that (i) world rice trade expanded by about 104 per cent (ii) world trade volume as a percentage of world consumption increased from 5.4 to 11.1 per cent (iii) world welfare increased $ 5.03 billion (iv) US rice exports increased 51.1 per cent, while total gross revenue rose 109 per cent (v) exports increased for all exporters (vi) major exporters were, Japan, South Korea, EU, Philippines, Taiwan and Brazil and (vii) movement to free trade in Japan has important effects on world and US trade volumes, structure and prices.

Mohandas and Thomas (1997), studied the economics of rice production in Kuttanad area of Kerala. They reported that cost of cultivation of paddy for state was Rs.13108.05 for marginal farmers (class-I), Rs.13309.72 for small farmers (class-II) Rs.13858.13 for large farmers (class-III). Rental value of own land recorded the highest expenditure in class-I and II, which accounted for 24.19 per cent (Rs.3171.30) and 22.38 per cent (Rs.3112.00) of total expenditure,
respectively. However, the highest item of expenditure was on fertilizer in class-
III, which came to 22.39 per cent (Rs.3100.75) of the total cost. Returns realised
for the care was highest in marginal farms (Rs.15,857.45), followed by small
farms (Rs.15,560.00) and (Rs.15,387.50) large farmers. The net returns and input-
output ratio was also found to be highest in the case of marginal farms
(Rs.2748.25 and Rs.1.21), followed by small farms (Rs.2250.28 and 1.17) and
large farms (Rs.1529.37 and1.11).

Barah. B.C and S. Pandey (2005), opine that regional disparity and
dismal performances, the rice production system has undergone tremendous
changes over the decades. Proper diagnosis of the changes and their
characterization is essential to formulate regionally differentiated targeted policy
interventions. In-depth understanding of the synergy among the varieties (modern
variety and traditional variety) as a determinant of system resilience and likely
future demand for rice research requires more insights into the on-farm dynamic
of the existing production systems and the pattern of change.

2.3. IMPACT OF COMPOUND ANNUAL GROWTH RATE (CAGR):

George and Mukherjee (1986), found that the growth rate of area, yield
and production fluctuated considerably across the districts, over seasons and over
time. In spite of the overall decline in area for certain seasons, the growth rate of
yield for the Period II (1975-76 to 1983-84) was much higher than that of the
Period I (1960-61 to 1974-75), particularly during autumn and winter seasons, but
during summer the growth rate of rice production has declined during the Period
II, but the decline was comparatively higher in case of summer rice. The
Proportion of irrigated (both HYV and Non-HYV) turned out to be a non-
significant variable in explaining paddy yield. While the proportion of area under
HYV had a significantly influence on yield during autumn and winter but it was
found non-significant during summer. Because of this difference in the annual
data, HYV area turned out to be unimportant in explaining rice yield. Inter-district
variations in paddy yield had been significant in many situations but inter-seasonal variations were not significant.

**Battese and Coelli (1988),** applied a panel data model in the analysis of technical efficiency in dairy farms in New South Wales and Victoria over three years. The estimated technical efficiencies ranged between 0.55 to 0.93 for New South Wales farms and between 0.39 and 0.93 for Victoria farms.

**Krishnan *et al.* (1991),** have worked out trends in growth rates of area, production and productivity of major crops in Kerala for the period 1970-71 to 1986-87 and compared them with the corresponding trends at the all-India level. Negative growth rates of output were registered by four out of the ten crops studied viz., rice, tapioca, arecanut and coconut. Growth rates of production were positive and significant for only two crops namely, dry ginger and rubber. Negative and significant growth rates for area of rice and tapioca indicated a shift in cropping pattern in favour of cash/plantation crops.

**Kamal and Meenu (2000),** worked out the compound growth rate for paddy in Punjab using data on area, production, and yield for the three periods viz., period I (1970-71 to 1983-84), period II (1984-85 to 1997-98) and overall (1970-71 to 1997-98). Chow-test was applied to test the difference in the growth rate between two time periods. The null hypothesis of no difference between the growth rates was tested against the alternative hypothesis that the growth rates for the two periods were significantly different. Results indicated that the annual compound growth of the area, production and yield of paddy was 6.90, 8.82 and 1.79 per cent, respectively for the whole period. Results of the Chow-test showed that there was a marked difference in the growth rates of area, production and yield between the two periods showing a significant decline in area, production and yield during the second period.

**According to Bhalla and Singh (2001),** in a recent study, the compound annual growth rate in the value of agricultural output in eastern India has changed
drastically over time using the triennium 1970-72 as the base line. The growth rate in the value of agricultural output during the triennium 1980-82 was low i.e., below the rate of growth in population in most of the eastern Indian states.

2.4. STUDIES ON PRICE OF RICE:

John Kerry King (1953), has observed that rice has been significant crop in the far East countries in the modern period. The shortage of rice becomes more acute since the Second World War. The previous surplus producers of rice were Burma, Indo-China and Thailand. The main deficit areas were India, Ceylon, China, Japan and Malaysia. Both production and movement of rice were badly dislocated by the war labour shortage and lack of transport facilities has effected production and marketing of rice.

In the post-war period U.S.A and U.K arranged for supply of rice from Thailand to nationalist China and other friendly countries. Japan’s entry into rice market for buying rice has had its impact on world rice price. There is a world shortage of rice and world surplus of wheat and wheat is sought to be made a substitute for rice by cropping it into Japan, India. Far Eastern countries the authors have pleaded for expanding Asian rice production to meet the needs of the region.

Nayyar and Sen (1994), point out that larger participation by India in a number of crops like rice and cotton would worsen its terms of trade and unless the volumes are adjusted quickly there would be a decline in the balance of trade. They also point out that the real export potential from agriculture does not lie in the major crops but it is in the development of horticulture and food processing. According to them, for these commodities, improved marketing, quality control and logistic are the real drivers and not trade policy restrictions.

According to Amrutha and Ballappa Shivaraya (1997), this was mainly suitable to higher rate of out-turn an higher income per unit of output obtained in large size rice mills (Rs. 2096.46/Q) compared to average (Rs. 1212.48/q) and
small (Rs. 1935.36/q) size rice mills. Similarly, the net returns per quintal of output produced being Rs. 829.70 in large size rice mills was significantly higher than that of medium Rs. 764.52/q and small Rs. 702.26/q size rice mills.

David Dawe (1998), has argued that some of the causes for the slower growth in area, yield and production has been lower rice prices in both international and domestic markets. Lower prices have reduced the profitability of rice farming especially in the face of higher opportunity costs for labour and land in many rapidly growing Asian economies slow growth of demand for rice due to secular trends in population and per capita consumption of rice dwelling on the importance of re-emerging the Green Revolution in rice, the author says higher prices seem area possibility unless public sector investments that increases the productivity of rice farmers are pursued aggressively in the near future.

Srinivasan and Jha (2000), analysed the effects of liberalising food grain trade domestic price stability using a multi-market equilibrium model in which the direction of trade is determined endogenously and world prices are sensitive to the amount traded by India. The study examines, the effect of liberalising external trade in two major food grains rice and wheat, on their domestic price variability in the absence of any government intervention. It then considers the case where the government operates the price band stabilisation schemes to stabilise domestic prices. They use a dynamic stochastic simulation model with a multi-market equilibrium approach where prices, consumption, production, trade and stocks of rice and wheat are all determined 14 simultaneously. Their results show that contrary to popular belief, freeing of trade by India leads to greater price stability even though world prices are more volatile.

Gulati and Narayanan (2003), explored the important link between rice trade liberalisation and poverty, seeking specifically to respond to two questions: What would be the effect of freer trade in rice on trade flow patterns? How will rice trade liberalisation and consequent rice price equalisation across countries
influence the prevalence of poverty in the poorer economies? In doing so, the paper focuses primarily on Asia. The author attempted environmental sustainability of rice systems would require deep reforms in input-pricing policies and also complementary policies pertaining to the environment. It is also important that government intervention in domestic markets ensures that these reforms do not offer perverse incentives to some crops over others in the interests of allocative efficiency.

Chengappa P.G. et al (2003), have studied the profitability aspects of hybrid rice cultivation which has not increased significantly in Karnataka since the introduction of hybrids in the state in the mid-1990s. They have further found that hybrid rice was found to be higher yielding but less profitable but less profitable than existing high yielding varieties. The authors have provided reasons for lower profitability and explained the constraints in hybrid rice expansion based on farm-level data. Higher costs of production due to higher seed costs of production higher level of fertilizers and labour use coupled with lower market prices have completely offset the yield gain recorded for hybrid rice. Overall the profitability of rice was a little lower than Hybrid varieties. The authors have suggested for refinement of hybrid rice technology to reduce cost of cultivation and improving the cultivation and improving the quality of rice to create a demand pull suiting the tastes and preferences of consumers.

Kumbhakar and Bhattacharya A. (2005), have referred to profit or economic inefficiency defined as profit loss from not operating on the profit frontier, taking into consideration farm specific prices and fixed factors. Consider a farm that maximize profits subject to competitive input and output markets and a single – output technology that is quasi-concave in the (nx1) vector of variable inputs, X and the (m x 1) vector of fixed factors Z. The actual normalized profit function that is assumed to be “well-behaved” can be expressed us; \( \Pi (P, Z) = Y (X^*, Z) - \sum Pi Xi ^*, X^* = g (P, Z) \) where \( Y (.) \) is the production function, the
asterisk denotes optimized values: \( P_i = \frac{W}{P} \), \( P_i \) is the normalized price of input \( i \), and \( P \) and \( W \) are the output and input prices, respectively.

**Vo Thanh Danh (2007),** have tried to estimate the supply response of rice in Vietnam by using the dynamic adaptive adjustment and rational expectations models were used to select an appropriate supply response model for rice under different prices expectation hypotheses. The authors have found that rice farmers were rational in forming the price expectations behaviour, making supply and marketed surplus were positively responsive to price expectations. Government policy variable had positive effects on rice production. The institutional factor of the household responsibility system had no contribution to rice production improvement. The authors have suggested that technological progress and market regulations should be regarded as potential tools to sustain rice production. Further the authors have argued that the price expectations played an important role in decision making of rice farmers. An appropriate price policy becomes an alternative way to enhance rice production in the country.

**Rosegrant.W.Mark, et al (2007),** have argued that partial equilibrium agricultural sector model to assess the effect of four trade liberalisation scenario. It reports regional results for cereals and meat trade, the impact on world prices, and net economic benefits. The authors have observed that 16 agricultural commodities and divides the world into 36 countries and regions. World and domestic prices are determined annually at levels the clear world markets. Rice prices increase 13 percent, followed by maize, wheat, and other coarse grains. An important finding is that the net economic benefits for developing countries from liberalizing their own agricultural economies without comparable trade liberalization by the developed country gains under full liberalization.

**Raveendaran N. (2008),** has argued that price of paddy is fixed on four major criteria viz (i) mistake content (ii) out turn of rice, (iii) percentage of broken rice and (iv) percentage of black grains. The introduction of Rs. 2/- Kg of rice
scheme in Andhra Pradesh has direct impact of the price of paddy, and rice in Tamil Nadu. The author has suggested godown facilities to wholesalers and millers in order to minimise the rise in prices of paddy and rice increase in cost of cultivation has been attributed for the increase in price of paddy the authors have suggested for adoption of system of rice intensification (SRI) methods of cultivation for reduction in cost of production of paddy another suggestion for reduction of price of rice relates direct procurement of rice from millers by organised retailers. The author has also recommended for encouraging farmers and farmer’s groups to convert the paddy produced by them into rice and direct sale of the same to consumers through farmer’s shandies.

**Pandey J.Shruti, Krishnaswamy, K.Kanagasabapathy (2013),** have attempted to analyse the annual inflation trends since 2005-06 in terms of the major contributory factors. First, it appears that food inflation has been major driving factor acting against disinflationary forces. Second, food inflation seems to be a result of both demand and supply-side factors besides man-made policy distortions playing their own role. Third, food inflation seems to feed on itself through a vicious cycle and assumed a secular and spiralling upward trend. The annual average food inflation (March over March) was 8.9 per cent during 2004-05 to 2012-13 and was never seen at comfortable level. The author’s findout inflation in cereals was in double digits in five out of eight years mainly because of a continued rise in rice prices and wheat. The inflation in rice prices was 17.9 per cent during 2012-13 and in wheat 19.9 per cent. As against this, the cost of production per quintal of rice rose from about Rs. 569 per quintal to Rs. 893 per quintal and that of wheat from Rs. 585 per quintal to Rs. 935 per quintal between 2004-05 and 2009-10. Authors have finally argued in favour of reconsidering traditional instruments of food management, meaning thereby the need to revamp the PDS along with the pricing policy based on MSPs.
2.5. STUDIES ON DEMAND FOR RICE:

Gupta and George. (1974), with similar findings have reported that the total fixed cost per quintal of paddy processed was found to be lower in large size rice mills (Rs. 32.24/Q) compared to medium (Rs. 35.26/q) and small (Rs. 42.65/q) size rice mills. This clearly indicated the economies of scale in processing of paddy as per unit fixed cost declined with the increase in the quantity processed.

Ashok Mitra (1977), in the context of India's agricultural rice policy, demonstrated that there was a clearly discernible bias against the traditional rice-growing regions government' methods farm price fixation. Of the country's two principal grains, while, in respect of production and consumption, rice is the predominant grain in the south-eastern part, wheat is the cereal in the north-east. Considering the spectacular rise in the production and productivity of the latter and the relative stagnation of the former, the upward adjustment in the procurement price of rice should have been larger than that of wheat.

Kalirajan (1981b), used a Cobb–Douglas production function to estimate the economic efficiency of farmers growing high-yielding, irrigated rice in India. He compared the small and large farm groups and concluded that there was equal relative economic efficiency in the cultivation of IR20 in Rabi season between the groups.

Srikanthamurthy (1986), in his study on resource productivity in agriculture in Bangalore district observed that, the cost cultivation of paddy per acre was found to be highest on marginal farms and lowest on large farms. Thus the existence of scale of economies was noticed in the cultivation of paddy. But the study did not notice economies of scale in ragi production.

Muralidharan (1987), studied the resource use efficiency in rice production in Kerala, employing the Cobb-Douglas production function. The adjusted $R^2$ was 0.84 indicating that 84 per cent of the variation in yield of paddy
is explained by the estimated production function. The coefficient of land and human labour were positive and significant at one per cent probability level.

**Shoichi I et al (1989)**, have made an empirical study on rice consumption in Asian countries in relation to income levels. The authors have found that empirical results using time-series and cross-sectional data indicate that rice in Asia is becoming an inferior good income elasticity declined and in some cases became negative between 1961 and 1985 in most of the fourteen Asian countries covered by the study. The authors have concluded that domestic demand for rice in these countries is not likely to grow as rapidly as it has in the past. As a consequent there is a potential for excess supplies of rice to develop in Asia putting downward pressure on rice prices. The authors anticipate that while governments in Asian countries may need to adjust their rice policies in the future world rice suppliers may need to develop new markets for rice.

The authors have drawn the conclusion from their study that decreasing income elasticises mean either the demand curve is shifting in or that it is shifting out by declining amounts. The Asian rice production is approximately 300 million metric tonnes and only ten to eleven mm tons of rice is currently traded in the world market the potential increases in exports from Asia could put substantial pressure on world prices.

**Deepak Ahluwalia (1989)**, has tried to measures the sources of growth in output in the two principal food-grains, wheat and rice over the period 1970-71 to 1983-84. The author has considered the major producing states individually as well as on the aggregate. The analysis is made to study growth from point to point in the peak years of food-grains production in the first part. The second part contrasts these result to the ‘trough’ years. The author has made major conclusions at the aggregate level.

(a) Output differences between peak and trough years are primarily due to variations in yields on unirrigated land.
(b) Irrigated yield increases have been substantial and increasing source of growth in both rice and wheat output, especially the former.

(c) In the peak years changes in the area components contributed more to growth in wheat than rice.

The better quality of the incentive package available to wheat growers might be behind this development. However the author has concluded that in the trough years the area components accounted for a greater share in the growth of rice than wheat, the author has observed that his analysis provides an insight into the debate on the sources of instability in food-grain production.

**Wendy K Olsen (1989),** has examined the Andhra Pradesh rice subsidy scheme and shows how much of the cost has in fact been borne through growth in the state government’s net indebtedness. The author has observed that the rural and urban poor have gained some Rs 240/- per year per household from the rice rationing policy but it is a temporary tenuous gain. The author has concluded that the rice ration not be said to “eradicate poverty” since it does not tackle the basic structures which have created poverty. An electoral programme to solve the underlying problem must combine support for a target food subsidy with a set of demand for more fundamental changes.

**Bawa and Kainth (1989),** have mentioned that structure of processing cost also indicated that large size rice mills (Rs. 1266.76) incurred higher processing cost as compared to medium (Rs. 1247.96) and small (Rs. 1233.10) size rice mills. This was mainly due to the higher total variable cost in large size mills (Rs. 1234.52/q), compared to medium (Rs. 1212.20/q) and small (Rs. 1190.45/q) size rice mills. The total variable cost (97.5) in general formed major component of the total processing cost. The increase in the variable cost procurement cost and higher cost of raw material (86.04) per cent.

**Dat Van Tran (1995),** has observed that the Green Revolution has enabled rice production to meet the demands of the growing population. However, he
argues that rice production has increased at a lower rate than the population and he has expressed the view that the deceleration in the growth of rice production is a cause for concern in terms of food security the author has perceived that yield gaps can still be observed in several countries while evidence of a productivity decline in intensive rice production has been increasingly noticed both on research stations and in farmers fields. An increase in rice yield can lead to improved farmers income and food security. The author has concluded that the use of innovative genetic improvements including hybrid rice the new plant type and possibly transgenic rice can increase the yield ceiling where yield gaps are almost closed.

Praduman kumar et al. (1998), have attempted to measure sustainability of the rice-wheat based cropping systems (RWCS) using the Total Factor Productivity (TFP) approach. The authors have observed that the rice and wheat cropping systems in India have significantly contributed in enhancing the food-grain production and achieving the food self-sufficiency and food security. However, the authors feel that the production system now is under threat due to stagnating or declining crop productivity and threatening total factor productivity approach.

Gail L. Cramer et al. (1999), have observed that Japan’s rice tariffication implemented in 1999 will reduce their rice imports and world price of rice will decrease about $10 per mt as a result of this shift in import demand. The total Japanese tariff on over-quota rice imports will be $ 4000 per metric ton when the world price of medium grain rice is about $ 500 per mt. The authors comprehend that for Japan to increase its imports close to its free trade amount in the long run it would have to reduce its current import tariff from 2.5 per cent to over 5 per cent per year. Without these adjustments in rice trade in the WTO Japan will have a difficult time arguing for more trade liberalisation in other markets. The authors have concluded that the implementation of WTO will improve food security and food safety. Modern technology is available to import high quality food products
including rice from more countries. The authors have expressed the view that reducing trade barriers will improve access to agricultural inputs and food products.

Hiroshi Fujiki (1999), the author has focussed on a comparison between rice production costs in Taiwan and those in the Non-Hokkaido region of Japan. The author has perceived that while the Japanese and Taiwanese economies are similar, it is due to Japan’s inefficient use of machinery that Japan’s rice production costs are higher than those of Taiwan. The author has indicated that as long as it is desirable to reduce rice production costs the Japanese government should change the legal government should change the legal and institutional arrangements that have induced farmers to be owner-tillers. Referring to the GATT Uruguay Round accord the author says it is hard to imagine a situation where the Japanese government could set domestic, price of rice at an artificially high level at its will. The Japanese govt sustained the high price of rice through the acreage control programme, but the application of a uniform rate of acreage control independent of farm size is counterproductive given the huge disparity in the average cost of production with respect to farm size. The author suggests that if the reduction in the price of rice is necessary the acreage control program per se is not compatible with this national objective.

Pandey S.et.al (2000), have shown that the situation is particularly frightening while reckoning the historical production performance in eastern India is that while combined areas under wheat and rice is stagnating around 69 million hectares (accounting about 57 per cent area under food-grains), at the same time, the productivity of rice in over two-third area got stuck at less than 2 tonnes per hectare. Low productivity affects the household food security of the millions of small and poor farmers, a phenomenon, likely to reach in manageable situation in future.
Sinha and Siddiq (2000), pointed out that same time, the outlook of rainfed rice is not bright too, as it is grown with negligible irrigation, minimal chemical inputs and the lowest level of mechanization. Unfortunately, the productivity in the traditional mode of production has been one of the lowest countries. Studies have shown that the declining trends in production and productivity endanger the food production and threaten the sustainability of food security at large.

Chandralekha Ghosh and Ajitava Raychaudhari (2003), have made an effort to understand the possible impact of price change consequent upon opening up of the rice market on rice demand supply. They have made the study relating to two major rice producing states of Andhra Pradesh and West Bengal and rice being the biggest share in the consumption basket of households in these two states. The authors have made estimation of price and expenditure elasticity of rice along with other important food items. The findings have practical significance and policy implications. The authors have found that the magnitude of demand elasticity of rice in rural AP is greater than rural West Bengal but supply elasticity is greater in West Bengal than in AP. The authors have concluded that whether there is going to be net availability of rice for export from each of the two states depends on the situation of domestic price after opening up of the economy.

Paul A. Dorosh (2004), has argued that trade liberalisation which permitted the import of rice and wheat by the private sector has enhanced national food security in Bangladesh. The author has suggested that a flexible trade policy may be needed to protect producer interests term food security particularly in the face of export subsidies or steep declines in world prices in years of good domestic harvests. Large scale food aid inflows may now threaten to reduce domestic wheat production similarly private sector imports of very low cost wheat and rice may depress prices even in years of normal harvests. The author concludes that south Asian countries liberalise their markets, each country’s
agricultural and trade policies (particularly those in India) will have a significant impact on its neighbours erratic weather and frequent changes neighbouring country policies may require periodic adjustment in policy, but intra-regional trade has the potential to increase food security and benefit all countries in the region.

Rai M (2004), says that rice production has a long history of evolution in India, which enabled wide adaptability indiverse ecosystems. A large gene-pool and land races also enabled building up large stock of rice biodiversity. But, India lagged behind in the production front due to low productivity.

According to Jha D. et.al (2005), accumulated evidences suggest that gap in research challenge and goals achievements has been bulging out, which also created more demand for rice research in the region. The unequal distribution of gain due to rice research achievement and growing nutritional insecurity has created escalating demand for appropriate and location specific research.

Barbara Harris-white (2005), has observed that rice is the basis of subsistence and social reproduction in Asia and as its output expands the market surplus rises disproportionately to the growth rate of production. This according to the authors implies that activities that once formed part and parcel of household labour activities also become commercialised, food security depends not only on the market but also on the social and political structures within which markets are situated. One of these social structures is gender. This gendered process consists of two aspects explored by the author. The first is “productive deprivation the impact of technological change is shown to be strongly net labour displacing and strongly biased against female labour. The author finds that poverty ensures the persistence of petty commodity production where women are either self employed or unwaged family workers. The author has found form his study that in the case of rice production in West Bengal growth in production has been accompanied by
the displacement of women from the rice mill labour forces in which economies of scale have been pitched against unwages work in petty production.

Hanumanth Rao C.H. (2005), has made comments on the various contributions submitted at the conference on “economic consequences of the New Rice Technology” at International Rice Institute Los Benos Philippines (1978) the author has expressed is struck by the enormous difference between the economically attainable potential yields of rice and its actual yields. In this context he has referred to the findings of Herd and Wickham who have shown that the gap is almost three fourths of the realisable gap. Factors attributable to this relate to lack of irrigation and flood control in adequate credit and high interest cost and the inadequate research to evolve technologies. The author has referred to the suggestions like investment in infrastructure, reforms and development of credit institutions and research to develop technologies. The author has broadly crystallised the views of other contribution in the above areas in their presentations at the conference.

Biradar D.P. et al (2006), has referred to the result of the demonstration conducted on nonfarm rice, wheat and chickpea across North Karnataka region which show that there have been substantial increases in yields and economic returns compared to recommended and common fertilization practices which lead to stagnant and reduced food production. Rice is mainly grown in Bellary district under the Tungabhadra irrigation project. The authors have observed that productivity of important crops like rice, wheat, and chickpea is low when compared with state and national averages showing potential for yield improvements. Yield under SSNM (Site-specific Nutrient Management) proved to be advantageous than under RDE (Rates of Fertilizers) and PF (Farmers Practices) in rice, wheat and chickpea. The author opined that these results hold promise as an example showing higher yields could be achieved with balanced use of nutrients as per soil test results and crop requirements. RDF can be improved for these crops, SSNM is capable of producing hundreds of thousands of additional
tonnes of rice, wheat and chick pea within the region annually generating billions in additional local currency within the state economy.

**Elsamma Job (2006),** has evaluated the gap between feasible and actual yields obtained by rice farmers of Alappuzha using the frontier production function for estimating the maximum feasible yield (MFY) and yield gap the author has found that rice yield gap in Alappuzha was estimated at 1588 kg ha with and MFY of 5447 kg actual yield of 3859 kg ha implying of certain constraints in raising productivity at the farm level.

**Idiong I.C, (2007),** have studied productivity of rice farmers can be raised either by adoption of improved production technologies or improvement in efficiency or both. But with the low rate of adoption of improved rice technologies by farmers in Nigeria, improvement if efficiency becomes the best option in productivity enhancement in the short run. The author estimated a stochastic frontier production function that incorporated inefficiency factors was using maximum likelihood estimation (MLE) techniques to obtain farm specific technical efficiencies as well as their determinants data collection from July 2004 to January 2005. The empirical studies that have made use of this model in determining efficiency in crop production in Nigeria is increasing, but they are relatively fewer studies on rice production in the country. The study has revealed that small swamp rice farmers are not fully technically efficient and therefore there is allowance of efficiency improvement by addressing some important policy variables that negatively and positively influenced farmers’ levels of technical efficiency in the area to these farmers will go a long way in addressing their resource use inefficiency problems.

**Kumar Praduman, et al (2007),** observed ‘Changing Consumption pattern in South Asia’, authors have analysed the consumption pattern, nutritional pattern, livestock products and food-grain disaggregated level, using the recent data obtained from FAOstat food balance sheet. They are observed South-Asian
countries viz., Bangladesh, India, Nepal, Pakistan and Sri Lanka. The decline in total cereals consumption during the 1990s was mainly on account of reduction in the consumption of rice and coarse cereals, which has been falling continuously since 1980s. In India and Nepal, the per capita rice consumption witnessed upward trend during the 1980s but it started declining during the 1990s. Finally concluded stating that the future demand for food and maintain self-reliance, the south-Asia region must attain a per hectare average yield of 2.4 tonnes for rice, 3.4 tonnes for wheat, 1.4 tonnes for coarse cereals and 1.02 tonnes for pulse by the year 2025.

Nancy Clarkson and Kishore G Kulkarni (2009), have articulated that rice prices are an integral part of national welfare to 60th consumers and producers forcing the Indian government to face competing concerns when implementing policy referring to protectionist policy actions of 2008 the authors have affirmed the increase in national welfare to a tune of $ 260 million and the benefits to consumers due to lower prices producers losses were offset by government and including debt decrease. However, the authors perceived that export tariff for all varieties of rice would have been more beneficial in lowering prices and increasing domestic supply than export restrictions. The authors have further referred to the implications of protectionist policies on the reduction in world welfare in other countries. Banning of non-basmati rice by India led to other major exporting countries like Thailand and Indonesia following suit. This led to higher world prices of rice. Internally export restrictions on rice could lead to negative earnings effect for farmers and could lead to encourage smuggling and hoarding. Externally importing countries could move to self sufficiency or alternative to rice, decreasing trade opportunities growth and efficiency export restrictions would lead to worsening of heavy debt service burden. The author has concluded in their paper that while protectionist trade policies have proved beneficial in the short-run, the effect is not sustainable.
Devi K. Sita, and Ponnarasi T (2009), have highlighted cost and returns of paddy in the system of rice intensification and their comparison with that conventional method with particular adoption of SRI technology in Tamil Nadu. They have applied logistic regression model to empirically quantify the relative influence of various factors in the decision of the respondents who adopted SRI method or conventional methods of rice cultivation. The findings of the results adoption of SRI technique would help increase rice production without increasing the area under cultivation. It has proved to serve as an alternative method for rice cultivation. The increased productivity and net profit would attract the farmers, and saving in water-use for rice cultivation is an important advantage for efficient water management.

Peter Timmer C. (2010), has disapproved the largely held assumption—that- food security in Asia is related to stable prices for rice in major urban markets of a country. That approach to food security made sense when a third of the economy was dependent or rice production, marketing, and consumption and well over half of daily caloric intake in some countries came from rice expects for few important exceptions Bangladesh and Viet Nam that world no longer exist. At world level rice accounted for just over one half of one percent of GDP in 1961 over the next half century the share of rice in GDP for the entire world fell to just 0.174 per cent of GDP. Regarding consumption the author says the projections suggest a significant decline in global rice consumption in the next four decades. The author has concluded that with more open trade and the globalization of tastes, a shift to more balanced diets in Asia there is a decline in rice consumption.

Peter Timmer C. (2010), has affirmed that food security in Asia has traditionally focused on rice-its production, marketing, and consumption. But rapid economic growth in the region and its accompanying structural transformation are redefining the needs of Asia. The author has heighted the changing role of rice in Asian agricultural production and its implications. The author has marshalled statistics to show that the share of rice in Asian economies
as well as household food consumption is declining very rapidly. The author feels the total size of rice demand nevertheless still remains important, because rice nevertheless still remains important, because rice remains the largest single source of calories for significant majority of consumers who are in the category of poor rice production however faces serious challenges and is likely to be more unstable in the future. The author has suggested for building up larger rice reserve as a means to stabilize rice prices in global rice markets. This would help the Asian economy to become much better integrated and more stable.

2.6. STUDIES ON SUPPLY OF RICE:

Thimmappa (1994), evaluated economics of upland paddy and its competing crops. Resource efficiency of upland paddy indicated that land, manures and seeds were underutilized while, and fertilizer, human labour were over-utilized on the small farms of Sorab taluk, Shimoga district in Karnataka. Land, seed fertilizer was found to be under-utilized while, manure and labours were over-utilized on large farms. Land and fertilizer were under-utilized in the small farms of Hangal taluk of Dharwad district and all the resource were over-utilized on the large farms.

Vishwanath (1997), analyzed resource productivity in paddy cultivation and indicated that seed and human labour contributed significantly to the total output in most of the zones in Karnataka during Kharif season. Fertilizer contributed significantly in southern transition zone and hilly zone. In summer, seed contributed significantly to the output only in central dry zone. In most of the zones, human labour was a major contributor to the output. Fertilizer did not contribute significantly to the output but its coefficients were positive in all the zones.

Vishwa Ballabh and Sushil Pandey (1999), have attempted to throw some light on the nature of economic and institutional changes occurring in rice production systems of two villages in eastern Uttar Pradesh over the last 15 years.
The authors maintain that the general perception of the Indian rural labour market particularly in eastern India has been that of an oligopolistic market with large and rich farmers fixing wages and using interlinked credit and land market to their advantage. The authors have mentioned that the changes that have occurred in the areas covered by their study over the past 14 years reflect the dynamism of agricultural sector in rural eastern Indian that has resulted from improved infrastructure, rising opportunity cost of farm labour and greater interaction of the rural sector with the market economy. The study has revealed that the area under sole crop of rice increased from about 20 per cent in 1982 to about 28 per cent in 1996, an increase of 8 percentage points. The expansion is accounted for by local varieties grown under rainfed conditions. There has been a decline in mixed cropping. The cropping pattern gives an impression of increasing specialisation towards rice-wheat system.

Datta (1999), re-examined the global competitiveness of Indian rice using Policy Analysis Matrix and explicitly recognizing varietal difference and considering costs of processing, transport, marketing as well as by-products use. This is done for two years 1994-95 and 1998-99 for three varieties of non-basmati (Haryana Gaurab, UP-71/12 and PR-106) and Basmati. The results broadly concluded that in three out of four varieties the competition is declining while the DRCR values suggest in two out of four cases the comparative advantage has improved and in other two cases it has deteriorated.

Singh (2002), attempted to study rice production environment in India is characterized by extreme diversity and disparity in multiple ways. It has been estimated that out of the total of 45 million hectares of harvested area under rice in India, only 46 per cent of these are irrigated, about 38 per cent are rainfed lowland, 13 per cent rainfed upland, and 14 percent flood-prone.

Aldas Janaiah (2002), has observed that inspite of huge capital and human researchers invested over the past decade to develop and supply hybrid rice
technology for Indian farmers there has not been a noticeable impact on the sector. The author has perceived that Indian has tried to emulate china’s success story in the area of hybrid rice research and development but Indian farmers have not readily accepted hybrid rice technology. The author has suggested some options for increased use of the hybrid technology for rice cultivation in India. He has suggested R and D should focus more on development and popularisation of farmer friendly methods besides pursuing knowledge intensive approaches like hybrid rice. He has stressed the need for developing consumer demand for hybrid role through grain quality improvement. The author has suggested for enhancement of farmer realisable yield potential of hybrid variety. He has emphasised the need for developing resistance breeding which can stand the pests and diseases to the crop. Lastly the author has argued for improved crop management methods to exploit full potential of hybrid rice.

**Mohanty et al., (2002),** analysed competitiveness of rice in major states of India and found it was least efficiently produced crop among five major crops discussed in the study. They found these results are consistent with the government policies of achieving food security in grain through high procurement price and heavy subsidization of inputs.

**Gulati Ashok and Sudha Narayanan (2003),** explored the link between rice trade liberalization and poverty, seeking specifically to respond to two questions: 1. What would be the effect of freer trade in rice on trade flow patterns? 2. How will rice trade liberalization and consequent rice price equalization across countries influence the prevalence of poverty in the poorer economies? They concluded that the countries with the highest domestic prices are the wealthiest countries, while those that are competitive in rice trend to have not only lower levels of per capita income but also a large number of poor people.

**Naik et al., (2004),** computed the NPC under the exportable hypothesis for the period between 1992-93 and 2000. They used the total cost of delivering rice
for India and the competitor (Thailand) to a common part of an importing country i.e., Ivory Coast for Parmal variety of rice. The NPC values remained below one up till 1999-2000. In the last two years, however, the NPCs have been marginally higher than one. This suggests that India may be losing its competitiveness in rice exports.

**Eric J. Wailes (2005),** has mentioned that despite the importance of rice as a basic staple global trade accounts for only 6.5 per cent of consumption which according to him means that most countries are self sufficient in rice and face increased price volatility in terms of production shortfalls. Most of Asian rice production is subject to monsoon climates resulting uncertain yields global rice trade is highly segmented by rice type degree of processing and quality. As staple food the demand for rice is not very responsive to price and income changes. The author has concluded that the combination of a high degree of protection geographic concentration, market segmentation, inelastic supply response to price and inelastic demand response to price and income results in volatile prices and volumes traded state trading enterprises are pervasive in rice trade most notably in china, Indonesia, India, Japan, Republic of Korea, Viet Nam, and Australia state trading tends to result in a lack of transparency in pricing and trade competitiveness with global policy reform, rice trade is estimated to increase by 10 to 15 per cent.

**Kormawa P and Toure A. (2005),** have observed that globally about 6 per cent of the total rice produced enters the international market which indicates that most rice is consumed in the producing countries. The authors feel that rice market (export) is thin and is concentrated among the Asian countries USA, Australia, Italy, Uruguay, Argentina and Spain as Myanmar or exporters international rice market provides a platform for highly variable prices. The author attributes it to policy and weather conditions. Rice trade policies are being liberalised in the wake of WTO, EU and World Bank trade agreements. These changing policies have direct impact on rice production, consumption, and trade
in Africa countries. African countries are net importers of rice spending close to 1.4 billion US dollars annually. Africa is aiming at achieving self sufficiency in grains and food rice research in Africa has developed technologies for promoting rice production. However, the authors emphasis that unless farmers get access to sufficient quantities of improved seeds chemicals fertilizers and other complementary inputs to improve their yields West Africa rice farmers cannot produce sufficient rice to feed the teeming millions.

Mohanty et al., (2002), analyzed competitiveness of rice in major states of India and found it was least efficiently produced crop among five major crops discussed in the study. They found these results are consistent with the government policies of achieving food security in grain through high procurement price and heavy subsidization of inputs.

Similarly Naik et al., (2004), computed the NPC under the exportable hypothesis for the period between 1992-93 and 2000. They used the total cost of delivering rice for India and the competitor (Thailand) to a common port of an importing country i.e., Ivory Coast for Parmal variety of rice. The NPC values remained below one up till 1999-2000. In the last two years, however, the NPCs have been marginally higher than one. This suggests that India may be losing its competitiveness in rice exports.

Raghvendra Jha et al (2006), have examined market integration in 55 wholesale rice markets in India using monthly data over the period January 1990 to December 1999. They have found that wholesale rice markets are considerably fragmented. They have found that wholesale rice markets are considerably fragmented they have attributed excessive interference in rice markets by government agencies and barriers to internal trade for such fragmentation. The study by the authors had led to the identification of the existing by controls and government interventions in rice markets however well intentioned as number productive and responsible for such fragmentation of rice markets such
fragmentation hurts efficiency of agricultural operations and isolates some markets stunting the functioning of market signals. The authors have suggested to reform the rules governing interstate commerce in food-grains and to over haul the attendant state government tax policies and regulations. There is an urgent need to reform price policy at the levels of producer, wholesaler and consumer. The authors have also stressed the need for privatising wholesale grain in free trade and thus improving the efficiency of market signals.

Savadatti P.M (2006), has highlighted that basmati rice continues to hold a significant share in the export basket of the country. The author has attempted to study the export scenario of basmati rice direction, changing pattern of export and imports. The analysis has been done with the help of time series data covering the period 1980-81 to 2000-01. She has adopted Markov Chain analysis liner model that captures the net effect in change in the exports of basmati rice over a period of time. The results of Markov chain analysis revealed that the exports are concentrated in Saudi Arabia and Kuwait. A high dependence on one or two export markets would increase the trade risk in the long run for our country. It is not good for our Indian agriculture. Therefore, appropriate export promotion strategies have to be evolved to diversify the directions of trade to other countries and it is also imperative to find new markets besides expanding the existing markets in major importing countries.

Vijayakumar B.K (2007), has analysed the global competitiveness of cereals (rice and maize) and their economics of production over a period of time in Karnataka. The author has made an attempt to estimate NPC, DRC direction of trade, integration between domestic and international prices and supply response of rice and maize. The author has generalised the performance of maize. The author has generalised the performance of maize with respect to area, production and yield in Karnataka was in pressive as compared to overall. Indian performance for the reference period he has observed that structural changes in costs are due to changes in quantity and quality of inputs associated with the
technologies process and also due to their prices. The area allocation decision of rice and maize crops in Karnataka State were determined by the lagged area, lagged yield, lagged price, and rainfall. The author has argued that the WTO factor was negative and non-significant to the both area and yield levels for the selected showed a less competitive advantage in the Pre-WTO period. The author’s study has revealed that the cointegration tests showed that there is integration between domestic and world prices of selected crops.

Kollurmath V.B, et al (2008), have argued that structural changes in cost of production of rice and maize in Karnataka are due to changes in the quantity and quality of inputs associated with technological process due to their prices and globalization. The authors have analysed the impact of globalization (WTO) on the cost of production of rice and maize using tabular analysis. They have concluded that the total cost of cultivation of rice has increased from Rs. 9008.95 in Pre-WTO to Rs. 23482.68 per hectare in Post-WTO period. Further in case of maize the cost of cultivation of maize has gone up from Rs. 5970.67 in Pre-WTO to Rs. 9192.88 per hectare in Post-WTO period. These increases in cost of production of rice and maize according to the authors were attributed to increase in quantity of inputs used and their prices.

Conception Calpe in his article “International Trade in Rice, Recent Developments and Prospects” has observed at the world rice market continues to be regarded as distorted, thin, segmented and volatile on policy front interventions have diminished in the wake of the market continues to be regarded as distorted, thin, segmented and volatile on policy front interventions have diminished in the wake of the market liberalisation launched by several countries since the late 1980s. Nonetheless rice continues to be one of the most protected commodities in developing and developed countries subject to high tariffs and non-tariff barriers, export restrictions or aids, state trading and domestic market interventions. Trade in rice has expanded during the past two decades and largely due to exports from traditional exporter. The bulk of global trade continues to be in the form of milled,
India, higher quality rice market wise Africa and a number of Asian countries are destinations of rice flows of lower quality rice. Rice prices have become more stable during 80s and 90s. The author thus concludes that the rising variability of trade flows was not associated with more volatile world prices. The author has made the observation that international trade in rice has become less distorted less ‘thin’ more unstable volume-wise but more dependable there much uncertainty on whether the tendencies observed in the 1990s will longer into the rest of the 2000 and in the decades to come.

Nirmala B. and Muthuraman P. (2009), have made a study on the economics and major constraints in rice cultivation in Kaithal district of Haryana during 2007-08 covering four villages. The data obtained by the authors have revealed that total costs in rice production accounted to be Rs. 33778.68 ha average yield was 4.99 t/ha. Benefit-cost ratio worked out to be 1.27. Pests and disease incidence lack of remunerative price and labour shortage were the major constraints in rice production. The author has concluded that machine labour and human labour constituted major costs in the total variable costs. Since the benefit cost ratio was 1.27 per cent rice cultivation is economical in the study area the authors have suggested that management of pests and diseases and addressing the problem of soil salinity will help in enhancing the yield levels in Kaithal district.

Nirmala B. et al (2009), have defined yield gap as the difference between the maximum attainable yield and the farm level yield. Farm level yield is the average farmers yield in a given area at a given time in a given ecology, maximum attainable yield is the yield of experimental on farm plots with negative physical, biological and economic constraints and with known management in a given time and in a given ecology. Yield gap according to the authors has two components the first one relates to non-transferable conditions like environmental condition as they see on gap pertains to the difference in management practices. The second yield gap is manageable and can be bridged by deploying more efficient research and extension services. The authors have found from their study
that among the major constrains to rice production labour shortage ranked first followed by lack of remunerative price, pests and disease incidence and untimely release of canal water are mentioned other hindering factors included imbalanced use of fertilizers, non-availability of agricultural machinery, small size of farm, weed infestation, tenancy problems non-optimal plant population, nutritional disorders, late transplanting, natural calamities, salt affected soils and poor organic matter etc. The authors have concluded that bridging the yield gap requires integrated and holistic approach and adequate institutional support to farmers.

Prasanna P. A. Lakshmi et Al (2009), has provided relationship between farm productivity and farm structure and have been analyzed focusing mainly on one channel of transmission of this relationship, viz. input-use pattern in rice production. The hypothesized relationship tested in this study is that land inequality influences access to/ use of resources in rice production and in-turn influences productivity. Market imperfections aggravate the negative effect of land inequity on productivity. The results have shown that smallholders’ share in inputs like fertilizers, and irrigation has increased over time, but a large number of smallholders still do not have access to these resources. Hence, for improving productivity and profitability of rice production of smallholders in particular and other farmers in general, addressing of structural inequity needs attention besides a focus on technology development.

Xiaobai Shen (2010), has provided an historical survey of the evolution of rice technology in China from the traditional farming system to genetically modified rice i.e, today using socio-technological analytical frame work, he has analysed a complex interaction of material and social elements and discusses the specificity of technology development and its socio-technical outcomes. The analysis points to two imperatives in rice variety development; wholesale transporting agricultural technology and social mechanism to developing countries are likely to lead to negative consequences; indigenous innovation
including deploying GM technology for seed varietal development and capturing/cultivating local knowledge will provide better solutions.

Dev S. Mahendra, N Chandrasekhar Rao (2010), have made a study with an in-depth analysis of costs and returns in rice and wheat, which are the most state-protected crops and underlie the livelihoods of millions of farmers, this paper examines the effectiveness of agricultural price policy in enabling farmers to obtain sufficient profits to promote investment, technology and productivity and thereby to food security. In this attempted objectives are to find out the trends in the movements of costs, prices and returns in rice and wheat farming to throw light on the impact of price policy on the profitability of farming in two of the most cultivated and consumed food crops in the country. It also tries to bring out the causes that necessitated the recent increases in support prices and their relation to food security of the country. The ratio came down to 0.90 and 0.91 in the case of CoP in the years 2005-06 and 2006-07. On the whole, the demand that the MSP of rice should be closer or slightly below than wheat, based on the cost data may need a sympathetic hearing.

Basu. Kaushik, (2011), focuses the issue to understand the fundamentals of our food-grain market and policy that lead to this situation and to suggest policies for rectifying this. The central argument of the paper is that it is imperative that we look at the entire system of food production, food procurement and the release and distribution of food. Trying to correct one segment of this complicated system is likely to end in failure. The paper argues that there are two different motives for food-grain procurement by the state to provide food security to the vulnerable and to even out food grain price fluctuations from one year to another. Further, how to procure the food has an impact on how we release the food, and vice versa. Inspired by the sight of food-grain going waste, it is often made out to be that our central problem is that of poor food grain storage. This paper disagrees with this popular view. While we no doubt should improve our storage facilities, it is important to be clear that this in itself will not lower the
price of food. Finally author suggested that we need to redesign the mechanism of how we acquire and release food grains to the market.

Aggarwal Ankita and Harsh Mander (2013), have attempted too study issues of National Food Security Act has been steadily watered down since it was first mooted in 2009. The Parliamentary Standing Committee that examined the 2011 Bill has disappointingly continued with “targeting”. National food security, and reduced the government’s resolve to end hunger to the mere distribution of 25 kg of food-grains (wheat and rice) a month to the 37.2% of the country’s population considered below the poverty line (BPL) according to the Planning Commission estimates. The paper points out major issue edict opens the door for commercialisation of agriculture and the food system, which can threaten the country’s food sovereignty, further impoverish farmers and increase food prices. The authors suggest policies only hope that the government salvages this bill and delivers on its long-pending promise of ensuring food security for all.

Palanisami K, Karunakaran K R, et. al. (2013), have highlighted major issues System of Rice Intensification be the answer to meet the country’s future rice demand A macro-level study covering 13 major rice-growing states indicates that fields with SRI have a higher average yield compared to non-SRI fields. The study was conducted during 2010-11 in 13 states and covered 2,234 sample farmers with SRI and non-SRI fields in the southern region. Finally authors find out results SRI fields have significantly higher yields, but the patterns are different across states. The average yield in SRI parcels in all states is 8.5 quintals per hectare (0.85 tonnes/ha), which is 22% higher than in non-SRI fields. Madhya Pradesh, Gujarat, and Odisha have significantly higher yields in SRI parcels in percentage terms (52%, 54% and 33% respectively), but they have some of the lowest yields among non-SRI fields. Maharashatra, Chhattisgarh, Andhra Pradesh, and Karnataka have the next highest yield increments with SRI – 27%, 24%, 23% and 25% respectively.
Carrasco Bruno, Hiranya Mukhopadhyay (2012), raised the major issues South Asia is the region most vulnerable to increasing food inflation given that a large part of its population lives below or near the poverty line. An empirical analysis of the factors that could explain the increase in food inflation is presented in this paper, while the effect of food price inflation on poverty and macroeconomic stability in South Asia is considered. The paper points-out the major Demand and Supply side factors population growth and increasing disposable incomes are the key factors that explain the growing demand for food in South Asia. The region experienced limited demographic transition and demonstrates higher fertility rates (2.35) than East Asia (1.98) and south-east Asia (1.98). Similarly the growth rate of rice yields dropped from 3.0% to 1.7% in the same period, while the annual yield growth of wheat slowed down from 4.2% to 0.6 Per cent. The author point out technological upgradation, a competitive pricing strategy, improved storage and marketing, and regional co-operation should play important roles in combating food price inflation.

Parikh S Kirit (2013), identification of the poor and the scale of operation are the most critical challenges of the proposed legislation on the right to food. This article suggests universal entitlement that excludes clearly identifiable rich. Food coupons could eliminate the need for the operations of public distribution system and eliminate diversion. It seeks to ensure adequate domestic production through assuring a minimum support price (MSP) to farmers, providing subsidised fertilisers and irrigation water as well as electricity for pumping. This will eliminate the problems of having to procure and distribute more than 500 lakh tonnes of food-grains every year as also the problem of diversion. The costs of the PDS system would be greatly reduced. Food-grains supply would have only a slight impact on the nutritional outcomes.
RESEARCH GAP:

A number of studies have been conducted in India and abroad on various aspects of Rice. These studies have been reviewed in the present work in order to find out the research gap in the field of rice economy both at the national and international level. Wendy K Olsen (1989), Hiroshi Fujiki (1999), Gail. L Cramer. et al. (1999), J.Wailes (2005), Peter Barbara Harris-white (2005), Timmer .C (2010) the authors argued the important link between rice trade liberalisation and poverty, seeking specifically to respond to two questions: What would be the effect of freer trade in rice on trade flow patterns? How will rice trade liberalisation and consequent rice price equalisation influence across Asian countries. There is large literature which deals in liberalization of rice market. Most of the studies have shown that in case of rice the domestic price is below the international price. Deepak Ahluwalia (1989), Gulati and Pradeep K Sharma (1990), Mohandas and Thomas (1997), Nayyar and Sen (1994), Gulati Ashok, and Sudha Narayanan (2003), Chengappa P.G. et al (2003), Gulati and Narayanan(2003) observe that opening up Indian economy may lead to increase in the domestic rice price. Wijegunawardane Agbenyegah using Lincoln Trade and Environment Model (LTEM) has observed that consumer price in India are predicted to increase with full liberalization. Most of the studies in case of India for estimating the demand elasticity have been at the aggregate national level. There are very few studies at the state level similarly have been observed that the green revolution has enabled rice production to meet the demands of the growing population. However, they argue that rice production has increased at a lower rate than the population and have expressed the view that the deceleration in the growth of rice production is a cause for concern in terms of food security, the author have perceived that yield gaps can still be observed in several countries while evidence of a productivity decline in intensive rice production has been increasingly noticed both on research stations and in farmers fields. According to Swaminathan, increase cost of cultivation and negative impact of minimum
support prices analysis of rice production in India. Most of studies have not focused on impact of universal public distribution system on general price level of rice in India. Hanumanth Rao. C.H. (2005), Kumar.Praduman, et al (2007), Prasanna P. A. Lakshmi et. Al (2009), Basu. Kaushik, (2011), have studied procurement prices and cost of production of rice in India. There is need for deep reforms in input pricing policies for environment sustainability of rice system. State to provide food security to the vulnerable and to even out food grain price fluctuations from one year to another. An integrated holistic approach and adequate institutional support for farmers involved in rice production is necessary to promote rice economy in India. Bhalla (2012) argued price hike of paddy for the kharif season 2012 is “dirty economics and dirtier politics”. But, MSP is only floor price, will benefit farmers if procurement infrastructure is good. How can the farmers sell their paddy at a price fixed by the government without proper procurement arrangements? CACP reports underlined that the market price of paddy has dipped below MSP in different states. There is an urgent need to reform price policy at levels of producers, wholesales and consumer technological upgradation, a competitive pricing strategy, improved storage and marketing could play roles in combating food price inflation. Present study examines pre-post reform and green revolution periods considered rice economy of India, production, trade and prices.
REFERENCES:


