CHAPTER–2

REVIEW OF LITERATURE

CHAPTER - II

Review of Literature

Review of literature in a research work is essential to evolve an edifice of knowledge to ensure that the present study would be an addition to the topic and gives way to mend away the lacunae left in the process of exploration of the research study. Therefore this chapter is devoted for an analysis of various literatures available on different aspects of agricultural growth in India.

M. Ghose (2007)[1] in his paper 'Agricultural Development, Agrarian Structure and Rural Poverty' has investigated the effect of agricultural development, agrarian structure and some other variables on rural poverty by using the OLS Method. He found that the incidence of rural poverty is inversely proportional to the agricultural development in terms of agricultural production per head of rural population, which exerts the existence of trickle-down process in rural India. Likely it was also observed that this process has been very limited and weakening over time suggesting that reliance solely on growth in agricultural production for achieving a desired reduction in the incidence of rural poverty would take an inordinately long time. The result suggests that rural poverty can be reduced significantly by increasing productive employment in rural areas and by maintaining rural wage rate at a reasonable level. It follows that any expansion of employment in agricultural and non-agricultural sectors would reduce rural poverty.

Mathur, Das & Sircar (2006)[2] in their article 'Status of Agriculture in India: Trends & Prospects' has analysed the growth trend in agriculture production across the nation and region-wise. They have also analysed the different factors for the growth in agriculture. They have used the flexible form of Cobb-Douglas production function to identify the different factors affecting the agricultural production. They observed that there has been decline in the growth of the agricultural sector during the 1990s till the recent past. This is accompanied with the recent decline in yield per hectare for a number of food crops. There are vast inter-state differences in growth rate of agriculture and even

more so for food grains. The all India analysis for the period 1990-91 to 2004-05 suggests that govt. expenditure in agriculture including public investment and subsidy for fertilizer usage and electricity consumption for agriculture are the main factors affecting agricultural production in India. The state-wise analysis shows that the agricultural output at current prices is significantly and positively dependent on government expenditure on agriculture, fertilizer usage, rainfall and population.

In his essay 'Regional Convergence in Agricultural Development' M. Ghose (2007)[3] examined the regional convergence in agricultural development. He has applied the α-convergence and absolutes and conditional β-convergence method in land and labour productivity and per capita agricultural product across major states after calculating the coefficient of variation in different periods of his study after green revolution. He found that during the period 1960/61-2001/02, while the estimates of absolute β-convergence for land productivity and per capita agricultural output provide no evidence of significant convergence, the results for labour productivity indicate that there has been a strong tendency of absolute divergence across the state during the period. The results of α-convergence show that although inter-state disparities in land productivity declined over time after that introduction of HYV-technology, the same in labour productivity and per capita agricultural output increased significantly.

Chattopadhyay (2005)[4] in his article 'Distributive Impact of Agricultural Growth in Rural West Bengal' has made an attempt to explore the distribution impact of agricultural growth on rural West Bengal during the last two decades of the previous century. He classified his analysis with the help of Lorenz Curve and regressing the Gini's co-efficient through the time. He observed that prior to the 1980s, the estimated rate of growth of agricultural output in West Bengal was very poor. It was even less than the ratio of grow of the rural and total population of the state. As a result, a significant portion of rural population lived in abject poverty. The agricultural output started to increase at an unprecedented high rate from beginning of 1980. This gave the result that the time profile of the shares of different ordinal groups in total rural consumption expenditure and ratio of the shares between the top 20 percent and bottom 20 percent of population revealed

an improvement in the overall distribution of consumption expenditure in rural West Bengal. However during latter part of 1990s when rate of growth of agricultural output declined substantially, its impact on rural income distribution was reversed with declaration in average earning of agricultural labour house hold.

M. Ghose (2007)[5] in his essay 'Sustainable Development in Agriculture' has analysed the sustainability of agricultural development by examining the trend in area under high yielding varieties crops in India and trend of annual compound growth rates (%) of output and yield of crops in India. His analysis showed that the new technology led growth in agriculture has been associated with growing environmental degradation leading to slowing down of productivity and output growth during the 1990s. The environmental consequences of HYV-technology has been undergoing as important factors imposing limits to growth and sustainable development in agriculture. Sustainable development naturally requires appropriate measures for arresting and reversing the adverse effects of HYV-technology. He noted that National Agricultural Research System (NARS) can play a crucial role to better development location-specific and environmental –friendly technologies.

S. Singh (2004)[6] in his article 'Crisis and Diversification in Punjab Agriculture: Role of State and Agribusiness' has analysed the farmers' hindrances in getting profitable participation in contact farming. He observed that there is not so much requirement of Multinational Corporation but the requirement of a variety of enterprises, which can ensure the participation of farmers in agro-industrial development as equal and active partners. Further since the present system of cooperatives in the state does not work efficiently to cater to the business needs of such farmers, the new generation cooperatives (NGCs) should also be started. This can also help mobilize some of the capital surpluses available with theses farmers for cooperative structure. The solution lies on the institutional level. The state agencies, farmers' organization and NGOs should intervene in contact farming as intermediaries to protect the farmers' interests. The contracting need not be promoted for all crops and the state should play more of a regulatory role rather than a promotional one. Agricultural diversification

will work only if current system of procurement is based on MSP in favour of new crop.

J. Singh and R. S. Sidhu (2004)[7] in their article 'Factors in Declining Crop Diversification – Case Study of Punjab' have analysed the growth of agricultural output in Punjab and the contribution of crop shift and crop diversification in the growth of agriculture sector. They showed the scale of diversification by calculating the diversification index for different regions of Punjab in different time period. It was observed that DI for the state as a whole declined from 0.707 in 1970-71 to 0.591 in 2001-02. Rice and wheat continued to grow in area and production at the cost of other crops, and the diversity in the output mix decreased continuously over time. This in turn led to almost a specialization of the wheat–rice system all over the state with the level of specialization varying marginally across regions due to land and water constraints. The future growth in agriculture with the present crop pattern and technology will come largely from the area expansion which is limited due to water constraints. Otherwise, the crop pattern shall have to be changed towards high-value crop like fruits and vegetables.

Desai (2002) [8] in his article 'Policy Framework for Re-orienting Agricultural Development' states that the six elements namely vision, mission, objectives, strategies, investment and last organization and management should be incorporated into any public policy for developing the agriculture sector. According to him, the larger vision recognizes that farming is entrepreneurial economic activity rather than a way of life. The mission should be to provide higher sectoral growth, narrow regional differences in agricultural productivity and growth and lead to larger growth linkage of agriculture. Objectives of agricultural development broadly included its per capita output and real net national products growth and alleviation of poverty. The strategies that can be adopted are extensive farming, second, intensive agriculture and third, scientific knowledge based on technical change. According to him we should apply such instruments which will improve barter term of trade which in turn will have favourable impact on private investment, technical change, and growth in

agriculture. The multi-agency model is required which will specialize knowledge and skills that are highly professional in nature.

Krishnaraj (2006)[9] in his paper 'Food Security, Agrarian Crisis and Rural Livelihood – Implications of Women' highlights the contribution of agricultural growth in removing poverty and increasing the per capita income of farmers and per capita availability of food grains across India. He analysed that the all India consumer price index for agricultural and rural labourers especially for food indicates a substantial rise in cost of living. This is the result of policies followed by the government to privilege the growth of rice and wheat through promotion of hybrid variety, accompanied by high input technology and concentration on irrigated areas. Apart from decline in area under cultivation of coarse cereals which are nutritionally rich, their production and yield have declined due to lack of support. Recent data on lower consumption of food and diversion to non-food items is aggregating the financial problems of poor farmers which results in lower incomes due to poor returns from agriculture. The growth rate of average income per worker has declined from 0.696 in late 1970s to 0.29 in 2003-04.

Narayanamoorthy (2006)[10] in his article 'Deceleration in Agriculture Growth: Technology Fatigue or Policy Fatigue?' has made a comparison between technological factors and factors related to policy implementations that which is really causing a deceleration in the growth of agriculture. According to him, policy fatigue is the main reason for the agrarian crisis and deceleration in agricultural growth. A major policy that confirms fatigue is the faulty agricultural price policy followed for different crops. Nobody would invest money in a venture like agriculture that doesn't provide reasonable remuneration. The policy makers must keep watch on the movements of both, the cost and value of output so as to fix the prices for different crops in consonance with the cost of cultivation. The reduction in public investment in agriculture is also one of the reasons for poor performance of agriculture in recent years. There has also been significant reduction in the growth of institutional credit to agriculture during the post-reform period. Further the increased dependence on ground water irrigation increases the cost of cultivation.

Raju and Chand (2007)[11] in their article 'Progress and Problems in Agricultural Insurance' have analysed the different insurance schemes for agriculture initiated by the government and their impact on the well being of farmers. According to them, despite various schemes launched from time to time in the country, agricultural insurance has served very little purposes. The coverage in terms of area, number of farmers and value of agricultural output is very small, payment of indemnity based on the "area approach" misses affected farmers outside the compensated area, and most of the schemes are not viable. This requires renewal efforts by the government in terms of designing appropriate mechanism and providing financial support for agricultural insurance. Providing similar help to private sector insurance would help in increasing insurance coverage and in improving the viability of the insurance schemes over time.

M. Raghwan (2008)[12] in his article 'Changing Pattern of Input use & Cost of Cultivation' has analyzed the trend in the cost of utilization of different inputs in agriculture and so the overall cost of cultivation in different state of India. He observed that the cost of cultivation have soared to unprecedented heights coinciding with the economic reforms. The analysis shows that all items of costs have not increased at the same pace. While fixed cost seemed to exhibit a gradual deceleration, operational costs have continued their relentless acceleration. Further during the post-reform period, there has been a steep decline in the labour hours applied in cultivation. So the agrarian crisis in the post-reform period afflicted not only the cultivating households but also the entire agriculture dependent population. During this period, there has been a deceleration in the rate of growth of fertilizers applied in cultivation. Nonetheless, the corresponding rate of growth of fertilizer's charges was three times higher than that of its physical application.

Singh, Kaur and Kingra (2008)[13] in their paper 'Indebtedness among Farmers in Punjab' have analysed the extent and causes of indebtedness of farmers in Punjab and its repercussion on Punjab farmers' life. They observed from their analysis that 89 percent of farm household in Punjab is indebted and all farm size categories are equally indebted in percentage terms. The amount of indebtedness was the highest in the South Western region. The smaller farm

households on a per hectare basis were more heavily indebted than other farm size categories. The institutional sources accounted for 62 percent of total loans to farmer. The share of productive loans was 75 percent. The farmers having tractors were more heavily indebted but had a highest share of institutional loans. It was overall observed that Punjab's farmers are severely trapped in the clutches of indebtedness. It warrants multi-pronged strategies and measures for reducing indebtedness in the short run and increasing the productive income for farmers in long run by generating employment.

Fan and Gulati (2008)[14] in their article 'The Dragon and the Elephant: Learning from Agricultural & Rural Reforms in China and India' have analysed and compared between the agricultural advancement during their economic reforms between China and India. They observed that both the countries achieved remarkable developments and growth even as aid as a percentage of GDP in the two countries remained low. But still both countries still face tremendous challenges on the path of further prosperity. Continued growth is a must owing to pressure from a growing population and the corresponding need for jobs. Given the high expectation of their citizens, the lack of growth or even slower growth could lead to unrest in both countries. The limited natural resource base can be critical constraint to growth. The further economic growth of both countries increasingly depends on imports of energy, for which future prospects are uncertain. Both the countries must also pursue more pro-poor-growth, which is not only a development objective in itself, but also a pre-condition for future growth in the long-term.

Rao and Gopaloppa (2004)[15] in their paper 'Agricultural Growth and Farmer Distress – Tentative Prospective from Karnataka' explored the process of agricultural growth in Karnataka and its impact on the livelihood of its farmers. They observed that farmers in the state are left without an effective cover against adverse weather effects. This is the reason for the origin of farmers' distress in Karnataka which is accumulating over the years. While the proximate cause is adverse weather, it is the weakness of policy interventions which is the real cause for farmer distress. They suggest that closer ground level monitoring of weather effects and access to crop insurance could avert farmer distress or at least keep it

within tolerable limits. The research and extension and credit and marketing are essential for farmers in a developing country confronted with the powerful forces of modernization and globalization. The quality and dependability of the services provided by the institutions and infrastructure of Karnataka remains poor thereby causing distress and suicides in Karnataka & other states.

Chand and Kumar (2004)[16] in their article 'Determinants of Capital Formation and Agriculture Growth – Some New Exploration' have estimated a simultaneous equation model to investigate determinants of private and public investments and analyse the impact of capital formation on GDP agriculture. The result shows that the rate of return on private investment, which in turn depends on the terms of trade and technology, is found to be the most important determinant of private capital formation. The addition of new farm holdings is the second most important determinant of private investment. The institutional loan supplied to agriculture was found to be another determinant of private capital formation. The impact of subsidy on private investment is also positive. The increase in farm subsidies and decrease in revenue receipts from agriculture are causing an adverse impact on public sector capital formation. The GDP agriculture is affected by both capital formation as well as subsidies, besides terms of trade.

Chandel and Rao (2003)[17] in their paper 'Investment in Oilseed Research in India' have analysed the growth in investment on oilseeds research in India. They found that the investment rate on oilseeds research in both current and real prices during the past two decades and overall growth rate were 6.4 percent. The growth rate in research investment was higher in oilseeds indicating improvement in research industry over time. In the TMO (Technology Mission on Oilseeds) period, certain crops were given priority in research investment during different periods like safflower during 1985-90, rapeseed–mustard during 1990-95 and seasamum and groundnut during 1995-2000. The increase in growth rate of investment in one crop was accompanied by a decrease in investment in another crop in the same period. Oilseed research investment has increasingly become dependent on ICAR budget allocation. The percentage share in oilseed research

investment increased for rapeseed and mustard and seasamum, and declined for all other crops.

Mahendra Dev (2002) [18] in his article 'Bold Initiative Needed on Agriculture and Rural Employment' has analysed the various factors affecting the growth of agriculture sector. He has also analyzed the slow progress in this sector and its adverse impact on the rural employment. He observed that we need to have a viable agriculture and compete with other countries under the WTO scenario. He observed that the growth rate of agricultural credit for small and marginal farmers declined in the 1990s as compared with the 1980s (RBI 2002). During the same period, there was no decline of growth in credit for large farmers. In case of investment, as percentage of agriculture GDP, public investment was between 8 and 9 percent in the 1990s which was less than that for the 1980s. This decline in public investment is cause for concern. Agricultural development is an important source of increase in employment. There is a need to shift cropping pattern in favour of non-food & cash crops. Growth in rural non-farm employment (RNFE) can also improve rural wages and employment opportunities.

Satish (2007)[19] in his article 'Agricultural Credit in the Post Reform Era - A Target of Systematic Policy Coarctation' has analysed the post-reform scenario of the credit flow to agriculture. He concluded that there has been real squeeze on the credit flow to agriculture. He observed from the trend that credit to agriculture as a proportion of total bank credit of commercial banks decreased from 15 percent in 1990-91 to 9.9 percent in 1999-2000 and further to 9.6 percent during 2000-01. The number of small borrower account below Rs. 25000, which can be treated as a proxy for extensiveness of credit flow to priority sectors shrank from 58.8 millions in 1991-92 to 39.3 millions in 1999-2000 and further to 36.8 millions in 2003-04. The incremental credit deposit (CD) ratio which averaged 60.4 percent during 1981-82 drastically reduced to 34.5 percent during 1999-2001. The effects are further reflected in the declining trend in the capital formation in Indian agriculture since early 1990s. The level of capital investment in agriculture that was at 1.88 percent of GDP in 1992-93, declined to 1.27 percent in 2002-03.

Ghosh (2004) [20] in his article 'Promoting Bio-fertilizers in Indian Agriculture' has analysed the growth and distribution of bio-fertilizers in the Indian agriculture. He evaluated the different factors affecting the distribution of bio-fertilizers by estimating a regression equation. He found the result that the distribution of bio-fertilizers, proxying for its adoption rate, has not consistently grown over time and has slowed does in the late 1990s. Although there have been more and more entries in the market, the average capacity has come down, characterizing the industry by a large number of small units. Further, there has been no diffusion of technology despite the central government's interventions. Besides this, despite the entry of private players, the share of private commercial sector in distribution remains below 50 percent. Private firms have over time neither improved their share in capacity or distribution nor their growth rate of distribution. Given the capacity of the unit, private ownership has an adverse effect on distribution performance, showing the dismal commercial performance of the industry.

Shahu and Rajosekhar (2005)[21] in their paper 'Banking Sector Reform and Credit Flow to Indian Agriculture' have analysed the credit availability to Indian agriculture by different type of institutions, formal and informal in India. After examining the trend in credit flow, they observed that the share of credit to agriculture in total net bank credit had significantly declined, after the introduction of banking sector reforms in specialty. Despite the fact that the lending targets were fixed, direct and indirect finance was clubbed, interest rates were deregulated and lending procedures in the credit delivery system were simplified, the banks couldn't achieve the target set for agricultural lending. The Share of those farmers, borrowing less than Rs. 25000 declined in both the total number of loans accounts and total loan amount during the reform period. Credit flow to agriculture was negatively associated with investment in government securities and proportion of credit provided by the cooperatives. Credit supply to agriculture was positively associated with the incidence of rural banks braches.

Mahendra Dev (2006) [22] in his article 'Half Hearted Attention to Agriculture' has attempted to analyse the growth process of agriculture during different plans upto tenth plan. He observed that the stagnant public investment in

the 1990s and in the first five years of the new millennium has been a concern as it is necessary for improving infrastructure which can facilitate the growth of agriculture in the country. The provision of irrigation and water management are crucial for agricultural growth. The focus should have been more on water management in dry land agriculture. Since the bulk of the rural poor live in the rain-fed regions it is important to give high priority to sustainable development of these areas through the water shed development approach and other water management practices. Further timely and adequate credit is important to meet the requirement of fixed and working capital for farmers. Also there is a need to focus research and extension on dry land, hilly and marginal areas, diversification of crop patterns and allied activities, and post-harvest and biotechnology.

Behera and Mishra (2007)[23] in their article 'Acceleration of Agricultural Growth in India: Suggestive Policy Framework' have analysed crisis in Indian agriculture and various type of policies undertaken to solve this. They observed that the absence of institutional control in the input market has not only increased prices of inputs but also created uncertainty on their availability in the right quantity at the right price and at the right time to small and marginal farmers. This coupled with reduction in subsidies on seeds, fertilizers, pesticides etc. and growing fragmentation of farm land has raised the cost of cultivation. On the other hand lack of easy proximity to the output market, weak agriculture industry linkage, asymmetric information, and absence of agri-business relations have restricted farmers from getting the right prices for their commodities. All these resulted in drastic decline in profitability from agriculture in recent years. This decline in profitability has created disincentives for many farmers to continue cultivation, putting the agriculture sector in deep crisis.

Majumdar (2006)[24] in his article 'Centrality of Agriculture to India's Economic Development' has analysed the broader objectives of our agricultural growth and development. He observed that in the Indian economy the importance of agriculture is more than mere crop production. Agriculture continues to hold the key to higher GDP growth, employment expansion, reduction in poverty and the equitable distribution of income. The larger than sectoral role of Indian agriculture stems from the basic fact that a large proportion of the population,

some 60 percent continues to depend on agriculture for its livelihood. The focus will have to be on agriculture and allied sectors like animal husbandry, fisheries, construction, tourism, small scale industries, micro-enterprises, retail traders and so on. Agriculture is used here as an inclusive concept which would also cover development of waste lands and forests and organic farming with organic seed and compost preparation. The employment expansion in the rural sector is also a wider objective of agricultural plan.

Shah (2006)[25] in his article 'Towards Reforms – Watershed Programme' has analysed the Partha Sarthy Committee Report on the watershed development programme in India. The report argues that it has become increasingly difficult to see further larger dam or tubewell based irrigation development as possible answer to the water crisis in agriculture. The report is also skeptical of the ability of government to raise resources for the gigantic interlink of river projects, apart from the huge ecological question marks against the scheme. Therefore, the Parthasarathy Committee suggests that a reformed and expanded watershed programme hold the key to livelihood security in rainfed India. The committee has suggested a bold tripling of financial allocation for the watershed programme to around Rs. 10,000 crore per year based on a revised norm of Rs. 12,000 per hectare. This would make it possible to cover all rainfed areas of India by the year 2020. Author feels that even more than money; it is governance reform that holds the key to eradicate poverty from dry lands of India.

Vadhyanathan (2006) [26] in his article 'Restructuring Watershed Development Programme' has analysed the report of different committees set up for watershed development in India and its utilization in the watershed areas of the country. He observed that there is a need to choose appropriate measures to treat watersheds in different type of areas (predominantly forest areas with relatively high rainfall and in relatively flat terrain) and weave them into a coherent and mutually reinforcing programme to realize their optimum potential. The appropriate institutional arrangements for this purpose, including the nature of the organizations, role of community institutions and equitable distribution and sustainable use of resources will vary. This has to be recognized and internalized as an integral part of the watershed programmes for restructuring efforts to

succeed. At the ground level, where most of the action will take place, community participation is sought to be achieved by entrusting the responsibility to Panchayati Raj Institutions.

Birthal and Joshi (2006)[27] in their paper 'Diversification towards High Value Agriculture – Role of Urbanization & Infrastructure' have analysed the diversification process in Indian agriculture towards high value commodities (HVC) i.e. fruits, vegetables and livestock products. It was found that the share of HVC in cold agricultural products is high as compared to other food commodities. It has also been found that compound annual growth rate of HYCs is also higher as compared to other food commodities thus varying the increased diversification of Indian agriculture towards HVC. They also found that this diversification is being propelled by increased access to markets and the factors facilitating their transport from production sites to consumption sites. The access to markets is approximated by urbanization and road density. Also with rapid growth in income, the food basket of both rural and urban consumers is changing drastically in favour of high value food commodities. The result suggests that urbanization would remain an important driver for diversification due to increasing population.

Anita Shah (1997)[28] in her paper 'Food Security and Access to Natural Resources – A Review of Recent Trends' has examined the recent trends in the production of food grains in the country. She reached at conclusion that the yield based growth in food production has taken place in most of the states including dry land regions and that the diversification is a larger process that had already set in before liberalization. She also focused that the shift from oilseeds to food grains production is essential for economic sustainability of dry land farming. She observed that although area under food grains crops has reduced marginally during the post reforms period, the pattern is not uniform across crops and regions. The total production and per capita availability of food grains has continued to increase and/or fluctuate around the level achieved during the period immediately before the reforms. The availability of coerce grains however, had declined marginally. The main source of growth in production has been the

productivity of land since the yield of all the crops has increased during the post reform period.

Sekhar (2004)[29] in his paper 'Agricultural Price Volatility in International and Indian Markets' has examined the issue of volatility of agricultural prices in India. He also studied the effect of transmission of international price volatility to domestic markets. He has made attempt to measure the degree of price instability of important agricultural commodities in major domestic and international market and further compares the patterns of variability in the two prices. He has also found out its implications for Indian producers and consumers. It has been found out that the inter-year variability is generally lower in the domestic markets than in international markets. However, intra year variability, which is short-run and a more appropriate measure of variability, is as high in domestic markets as in international markets. He suggested that since short-term variability in agricultural prices in international markets is not found to be higher than domestic markets, international trade may be used as a short-term price stabilization strategy in case of supply shocks.

Chand, Raju and Pandey (2007)[30] in their article 'Growth Crisis in Agriculture – Severity and Options of National and State Levels' have discussed about the trend in agricultural growth and factors underlying the slowdown. They also explored the ways and means to bring about acceleration in agricultural growth in India. It was observed that the initial years of reforms were somewhat favourable for agricultural growth but the post-WTO period witnessed a sharp decline in the growth rate of almost all sub-sectors and commodity groups in the agricultural sector. The main reason for deceleration and stagnation in agricultural output after 1995-96 have been a slowdown in growth of fertilize use, irrigation and energy (electric power), crop intensity and the area under cultivation have shown either a poor growth or a decline. Diversification towards high value crops has also slowed down. The terms of trade for agriculture has shown deterioration and agricultural incomes faced an increased instability in the recent years.

Joshi, et al. (2007)[31] in their article 'Agriculture Diversification in South Asia – Pattern, determinants & Policy Implications' have attempted to examine

the extent, nature and speed of agricultural diversification in South Asia and India exclusively. They identified the determinants of agricultural diversification and assessed its implication on food security, employment and sustainable use of natural resources. They have applied the Generalized Least Square Method (GLS Method) to determine the significance of various variables which affects the diversification. It has been found in their study that agriculture sector in South Asia is gradually diversifying in favour of high value commodities, namely fruits, vegetables, livestock and fish products. In case of India, markets and roads were the key determinants for diversification. Diversification was more pronounced in rain fed areas, which were by-passed during the green revolution. The rain fed areas are becoming a hub of non-cereals due to their low water requirement and abundant labour supply. Further, the high value crops have substantial potential for generating employment opportunities.

H. S. Shergill (2007)[32] in his article 'Sustainability of Wheat–Rice Production in Punjab: A Re-examination' has analysed the sustainability of wheat and rice production at the present scale in Punjab. He came to the conclusion that at present there is no such threat to it both on economic and ecological grounds. It has been found that the fall in the water table has neither crossed the danger mark nor has the fall been caused by intensive wheat–rice cultivation per hectare. The further marketing prospects of Punjab grains are also quite secure. The Minimum Support Price (MSP) of wheat and rice in India has remained quite in line with the world market price of these grains. The contribution of food subsidy in the fiscal deficit of the central government, and its burden on the economy is rather marginal. He observed that the water table situation in the state is not as serious as is being made out by some experts and newspaper reports. Also the water use in wheat–rice rotation is not excessive so the economics of wheat–rice cultivation in Punjab is not alarming.

Ramesh Chand and T. Haque (1998)[33] in their paper 'Rice–Wheat Crop System in Indo-Gangetic Region – Issues Concerning Sustainability' have discussed about the adverse phenomena such as water logging, soil salinity and over exploitation of the natural resource base which have resulted due to rice-wheat rotation crop system in the Indo-Gangetic region after the post green

revolution. They observed that the eastern region of Indo-Gangetic plane need the human resource development and technological improvement which can solve the problems of low productivity and yield instability in rice–wheat cropping system. There is also the lack of managerial expertise which can provide better on-farm research and training of farmers regarding timeliness; improved methods of farm operations; proper use of inputs and by-products and conservation of natural resources. There is need for developing appropriate pest and rust resistant plant varieties for rice–wheat system in various agro-ecological zones, within the Indo-Gangetic plains region.

K.S. Krishnaswamy (1994)[34] in his article 'Agricultural Development under the New Economic Regime' has discussed the impact of the government's New Economic Policy (NEP) on agriculture and agricultural development. He observed that there has been no worthwhile public investment in agriculture and allied sectors apart from what World Bank financed projects because the sole objective of fiscal adjustment in recent years has been the reduction of the fiscal deficit only. Even during the plan-years, the bulk of direct investment in agriculture had been private investment. Public investment was dominant essentially in the areas of irrigation and soil conservation, agricultural research and rural electrification. The globalization process of India with GATT might yield some benefit to the big farmers, especially in the water rich areas, but the prospects are not very reassuring for the millions of small farming households which don't belong to that category. Also there is nothing solid to assure us that surplus labour that may be thrown out of agriculture be quickly absorbed elsewhere.

Kumar and Rosegrant (1994)[35] in their article 'Productivity and Sources of Growth for Rice in India' have assessed the total factor productivity growth in different regions of India. They have used the Divisia-Torngrist Index for computing the total output, total input, TFP and input price indices for rise. They also estimated the parameters of different variables affecting the growth in total factor productivity (TFP) and found their respective significance. It was analysed that the area under rice has increased only slightly during the 1980s. The gain in rice production has come essentially from the improved utilization of the

available infrastructure and from the resulting increase in yield per unit of land. Public policies such as investment in irrigation, infrastructure development and investment in research and pricing policies have lowered unit cost of production and rice prices in real terms and benefited both consumer and producers. Productivity of resources can be enhanced further by improving the management of infrastructure and by introducing new technologies.

Monirul Hussain (2004)[36] in his article 'Food Security and the North-East' has assessed the food security situation in the North-East region of India. He observed that the entire North-East has a deficit food production. The Brahamputra valley, the Bark valley in Assam and the small Imphal valley in Manipur, all these three valleys are thickly populated, and the land–man ratio has become increasingly unfavourable. Landlessness among the peasantry has increased substantially together with the concentration of land in the hands of a few. As a result, a large number of landless peasants have become totally unemployed with no alternative means of livelihood. Besides a large section of people have lost their land and livelihood as a result of environment and conflict–induced displacement – the internally displace persons (IDPs). The IDPs are most vulnerable people susceptible to food insecurity in the North–East.

According to Nayyar and Sen (1994)[37], in their paper 'International Trade and The Agricultural Sector in India' the trade policy reform in India, which seeks to dismantle restrictions on trade other than tariffs, and to bring domestic prices closer to world prices, represents a fundamental change from the past. The impact would not be confined to trade flows. It would extend to output and prices. The changes in the distribution of agricultural output and incomes between regions may accentuate inequities which would have potential implications. The increase in domestic prices of wage goods produced in agricultural sector is bond to erode food security which would, in turn have social consequences. There may not be much comfort in the balance of payments either. Insofar, as the volume of India's agricultural imports or exports would affect world prices, terms of trade are likely to worsen. The possibilities would be constrained further in as much as structural rigidities in the agricultural sector inhibit supply response.

Patil (2008)[38] in his article 'Agricultural Indebtness - Crisis and Revival' has observed that there is no doubt that agriculture has suffered due to long neglect and inadequate allocation of resources. Inclusive growth would require a major shift in our planning strategies and a much higher allocation of development and plan resources. High growth rate of Indian economy may be sustained but a sub 2 percent growth of agriculture would continue to be a major obstacle in reducing rural poverty and casing social tensions. The high indebtness of the Indian farmer is a manifestation of the neglect and inadequate investment in agriculture. The small and marginal farmers who form the overwhelming percentage of Indian farmer's households are the worst sufferers. Most of them are continuing in agriculture because of the complete absence of any alternatives. The growing unrest in large parts of rural India is a serious issue but has not attracted adequate attention of the authorities.

Reddy and Mishra (2008)[39] in their article 'Crisis in Agriculture and Rural Distress in Post Reform India' have observed that the incidence of suicide had been higher among small marginal farmers moving from subsistence agriculture to the high value crops with a strong motivation to improve their social and economic status. They are indeed risk-taking small agricultural entrepreneurs whose success would be the basic premise for the transformation of rural India towards better and equitable incomes and livelihoods. So farmers' distress is not due to enterprising qualities of farmers who pursue growth and even achieve it in good measure. But, drought-prone environment and non-caring policy regime turn those who bring growth into victims. There is increasing evidence that there can not be rural development, even in relatively prosperous regions like Andhra Pradesh and Punjab without high agricultural growth.

Sidhu and Bhular (2005)[40] in their article 'Patterns and Determinants of Agricultural Growth in the Two Punjabs' have observed that the productivity of all the crops except cotton was higher in Indian Punjab than in Pakistani Punjab. Low Level and less assured irrigation and low use of modern production inputs were primarily responsible for low productivity in Pakistani Punjab. Use of fertilizers and pesticides was also higher in Indian Punjab. Rural electrification, high rural roads intensity and strong input delivery mechanism provided further

impetus to growth in Indian Punjab. Intensive agriculture in both the states has led to land and water resources degradation. The increase in area under rice and wheat has put greater pressure on ground water resources leading to a fall in water table depths. Similarly, the nutrients – exhaustive crop patterns has resulted into poor fertility status of soils. The problem of salinity by using brackish water has aggravated in Pakistani Punjab. Consequently, the production patterns are reaching the limits of unsustainability from both economic and ecological points of view and call for diversification in both states.

Chand (2007)[41] in his article, 'Wheat Supply, Price Prospects and Food Security' has observed that the sharp increase in wheat prices witnessed in 2006 has sensitized the country to the fact that production is not keeping pace with demand. The situation is turning equally bad for other staple food like cereals and pulses. The per capita production of cereals, on a five year basis, since 1971, kept increasing till the mid 1990s. The first slowdown occurred during 1996-2000. Per capita production of cereals during the first five year of the 21st century is found to be 7 percent lower than the last five years of previous century. Pulses, which are major source of protein for the Indian population, have showed a decline since 1971. If these downward trends in cereals and pulse production are not reversed, there could be a serious threat to the food security of our large population. All these factors underscore the need to pay adequate attention to wheat and other staple food crops to ensure that their production grows at least at the rate of 2 percent per annum.

Ramakumar (2007)[42] in his article, 'Revival of Agricultural Credit in the 2000s : An Explanation' has observed that the growth rate of credit flow to agriculture from commercial banks in the period 2000 to 2006 was 20.5 percent per annum, which was significantly higher than the corresponding growth rate in the period between 1990 and 2000. The extent of revival of credit flow to agriculture in the 2000s would have been far less impressive in the absence of a sharp growth in indirect finance to agriculture. About one-third of the increase in credit flow to agriculture between 2000 and 2006 was on account of the increase in indirect finance. The entire growth of indirect finance to agriculture in the 2000s originated from a major expansion of loans with a credit limit of more than

Rs. 25 crore. The most important beneficiaries of the increase in direct advances since the last 1990s were the big cultivators.

According to Tushar Shah (2007)[43], in his paper 'Crop per Drop of Diesel? Energy Squeeze on India's Small Holder Irrigation' three factors are causing the adverse effects on the irrigation of small holders in India. They are (a) deteriorating free power supply (b) embargo on new electricity connections, and (c) an eight fold increase in diesel prices since 1991. The government of India's accelerated irrigation benefits programe is investing tens of thousands of crores annually in surface irrigation, which is shrinking. The author has observed that promoting fuel-efficient diesel/kerosene pumps of Chinese variety can ease the cost price squeeze. The idea of providing subsidized diesel to farmers as is done for trawler operating fisher folk in some states is also on anvil. The improvement in manual irrigation technologies and better management of surface water bodies for gravity flow irrigation too can relieve the stress from the energy squeeze.

According to Mahendra Dev and Rao (2005)[44], in their paper 'Food Processing and Contract in AP: A Small Farmer Perspective', the contract system is working well and solved the problem of marketing, input purchase and extension services. They further observed that the contracts could be improved by finalizing the grading process at the collection centre only. They observed that the grading processes are done again at the factory and in this process the shriveled fruits are rejected. This according to them is leading to a variation of weight of up to 10-20 percent. They want that the grading be completed at the collection centre itself. Some of the respondent (15 percent) felt that the drip subsidy could be extended for increasing production of the crop. Around 75 percent of the farmers wanted the government to supply power for a minimum of 10 hours in place of the present 6-7 hours. They also asked for crop insurance and quality pesticides.

Sengupta (2002)[45] in his article, 'Traditional Vs. Modern Practices in Salinity Control' has observed that nearly 35 percent of canal irrigated land in India is suffering from productivity losses of more than 10 percent due to water logging and salinity. The total loss of agricultural products on this account in the

past 50 years, would add up to a whole year's agricultural production at present. Land rehabilitation costs are those incurred to stop further degradation and to restore the land to something approaching its original un-degraded condition. One is preventive measures which include canal lining and conjunctive use. Other is curative measures which are surface and sub-surface drainage as well as chemical treatment and vegetative and biological measures. Lining of canals or conjunctive use produce immediate result.

According to Wilson (2002)[46], in his paper 'Small Cultivators in Bihar and 'New' Technology: Choice or Compulsion?', the small and marginal cultivators cultivating less than 2.5 acres are adopting 'new' technology from the period since the early 1980s. A large proportion of these cultivators are essentially subsistence producers who have been compelled to adopt high yielding crops and technologies in order to pay rents and service debts. These producers are characterized by the marketing of a 'distress surplus' and by the large proportion of land devoted to the cultivation of high value crops for sale. Increasing costs of cultivation have made small and marginal cultivators more dependent on the minority of large land owners for high interest production as well as consumption loans. Meanwhile, the supply of inputs including fertilizer, seeds and diesel continues to be largely controlled by a section of these land owners.

Pant (2005)[47], in his article, 'Control of and Access to Ground Water in UP' has observed that there has been stupendous growth of private tube wells (PTWs) in U.P which rose from about three thousand in 1951 to 600 thousand in 1977 and to 1.05 million by March 1980. In fact, by mid 1970s, tube well irrigation had overtaken canal irrigation, which was the dominant mode of irrigation earlier to that. On an average, there were 21.1 PTW per 100 hectare in U.P. This compares favourably in relation to other regions of South Asia except North West India. He observed that the backward castes seen to be racing ahead of high casts in owing such implements. But even today for marginal farmers, particularly SCs/STs the ownership of mechanical water extraction devices and modern agricultural implements remain out of their reach. This is despite the high sounding success of the free boring schemes.

Shankari and Reddy (2005)[48] in their article 'To Free or Not to Free Power – Understanding the Content of Free Power to Agriculture' have made a spatial analysis of efficiency and sustainability of different sources of irrigation like canal water irrigation and bore well irrigation. They also discussed the efficacy of power subsidy given by government to the farmers for the irrigation purpose. They observed that while hardly 40 percent of cultivable land in the country has been irrigated in 2000, the surface irrigation by canals during the last 30 years (1970-71 to 1999-2000) has grown very slowly by 34 percent promoted by the government. In sharp contrast, the area irrigated under open wells has gone up by 64 percent and by tube wells has shot up by 25 percent during the same period. Considering the fact that most of the cultivators tend to have small holdings, it can be safely assumed that the small and medium farmers occupy a critical and substantive extent of the land under irrigation in the country.

Most of these previous studies have focused on the effect of economic reform initiated in 1991 on the development of agriculture sector at national level and not at state or regional level. In addition to this these studies have focused mainly on the outcome and consequences of agricultural development of only green revolution areas of the country such as Punjab, Haryana and western Uttar Pradesh. There has not been made any serious attempt to analyse the agricultural development after reform in Uttar Pradesh which is the traditional granary basket of India. In the light of this perspective the present study has great relevance and importance in national as well as regional context.

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