

STRUCTURAL CHANGES AND PATTERN OF AGRICULTURAL DEVELOPMENT IN PUNJAB ECONOMY

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In

Development Economics

By

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DECLARATION

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ABSTRACT

“Structural Changes and Pattern of Agricultural Development in Punjab Economy”

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This study analyses the structural changes and pattern of agricultural development witnessed by Punjab economy over 1981-2010 period. Typically, it presents a quantitative analysis of sectoral trends in Punjab economy and its relative economic performance with major Indian states. The study finds that Punjab is no more an agrarian state. In sectoral distribution of GSDP, share of primary sector in GSDP has declined from 40 per cent in 1980-81 to 25 per cent in 2009-10, while that of secondary and tertiary sectors has increased from 17 per cent to 30.8 per cent and 42.9 per cent to 44 per cent respectively during the same period. The GSDP growth rate during 1980-81 to 2009-10 was only 3 per cent in primary sector as against 6.6 per cent in secondary and 4.76 per cent in tertiary sector. The work force engaged in agriculture (cultivators and labourers) declined from 58 per cent in 1981 to 35 per cent in 2011. The decline in capital and development expenditure and rise in non-development expenditure has a capacity to crowd out private and public investment. The relative economic performance vis-a-vis other major Indian states shows that Punjab has slipped from a leading state to a laggard state in terms of per capita income. The down turn in economic growth

was more severe during post reform period. The pattern of agricultural development in shows that Punjab economy has developed into highly mechanized agriculture with input usage of the highest order. There is stagnation in production of major food gain crops in Punjab. Thus, there is need to rejuvenate the Punjab economy by diversifying agricultural sector to more commercial agri-business sector which will also take care of industrialization, particularly in rural areas.

Poonam Rani

Dr. Naresh Singla

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LIST OF ABBREVIATIONS

S.No.	Full form	Abbreviation
1.	Average Size of Land Holding	ASLH
2.	Budgetary Expenditure	BE
3.	Capital Expenditure	CE
4.	Census of India	COI
5.	Central Statistical Office	CSO
6.	Centre for Monitoring Indian Economy	CMIE
7.	Compound Annual Growth Rate	CAGR
8.	Consumption of Fixed Capital	CFC
9.	Cropping Intensity	CI
10.	Development Expenditure	DE
11.	Gross Cropped Area	GCA
12.	Gross District Domestic Product	GDDP
13.	Gross State Domestic Capital Formation	GSDCF
14.	Gross State Domestic Product	GSDP
15.	Human Development Index	HDI
16.	Large and Medium Scale Industries	L & M
17.	Net District Domestic Product	NDDP
18.	Net National Product	NNP
19.	Net State Domestic Product	NSDP
20.	Nitrogen, Phosphate and Potassic	NPK

21.	Non-Development Expenditure	NDE
22.	Other Workers	OW
23.	Reserve Bank of India	RBI
24.	Small Scale Industries	SSI
25.	United Nations Development Programme	UNDP

Chapter 1

Introduction

Punjab with an area of 50,362 square kilometres is one of the smallest states of India. Its economy is typically characterized by the presence of three major sectors-primary, secondary and tertiary. The percentage contribution in GSDP is the highest for the tertiary sector (45.3 per cent) followed by the share of the secondary (30.8 per cent) and primary sectors (23.9 per cent) during 2010-11 (Statistical Abstract of Punjab, 2012). Though the share of primary sector is the least amongst all the sectors, but still the economy of the Punjab is agrarian as about 67 per cent of population depends on agriculture and allied activities (Khanna, 2011). There are about 10.6 lakh operational holdings in Punjab. Of these, 34.19 per cent holdings are of marginal and small farmers. The semi-medium, medium and large holdings constitute 66 per cent of total operational holdings in 2010-11. Punjab is the major producer of the food grains. The production of food grains in Punjab was 290.92 lakh metric tonnes in 2011-12. Wheat and rice crops played a major role in pushing up agricultural production in the state. Punjab contributed a share of 33.6 per cent in wheat and 41.9 per cent in rice to the central pool of India during 2012-13. Further, 97.9 per cent of gross cropped area was irrigated in 2011-12 and the irrigation intensity is also of the very high order (190 per cent). 73 per cent of the area in Punjab is irrigated by tube wells and remaining 23 per cent by canals (Economic Survey of Punjab, 2012).

The above given statistics pertaining to the Punjab economy though represents a very prominent role of agriculture sector in the state's economy. But, Punjab which held a pride place among the Indian states for its outstanding achievements in agriculture after the introduction of green revolution in the mid 1960's is witnessing many structural changes primarily due to the reduction of the share of the agriculture sector in the state's economy. The state which was once called as 'food bowl' of India is witnessing decline in the growth rate of agriculture. Punjab experienced a remarkable agricultural growth of 3.18 per cent during 1966-67 to 1979-80, 4.87 per cent in 1980-81 to 1990-91. The agricultural growth started declined during nineties. It was 0.37 per cent in 1991-92 to 1998-99 (Singh and Singh, 2002). In 2002-03, growth rate in agriculture became negative (-1.37 per cent). In 2007-2012, agriculture growth rate was just 2.40 per cent

(www.indiastat.com). The deceleration in SDP of major productive sectors and acceleration in growth of the service related sectors clearly underline the importance of structural changes.

The comparative analysis of growth in Punjab with other states overtime reflected that state's ranking slipped from 1st during 1999-00 to 5th during 2007-08 in terms of per capita income. The growth rate of per capita income also declined from 3.42 percent during 1980's to 2.72 percent during 1990's (Singh and Singh, 2002). Punjab has turned from 'a leading to a laggard state' during post reform period of economic growth (Singh, 2010). The shift from development to non development expenditure also effected to growth outcomes of the economy (Singh and Singh, 2002). Deceleration of economic growth of the Punjab economy in general and agriculture sector in particular has increased the crisis of capitalistic path of economic development especially in the liberalisation and globalisation era (Gill and Singh, 2005). Thus, it becomes important to study the structural changes that have taken place in Punjab's economy and also pattern of agricultural development in Punjab.

Agriculture sector has a large impact on the entire economy, especially the agro-industries that supply current and capital inputs and that process agricultural output. The emergence of large market surpluses in agriculture stimulates an unprecedented increase in trade and transport. The rapid rise in the per capita income of the rural and urban population widens the market for consumption goods and services. Thus, by raising the income of a large proportion of rural workers, rapid agricultural growth not only made a deep dent in rural poverty but also led to development of other sectors of the economy (Bhalla, 1995). The performance of agriculture sector also affects the growth prospects of the other sectors of the economy directly and indirectly due to interconnections between sectors (Singh, 2010). Lewis theory of growth based on the process of structural transformation has also outlined the importance of the agriculture sector as it plays an important role through the supply of surplus resources and workforce for the rapid progress of other sectors, especially industrial, to transform the economy from a low productivity to a higher productivity one (Singh and Singh, 2002). Therefore, in the context of Punjab, declining growth in productivity of agricultural sector without substantial growth in industrial sector is a cause concern for the policy makers.

1.1 Nature and Scope of the study

The study is an empirical investigation into some of the important aspects of structural changes in Punjab and its relative economic performance with other states of India. Structural changes in any economy show the changing relative contribution of primary, secondary and tertiary sectors (Singh, 2010). Therefore, it is very important to study the structural changes in Punjab economy to find the changes in the relative contributions of the different sectors. The concept of structural changes is very useful to find the long term economic growth and development. The analysis of economic growth across states, sectors and over time is incomplete without examining the structural transformation of the economy (Singh and Singh, 2002). Besides, within each sector, it is also necessary to examine the change in relative composition of sub-sectors. However, specific aim of the study is to find the pattern of agricultural development in Punjab in order to find out its role in bringing the structural changes in the economy. The comparative analysis of growth across states overtime would be helpful to understand the comparative economic performance of Punjab economy under the new policy regime in relation to other states.

1.2 Objectives

The specific objectives of the study are:

1. To study the structural changes and economic development in Punjab economy since 1981.
2. To study the pattern of agricultural development in Punjab since 1981; and
3. To suggest suitable policy measures for the economic development of Punjab.

1.3 Key Research Questions

- (1) What is the sectoral distribution of Gross State Domestic Product (GSDP) in Punjab?
- (2) What is the relative economic performance of the Punjab with other major Indian states?
- (3) What is the pattern of public expenditure in Punjab?
- (4) What is the change in structure of the work force in Punjab?

(5) What are the structural changes in the production and employment pattern across different industries in Punjab?

(6) What is the role of the agriculture sector in Punjab economy?

1.4 Hypotheses

- 1) No major change has occurred in sectoral distribution of GSDP.
- 2) No shift in work force across different sectors of the economy.
- 3) Economic performance of the Punjab is better as compared to other major Indian states.
- 4) Agricultural sector still plays a prominent role in the economy.

1.5 Chapterization

Following this introductory chapter, second chapter reviews the various studies on performance of the state economy and role of the agriculture sector. Data base sources and methodology used is outlined in third chapter of the study. Fourth chapter of the study analyzes the structural changes, mainly in socio-economic indicators such as share of different sectors in state economy, pattern of public expenditure, structure of work force etc. This chapter also compares the relative economic performance with other major Indian states. Fifth chapter analyzes the pattern of the agricultural development sector in production of food grains, cropping pattern, land utilization pattern, ownership of land holdings, usage of agricultural inputs etc. Sixth and last chapter summarizes the study with some policy suggestions.

Chapter 2

Review of Literature

This chapter reviews some of the studies in the context of Punjab which have examined structural changes across different sectors and pattern of agricultural development. An attempt has also been made to review the studies which have compared the state's economic performance with other major Indian states.

Bhalla et. al., (1990) studied the structural changes in the Punjab economy that have taken place as a consequence of rapid economic growth since the introduction of the new seed-fertilizer agricultural technology during the mid-1960. This study had also identified the contribution made by agriculture in the growth process of the state. Primary sector recorded an annual growth rate of 4.5 per cent as against a growth rate of 5.6 per cent in secondary sector and 6.8 per cent in tertiary sector during 1960-61 to 1983-84. The share of primary sector in NSDP declined from 59.9 per cent in 1960-61 to 50.0 per cent in 1983-84, while that of the secondary sector increased from 14.6 per cent to 17.2 per cent and that of tertiary sector increased from 25.5 per cent to 32.8 per cent during the same period. The new technology had resulted in phenomenal increase in wheat and rice yields. The share of wheat area in the gross cropped area (GCA) increased from 30.6 percent in 1964-65 to 44.1 percent during 1984-85. The area of rice, which was about 5 percent during 1964-65, had increased to 23.4 percent during 1984-85. In manufacturing sector, the emergence of machine-based and metal-based industries reflected the deepening industrial structure of the state. The higher level of agriculture output and manufactured activities trade and transport and other services had significantly increased their share in the state economy. The study concluded that rapid growth and structural transformation of Punjab economy had taken place primarily as a result of technological breakthroughs in agriculture.

Gill (1994) analyzed the economic performance and structural changes in Punjab economy through the changes in various factors such as per capita income, Net State Domestic Product (NSDP), expenditure by government and work force structure etc. The study also described the structure of agriculture and

industrial sectors. The performance of Punjab in per capita income was good during 1980-81 and 1990-91 as Punjab maintained first position in terms of per capita income as compared to the other states. The share of primary sector in NSDP declined from 50.04 percent to 47.94 percent while that of secondary sector increased from 16.69 per cent to 21.64 percent and tertiary sector declined from 33.27 percent to 30.44 percent during 1980-81 to 1990-91. The share of workforce structure also declined in primary sector from 58.03 percent to 56.14 percent during 1981 to 1991 mainly due to increase in demand for non-agriculture products through increase in per capita income, rise in value of agriculture product, and use of modern technology. Study suggested that the diversification towards crops like pulses, oilseeds, sugarcane, vegetables and fruits was necessary for development of agriculture. Lastly, the coordination between centre and state was also reported essential for development process of the state.

Bhalla (1995) examined the agricultural and industrial growth performance of Punjab. The NSDP growth rate during 1967-68 to 1987-88 was higher in Punjab (5.3 percent) than that in India (4.3 percent). Growth rate in per capita income was 3 per cent in Punjab as against 1.9 percent of whole India during the same period. Punjab also had higher growth rates in primary as well as secondary sectors as compared to the India level. The GCA increased 1.64 percent between 1960-61 and 1987-88 due to increase in cropping intensity. The net area irrigated by canals declined from 59 per cent to 40 percent while tube well irrigated area increased from 36 per cent to about 60 per cent during 1950-51 to 1989-90. The consumption of fertilizer per hectare of cropped area increased from a mere 19 kilograms in 1965-66 to 51 kilograms in 1970-71 which further increased to 155 kilograms in 1989-90. The study found the positive technical change in both wheat and rice and negative for cotton through Solow index of growth. The growth of manufacturing increased with increase in agricultural output during the 1960s created a demand for more agro-processing, agro-input, and machine goods.

Singh and Kohli (1997) analyzed the pattern of rapid innovation in Punjab agriculture during the green revolution period as compared to other Indian states and pointed that high levels of innovation and investment in Punjab agriculture could be understood in terms of three categories of variables such as innovation, investment and incentives. The study found that economic growth could occur as a

result of technological change or an increase in the inputs used in the production process. Punjab achieved technological innovations such as high yielding varieties of seeds, chemical fertiliser, pesticides, tube well, diesel pump sets etc. during green revolution. During 1961-62 to 1985-86, growth rate in food grain production was higher in Punjab (6.4 percent) than Haryana (4.7 percent), Gujarat (3.4 percent) etc. Level of fertilizer consumption per operational holdings, pesticide consumption, and tractors per lakh hectare of GCA etc. was of the highest order in Punjab as compared to other Indian states during 1971-72 and 1985-86. But, study also found that Punjab was not always the highest consumer of all technological innovations. The energised tube wells increased from 1486 to 10756 per lakh hectare of GCA during 1968-69 to 1985-85 in Punjab but in Tamil Nadu, these increased from 5318 to 16769 per lakh hectare of GCA. In 1985-86, the wholly owned and self operated holdings as percentage of total number of operational holdings under all size groups were higher in Gujarat (99.9 percent) as compared to the Punjab (84.9 percent).

Bawa (2000) analysed major changes in agricultural sector in Punjab economy during 1966-67 to 1997-98. The study found imbalances in the cropping pattern which was favourable for wheat-paddy rotation. In 1970-71, 45.77 percent of GCA was under wheat-rice rotation which increased to 70.9 percent in 1997-98. Average yield of wheat and paddy substantially increased during 1966-67 to 1997-98, while the increase was marginal in case of pulses and oilseeds. The contribution of wheat to central pool increased from 42.8 lakh tonnes during 1980-81 to 59.6 lakh tonnes during 1997-98, while that in case of rice, contribution increased from 25.2 lakh tonnes to 60.4 lakh tonnes during the same period. The consumption of chemical fertilisers per hectare increased from 38 kg nutrient during 1970-71 to 167 kg nutrient during 1997-98. This study also pointed that the green revolution had mainly benefitted large farmers. The gains for medium farmers were not substantial, while the gains for small and marginal farmers were negligible. Some of the suggestions given by the study were: opening of education institutions in rural areas, diversification of agriculture towards allied activities like dairy farming, poultry etc., rural industrialisation to remove unemployment and rural poverty etc.

Gill and Ghuman (2000) analysed the economic and fiscal crisis in Punjab economy. The crisis had started during 1980's and had become serious during 1990's. Economic crisis started due to lower growth rate (5.1 per cent) than all India average (6.8 per cent) between 1992-93 and 1997-98. Punjab also lost its first rank in terms of per capita income among major states of India. The growth rate of income of primary sector turned negative during 1983-84, 1990-91, 1995-96 and 1997-98. The existing cropping pattern was not sustainable as it was causing depletion in water table, degradation of soil etc. The share of development expenditure in total expenditure declined from 73 per cent in 1978-79 to 54 per cent during 1997-98, while non-development expenditure increased from 26 per cent to 45 per cent during the same period. The study suggested that the state development strategy required optimum utilisation of resources, infrastructure in transport, communications, improvement in quality of educational institutions etc.

Rangi and Sidhu (2000) critically examined the problems faced by the agricultural sector in Punjab and its prospects of further development in near future. The study found that average size of operational holdings which was 3.79 hectare in 1980-81 declined to 3.19 hectare in 2000-01 due to shift of agricultural land for non-agricultural uses. The net area sown per cultivator and agricultural worker declined from 1.93 to 1.25 hectare during 1960-61 to 1990-91, while GCA per cultivator and agricultural worker declined from 2.44 hectare to 2.22 hectare during same period. Stagnation in yield of wheat and paddy coupled with decline in production of other crops like barley, maize, pulses etc. during the period of 1966-67 to 1997-98 was also indentified in this study. This study suggested that in order to increase the income of farmers, subsidiary enterprises like dairy farming, bee-keeping etc. might be encouraged by the policy makers and administrators. Free power supply to farm sector might also be stopped without further delay.

Sethi and Raikhy (2000) analysed the structure of Punjab economy from 1970-71 to 1997-98 in order to find imbalances in the pattern of growth. The relative share of different sectors in the NSDP showed that the structural changes had taken place at a rapid rate. The share of primary sector decreased from 60.33 per cent in 1970-71 to 43.24 per cent in 1997-98, while that of secondary sector increased from 13.98 per cent to 27.29 per cent during same period. The share of tertiary sector in NSDP increased to 29.48 per cent in 1997-98 from 25.70 per cent

in 1970-71. During the period from 1970-71 to 1997-98, the rate of growth of workforce was not uniform in respect of workers engaged in different industrial activities. In construction, trade storage and commerce, transport and communication, growth rate of labours was higher at 3.76 per cent, 3.57 per cent and 3.48 per cent respectively than that in agricultural sector (3.07 per cent) during 1970 to 1997. The overall employment in the state increased at a rate of 2.26 per cent per annum. The study concluded that both for NSDP and workforce, the index of structure change experienced a low declining during eighties as compared to seventies but during the nineties, the structure change had been quite rapid for NSDP, but fairly slow for workforce. The imbalanced growth index which was worked out on the basis of structure change in NSDP and workforce indicated that the degree of imbalance in the Punjab economy became much higher during nineties and might be termed as structural distortion.

Singh, I. (2000) analysed the structural changes in the Punjab economy based on input-output framework of production. This framework was based on 30 common sectors such as wheat, rice, dairy products, printing and publishing, metal products, transport equipment etc. Sectoral distribution of NSDP showed that share of primary sectors in the total NSDP had come down to 43.24 per cent in the year 1997-98 as against 49.50 per cent in 1980-81. On the other hand, share of secondary sectors had improved from 18.47 per cent in 1980-81 to 27.29 per cent in 1997-98. The share of tertiary sectors in the NSDP depicted a marginal increase during same period. An analysis of input-output framework of production showed that agricultural sector generated a below average input requirement from other sectors, while its output was widely used by other sectors. The study concluded that the Punjab growth model of capitalist development of agriculture had developed the agriculture and its allied sectors, but it failed to integrate with rest of the sectors. Agriculture, in spite of being so developed, was still characterised by low backward and low forward linkage pattern.

Singh, S. (2000) studied agricultural crisis in Punjab during the 1980s and 1990's. Some of the reasons identified for agrarian crisis were: rice-wheat monoculture, ecological problems (declining water table, micro-nutrient deficiency and pollution due to burning of crop residues of paddy and wheat after mechanical harvesting of these crops etc), failure of contract farming schemes, emergence of

second hand tractor markets, suicides by large number of farmers (due to constant crop failure, indebtedness), change in work culture where farmers stopped doing manual farm work and became dependent on migrant labour etc. This study suggested that the state should encourage organic crop production and gave incentives to farmers to tackle with ecological problems and achieve diversification of a meaningful type. There was need to encourage integrated farming systems, not just single crop or only crop systems.

Gulati (2002) examined the challenges faced by Punjab agriculture in a globalizing world. During 1990's, growth rate of NSDP declined to 4.3 per cent from 5.4 per cent during 1980's. Punjab also lost its 1st position in higher per capita income in comparison with other major states of India. Stagnation of wheat and rice yields had resulted in increased capital costs and shrinking profit margins in agricultural production. The cropping pattern was dominated by wheat, rice and cotton but the market of these commodities, including food grains was lacking during 1990's as the excess supply of food grains from Punjab declined, while it had improved other northern and northeast states of India during same period. Due to rising subsidies and falling public investments, there had been an enormous waste of resources, particularly water. The farming system had become unsustainable. There was a need to shift to a new production profile i.e. shift away from common rice and wheat to high value crops such as basmati rice and durum wheat. Diversifying to crops like soybean and maize and increasing the production of livestock and poultry would help in reducing the pressure on land from food grain production.

Planning Commission (2002) described the development and changes in Punjab economy in Punjab Development Report. This report measured the state performance through economic, agricultural, industrial and human development etc. In 1980's, growth rate was 5.3 per cent per annum as compared to 5.5 per cent at national level. It declined to 4.71 per cent during 1990's in Punjab compared to growth rate of 6.9 per cent at India level. In budgetary expenditure, share of development expenditure declined from 60.15 percent in 1967-68 to 46.77 percent in 2000-01. On the other hand, non-development expenditure increased from 39.84 percent to 52.54 percent during the same period. In the situation of deceleration of the overall state economy, it had undergone a

structural transformation during the periods of 1970-71 to 1998-99. The primary sector grew at the rate of 3.9 per cent per annum as against the secondary sector at 6.5 per cent and the tertiary sector at 5.4 per cent during 1970-71 to 1998-99. Small scale industries dominated the industrial structure in the state. In small scale industries, the number of units increased from 8023 to 199071, while employment increased from 56,000 to 8, 83,005, fixed investment increased from Rs. 60 crore to Rs. 3793.7 crore and production increased from 200 crore to 16610.8 crore during 1966-67 to 1999-00. Large scale units increased from 122 to only 611, their employment increased from 42,735 to 22, 35,993, fixed investment increased from Rs. 104 crore to Rs. 14765.8 crore and production increased from 93 crore to 23720 crore during the same period. The study found that growth of large scale industrial units was lower in Punjab because of closeness of sensitive international border with Pakistan, lack of metallic minerals and fossil fuels, increase in capabilities of other parts of India and reduced investment etc.

Singh and Singh (2002) studied the deceleration of economic growth in Punjab during 1990's. The real SDP declined from 5.36 per cent to 4.68 per cent during 1980's to 1990's, while per capita growth rate declined from 3.42 per cent to 2.72 per cent. Differential economic growth performance across sectors and overtime showed a change in the economic structure of the economy. The agriculture sector recorded a growth rate as low as 0.37 per cent during 1990's compared with that of 4.87 per cent in the 1980s. Manufacturing growth rate also declined from 9.12 per cent to 8.49 per cent. Transport, storage and communication sector growth rate experienced an increase from 6.92 per cent to 11.64 per cent during same period. Budgetary expenditure increased from Rs. 549.53 crore during 1980-81 to Rs. 9553.3 crore during 1998-99. In that, share of development expenditure declined from Rs. 71.92 percent to Rs. 46.48 percent, while non-development expenditure increased from 28.07 percent to 52.77 percent. In Human Development Index, Punjab was at second position among all the major Indian states. The study concluded that massive investment in public research particularly in the areas of biotechnology were necessary for development.

Gill and Singh (2005) explored crisis of agrarian capitalism, farmer suicides and response of public policy. Growth rate of NSDP declined to 4.7 per

cent during nineties compared to 5.4 per cent during the eighties. The share of agriculture in GSDP which was 54.27 per cent in 1970-71 declined to 39.22 per cent in the year 2000-01. The share of industrial sector in GSDP declined to 16.10 per cent, while that of tertiary sector improved to 45 per cent during same period. The declining importance of agriculture and industry sectors and increasing importance of tertiary sector was not a healthy sign of structural transformation in the backdrop of deceleration of growth of the productive sectors of the economy. Work force engaged in agriculture and industrial sectors was 58.02 per cent and 3.5 per cent respectively in 1981 which declined to 39.36 per cent and 8.41 per cent respectively during 2001. The study concluded that deceleration of economic growth of the Punjab economy in general and agriculture sector in particular had increased the crisis of capitalistic path of economic development, especially in the liberalisation and globalisation era.

Sidhu (2005) examined the production conditions in contemporary Punjab agriculture. This study found that dependence on wheat-rice cultivation had caused problems like deterioration in the productivity of soil, depletion of underground water etc. The yields of rice, wheat and sugarcane increased during 1970-71 to 1999-00, while that of bajra, groundnut and cotton declined during same period. The cropping intensity increased from 140 percent to 186 percent during 1970-71 to 2000-01. The average land holding size fell sharply from 4.01 hectare in 1980-81 to 3.61 hectare in 1990-91. The consumption of fertilizers per hectare increased from 38 kg to 179 kg during 1970-71 and 2000-01. Lack of funds with state government to waive off the loans of poor farmers was identified as major reason for agrarian crisis in Punjab.

Sidhu et. al., (2005) analyzed the changes in the structure of cropping pattern, employment, productivity and income since green revolution period. The study found that during 1970's and 1980's, productivity of important crops grew significantly, employment in agriculture increased and income of farmers also improved. During 1990's, technical changes dried up in farming sector, production of rice and sugarcane platered, farm employment in the crop sector had shrunk, over-capitalization particularly on small and semi-medium farms etc. The study recommended a new approach focussing on high value crops and enterprises, vertical integration of the market for perishable and other high value enterprises,

and modernising of market infrastructure for new crops was necessary for the state.

Singh (2006) examined the deceleration of industrial growth in Punjab economy. This study had examined the industrial growth experience during the periods of 1980-81 to 2001-02. According to this study, the industrial growth of Punjab had come down during the post reform period as compared to pre reform period. The growth rate of manufacturing sector was 9.32 percent during 1980-81 but it declined to 5.74 percent during the period of 1991-2001. Growth rates of registered/organized sector and unregistered/unorganized manufacturing sector declined from 9.29 percent to 6.94 percent and 9.33 percent to 3.78 percent respectively during the period from 1980-90 to 1991-2001. Lower investment-GSDP ratio, lower plan expenditure and lower quality of human capital and infrastructure were the factors identified for deceleration of industrial growth of Punjab. The study pointed that in order to self sustain the economic growth, there was need to bring change in the organizational structure, involve local people to organize economic activities and eliminate the rent seeking middleman. The role of the government was also found important in terms of providing essential institutional and infrastructural arrangements.

Ghuman (2008) examined the socio-economic crisis in rural Punjab. The study pointed that yield of major agricultural crops had experienced stagnation since early 1990's. As a consequence, decline in per hectare net returns was seen as the real crisis of Punjab agriculture. A depleting water table, ever-rising use of fertilities and pesticides, over mechanisation, declining fertility of soil and almost stagnation in minimum support prices were the other major reasons identified for shrinking income from agriculture. The rising cost of cultivation and declining net returns had resulted in the heavy indebtedness of farmers which also led to suicides in some cases. The study pointed that there was an urgent need to develop the rural non-farm sector for employment generation and smooth transformation from agriculture to other sectors.

Chand (2008) also analysed the development of agriculture and allied sectors in Punjab. The study found that agriculture and allied sectors experienced a serious decline in growth during the reform period. The growth rate of NSDP of

agriculture increased from 4.03 percent to 5.33 percent during 1970's to 1980's, but declined to 2.34 percent during 1990's. With the introduction of green revolution, area under wheat and rice increased from 50.92 percent to 71.78 percent during 1970's to 1990's, while that of oilseeds declined from 4.86 percent to 2.38 percent and that of pulses declined from 6.35 percent to 1.34 percent during same period. The study suggested that Punjab should give new direction to its agricultural production by diversifying 13 per cent of area under wheat and 37 per cent of area under paddy to other crops that were globally competitive and had a high future demand.

Singh (2010) studied major constraints and their remedies in post reform economic development in Punjab. The study found that performance of Punjab state deteriorated when compared with its own past performance and achievements. According to per capita income estimates, rank of Punjab was number one in 1999-2000 with Rs. 25631, which was higher than per capita income of India's economy (Rs. 15881). But, during 2007-08, the rank of per capita declined to 5th place and per capita income was Rs. 31662. The relative share of agriculture in the NSDP had declined from 44 per cent in 1990-91 to 39 per cent in 1999-2000 and to 32 per cent in 2007-08. Manufacturing sector contributed 15.1 per cent in NSDP during 1990-91, which declined to 13.6 per cent during 2007-08. The combined share of all the sectors which had recorded deceleration in growth during the 2000's was 68.52 per cent in 1990-91 which declined to 57.74 per cent in 2007-08. The major constraint that had impinged upon the development process were structural rigidities, macro-economic policies, human capital development, low investment GSDP ratio and non-economic factors such as social, political and an active international border. The study showed that Punjab economy had experienced deceleration of economic growth in post-reform period contrary to acceleration of economic growth of the national economy as well as majority of the major states of the country. To harness long term sustained and inclusive growth, an alternative structural transformation pattern of economic growth had been outlined in the study.

Khanna (2011) analysed post reform structural changes in Punjab economy. The study described that the agricultural production system had become ecologically and economically unsustainable. Agriculture and livestock constituted

52.85 per cent of GSDP in 1966-67 which increased to 54.27 per cent in the year 1970-71. Thereafter, share of agriculture and livestock income in GSDP started declining continuously and dwindled to 30.52 per cent in year 2005-06. Manufacturing sector share in GSDP increased from 7.86 percent to 20.12 percent during 1966-67 to 1995-96. After that period, it declined to 16.10 percent during 2000-01 and 13.49 percent during 2005-06. The tertiary sector generated 44.84 per cent of GSDP during 2005-06. During 1966-67, the share of tertiary sector was only 26.67 percent. The expenditure on agriculture and allied sectors had come down from 10.3 per cent in the fourth plan to 2.91 per cent during the eleventh plan. The share of expenditure on industry and mineral also declined to 0.55 per cent of total plan expenditure during the eleventh plan. This study analysed that the state of Punjab which was taken as a role model of development for other states, showed deterioration in the growth process in the nineties compared with the eighties and worst performance was of the agriculture sector. The study pointed that a fast deceleration of rate of growth of the agriculture sector had far reaching consequences for the rest of the economy due to interdependence of the sectors.

Dutta (2012) explored the contemporary agrarian situation in Punjab. He found that green revolution did not sustain for a long time as it started losing its charm and was followed by a series of crises, especially in its economy and environment. The crises of Punjab agriculture started with declining viability of small and marginal holdings and higher rate of rural indebtedness after the green revolution. The share of marginal operational holdings in total operational holdings declined from 37.63 percent during 1970-71 to 12.34 percent during 2000-01, while share of small farmer holdings in operational land holdings declined marginally from 18.91 percent to 17.35 percent during same period. The share of holdings under medium, large and extra large farmers increased from 43.46 percent to 70.31 percent during 1970-71 to 2000-01. Many multinational companies took control over agricultural production since the introduction of economic reforms in 1990's. The agrarian crisis not only brought about the problem of indebtedness, but also suicides among various classes of farmer.

CDEIS (2012) prepared a policy document for rejuvenation of Punjab economy. The document described that Punjab economy since liberalization had

performed below from its potential level and slipped from 1st to 5th rank in terms of per capita income. The per capita income of the state was Rs. 67,473 during 2010-11, which was Rs. 24,678 less than that of the first ranking Haryana state (Rs. 92,327). Investment-SDP ratio was 15 percent points lower than all India average. This document suggested that Punjab needs to match, at least, with the national average, and that required an additional Rs 10,000 crore of annual investment in capital formation. For maintaining sustainable development and inter-generational equity, government must devote at least one percent of its SDP for research and development expenditure with immediate effect. Agrarian sector after liberalization had been facing multipronged crisis. The document stated that in shorter period, farmers should be freed from the tyranny of middlemen by reforming the rent seeking anti-farmer commission agents. In long run, Punjab government should step up efforts to pull out rural people out of agriculture by giving agro-processing industry a policy push. The rural economic transformation of Punjab economy was desired for long run goal of economic development. This transformation was possible if primary producers were integrated with both manufacturing and marketing activities for reaping the surpluses generated by them.

Singh (2012) examined the problems of lack of diversification and declining growth profitability and surpluses of Punjab agriculture. The study showed that during the period of 1960-61, about 29.6 per cent of GCA was under wheat which increased to 43.6 per cent during 1990-91 and it remained stable at 43 per cent during 2001-02. The GCA of paddy also increased from 4.8 per cent to 26.9 per cent which further increased to 31.30 per cent during same periods. The per cent of small and marginal farmer holdings increased from 38.65 per cent to 44.7 per cent during 1980-81 to 1990-91, which declined to 35.4 per cent and 29.69 per cent during 1995-96 and 2000-01 respectively. On the other hand, the share of medium and large farmer holdings increased during same period.

Singh et. al., (2012) described agricultural profile of the state. The share of agriculture in GSDP at constant prices declined from 17.51 percent in 2007-08 to 15.47 percent during 2010-11. The average size of holding which was 3.95 ha during 2004-05 declined marginally 3.78 ha during 2010-11. The cropping pattern was highly imbalanced as it was in favor of two cereals viz. rice and wheat only.

The per hectare consumption of chemical fertilizers (NPK) increased from 37.50 kg in 1970-71 to 246 kg in 2011-12. The consumption of pesticides had increased from 3200 metric tonne in 1980-81 to 6150 metric tonne in 2011-12. The cropping intensity increased from 187.9 per cent to 190 per cent during 2007-08 to 2010-11.

Sharma and Mohan (2013) studied that Punjab economy particularly its agricultural sector had gone through the process of commercialization and mechanization, consequent to which production and productivity of agriculture had undergone robust increase. However, green Revolution was only limited to its impact on large farmers. In overall Punjab economy, more particularly its agricultural sector was passing through severe economic crises. Slowing down of agricultural growth, paddy-wheat monoculture, over-exploitation of natural resources, ever increasing debt burden of the state farmers', rapidly rising labour force, declining land-man ratio, large use of pesticides and fertilizers, steep rise in land prices, inadequacy of financial facilities, poor human capital formation, infrastructural bottlenecks, increasing land degradation, increasing income inequalities, farmer suicides and declining public expenditure on agricultural growth were the major issues identified in the study which were creeping in the state's economy. The study suggested that there was an immediate need to diversify overall economic base of the state, instead of attempting it only in terms of crop diversification. The thorough diversification coupled with a well-synchronized system of technological-cum-infrastructural-cum-institutional mechanism for the entire economy of the state could prove to be an ultimate solution to deal with the various socio-economic issues that the state was facing.

Chapter 3

Database and Methodology

This chapter describes the various sources of data used in the study and methodology for analyzing the data. An attempt has also been to define some of the key terms used in analysis of the data in this chapter.

3.1 Database

The study is carried out by using the secondary data only. The secondary data on different variable used in the study is taken from the different sources. The various sources of the secondary data used are: various issues of Statistical Abstract of Punjab, Agricultural Statistics at a Glance, Report of Environment Statistics of Punjab, various national level data sources such as RBI's Handbook of Statistics on Indian Economy, RBI's documents, Planning Commission Reports, Human Development Report of India, Annual Survey of Industries, UNDP reports, CSO (Central Statistical Organization), Census of India etc. Some of the online data sources used were: indiastat.com, [CMIE \(Centre for Monitoring Indian Economy\)](http://cmie.org), rbidoc.rbi.org.in, planingcommision.nic.in etc. Various research articles and journals on Punjab economy were also used to corroborate the findings.

3.2 Methodology

The study has been carried out by using the secondary data for the period 1980-81 to 2011-12. In order to compare the economic performance of Punjab in terms of per capita income, Gross State Domestic Product (GSDP), Net State Domestic Product (NSDP), Human Development Index (HDI), an analysis of Punjab economy is made with other 14 major states of India. The data was taken from these states only as these together accounts for more than 90 percent of population in India.

3.3 Key Terms Used

This study used various socio-economic factors like GSDP, NSDP, per capita income, public expenditure, work force structure, gross state capital formation, human development index etc. for analyzing structural changes in Punjab economy. The major indicators used for describing pattern of agricultural

development are: operational holdings, land utilization pattern, cropping pattern, area, yield and production of different crops, etc. The short details of some major factors are listed below:

3.3.1 Gross State Domestic Product (GSDP)

Estimates of State Domestic Product are regarded as the most important single economic indicator to measure the economic development of a state. It measures in monetary terms, the volume of all goods and services produced within the boundaries of the state during a given period accounted without duplication (GOP, 2009).

3.3.2. Net State Domestic Product (NSDP)

State Income (Net State Domestic Product/NSDP) and District Income (Net District Domestic Product/NDDP) is defined in exactly the similar manner as the net domestic product for the country, i.e. it is equal to the income generated by the production of goods and services within the geographical boundaries of a State or a district, as the case may be. This is arrived at by netting the gross state/district domestic product estimates (GSDP/GDDP) by the consumption of fixed capital (CFC) (CSO, 2008).

3.3.3 Per Capita Income

Per Capita Income is obtained by dividing the NSDP (State Income) by mid-year projected population of the state and is in contrast to the Per Capita National Income which is obtained by dividing the Net national Product (NNP) by the mid-year population of the country. Thus compilation of Per Capita State Income is based on income originating approach whereas compilation of Per Capita National Income is based on income accruing approach. Similarly the per capita district income is obtained by dividing the Net District Domestic Product (NDDP) by mid-year projected population of the district (CSO, 2008).

3.3.4 Development and Non-Development Expenditure

All expenditure relating to revenue accounts, capital outlay and loans and advances are categorized into social services, economic services and general services. While social and economic services constitute development expenditure, expenditure on general services is treated as non-development expenditure (RBI, 2013).

3.3.5 Capital Expenditure

General Financial Rule 79 defines capital expenditure as “significant expenditure incurred with the object of acquiring tangible assets of a permanent nature (for use in the organization and not for sale in the ordinary course of business) or enhancing the utility of existing assets. The rule requires that “capital expenditure and revenue expenditure shall be shown separately in the accounts”. Capital expenditure should relate to creation of assets and be determined by ownership criterion (Planning Commission, 2011).

3.3.6. Gross Domestic Capital Formation

Gross capital formation consists of the acquisition of fixed assets and the accumulation of stocks. Fixed assets are physical productive assets, examples of which are buildings, civil works, machinery, vehicles etc. The stock accumulation is in the form of changes in stock of raw materials, fuels, finished goods and semi-finished goods awaiting completion. Thus gross capital formation is that part of country's total expenditure which is not consumed but added to the nation's fixed tangible assets and stocks (CSO, 2008).

3.3.7 Main Workers

Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are termed as main workers (www.censusindia.gov.in).

3.3.8. Small Scale Industries and Medium Scale Industries or Enterprises

A small enterprise is an enterprise where the investment in plant and machinery is more than Rs 25 lakh but does not exceed Rs 5 crore. On the other hand, a medium enterprise is an enterprise where the investment in plant and machinery is more than Rs 5 crore but not exceed Rs 10 crore (RBI, 2013).

3.3.9 Human Development Index (HDI)

The Human Development Index (HDI) is a composite index of outcome indicators in three dimensions:

- A long and healthy life, as reflected in life expectancy at birth.
- The acquisition of education and knowledge as reflected in the mean years of schooling (adjusted for out of school children) and literacy rate (age 7 years and above).
- The standard of living and command over resources, as reflected in the monthly per capita expenditure adjusted for inflation and inequality.

HDI is a simple average of three indices in different dimensions, given as under:

$$\text{HDI} = \frac{1}{3} (\text{Health Index} + \text{Education Index} + \text{Income Index})$$

(Planning Commission, 2011a)

3.3.10. Operational Holding

All land which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others without regard to title, legal form, size or location is called operational holdings (<http://agcensus.nic.in>).

3.3.11 Gross Cropped Area

This represents the total area covered with crops, i.e. the sum total of areas covered by all the individual crops; areas sown with crops more than once during the year being counted as separate areas for each crop (<http://agricoop.nic.in>).

3.3.12 Net Sown Area

The net area sown was defined as the difference between the total geographical area of all plots of land of the holding and the sum of the areas of land under (1) forest, (2) barren and uncultivable wastes, (3) put to non-agricultural uses, (4) cultivable wastes, (5) permanent pastures and other grazing land, (6) miscellaneous tree crops excluding orchards and (7) all type of fallow lands (<http://mospi.nic.in>).

3.3.13 Cropping Intensity

Cropping intensity is defined as a ratio of gross cropped area to net sown area (Statistical Abstract of Punjab, 2012).

$$\text{Cropping Intensity} = \frac{\text{Gross Cropped Area}}{\text{Net Area Sown}} \times 100$$

3.3.14 Gross Area Irrigated

An irrigated plot growing crop in more than one season, is counted as many times as it is cropped to arrive at gross area irrigated (<http://mospi.nic.in>).

3.3.15 Net Irrigated Area

The total of all the areas irrigated from different sources, counting each area irrigated only once even though it was irrigated more than once in the same year (<http://mospi.nic.in>).

3.4 Analytical Tools Used

The data on GSDP and NSDP was spliced to 2004-05 constant prices (see 3.4.1). Besides, data is also analyzed by using the simple statistical tools such as mean, percentage change, compound annual growth rate etc. only.

3.4.1 Splicing GDP/NSDP

All the data on GSDP and NSDP at different constant prices was converted to 2004-05 prices. For this, GSDP and NSDP data on previous old series (e.g. say 1999-00) was multiplied by the conversion factor which was calculated as a ratio of sum of GSDP/NSDP data for the current base year for the years common in current base year and previous base year to sum of GSDP/NSDP data for the previous base year for the years common in current base year and previous base year. It has been worked out separately for each sub sectors in the economy.

$$\text{Conversion factor} = \frac{\sum_{i=1}^j (\text{GDP})_{\text{new}}}{\sum_{i=1}^j (\text{GDP})_{\text{old}}}$$

Where,

J= number of years common between new and old series of GSDP/NSDP.

3.3.2 Compound Annual Growth Rate (CAGR)

The percentage increase or decrease by a constant change per annum is called as the CAGR. The CGR has been worked out in the analysis from the different variables used in the study by the following formula.

$$\text{Log } Y = AB^t$$

$$\text{Log } Y = (\text{Antilog} - 1) \wedge^* 100$$

Y= Dependent Variable

A and B = Parameters

t = Time

Chapter 4

Structural Changes in Punjab Economy- An Analysis of Socio-Economic Indicators

Structural changes describe relative contribution of different sectors in an economy. A detailed analysis of structural changes taken place in Punjab has been carried out in this chapter. An attempt has also been made to compare the state's economic performance with other major Indian states.

4.1 Sectoral Distribution of Gross State Domestic Product (GSDP)

The character of Punjab economy during pre-reform period was fundamentally agrarian. The contribution of primary sector in Gross State Domestic Product (GSDP) was 40 per cent each in 1980-81 and 1990-91. But, during post-reform period, share of primary sector in GSDP had come down. It was 34.55 percent during 2000-01, which further declined to 25 percent during 2009-10. In primary sector, share of agricultural sector in GSDP had drastically declined from 29.11 percent in 1980-81 to 15.93 percent in 2009-10. The livestock sector had shown an increasing trend from 1980-81 to 2000-01. The share of livestock sector in GSDP was 8.42 percent in 1980-81, which increased to around 9.5 percent each during 1990-91 and 2000-01. But, it declined to 7.82 percent during 2009-10. The share of forestry and logging in GSDP was 2.45 percent in 1980-81. After that, it declined to 1.6 percent in 1990-91, 1.46 percent in 2000-01 and only one percent in 2009-10. Fishing sector in Punjab had witnessed slight improvement. Its share in GSDP had improved from 0.03 percent in 1980-81 to 0.24 percent in 2009-10. The share of mining and quarrying in GSDP was negligible during entire period of 1980-81 to 2009-10.

The performance of secondary sector was good particularly during the post-reform period. The share of secondary sector in GSDP was only 17 percent in 1980-81 and it increased to 20.5 percent during 1990-91. Its share in GSDP increased to 25 percent during 2000-01 and to 31 percent during 2009-10. In secondary sector, manufacturing sector had emerged as greatest contributor. The share of manufacturing sector in GSDP was 8.46 percent during 1980-81 which increased to 13 percent during 1990-91, 16 percent during 2000-01 and 20 percent during 2009-10. The share of electricity, gas, and water supply; and construction in GSDP improved only marginally from 1980's to 1990's. The share

of tertiary sector was improved marginally only. The share of tertiary sector in GSDP was 42.9 percent during 1980-81 which increased marginally to 44 percent during 2009-10. In service sector, share of trade, hotels and restaurants was the largest (11.22 percent) followed by other services and sanitary services (9.40 percent); banking and insurance (6.89 percent); transport, storage and communication (6.77 percent), real estate ownership of dwellings (4.97 percent) and public administration (4.88 percent) during the 2009-10. Among all the components of tertiary sector, trade, hotel and restaurant; real estate and ownership of dwellings; and other services and sanitary services had witnessed a decline in share in GSDP. The share of tertiary sector components such as transport, storage and communication, banking and insurance and public administration had increased in GSDP from pre-reform to post-reform period. From above analysis, it is clear that the structure of Punjab economy has systematically changed from agrarian sector to more diversified industrial and tertiary sectors (Table 4.1).

4.2 Sectoral Growth Rate of GSDP

The growth experience of different sectors in Punjab shows that growth rate in primary sector was 4.72 percent during 1980's which declined to 2.4 percent during 1990's and 2.2 percent during 2000's. In primary sector, agriculture sector was the engine of growth and a major contributing sector of GSDP during 1980's. The growth rate of agriculture sector in GSDP was 4.78 percent during 1980's. It decreased to 1.4 percent during 1990's with marginally increase to 1.56 percent in 2000's. The growth rate of livestock was 5.59 percent in 1980's. It declined to 5.1 percent in 1990's and 3.75 percent during 2000's. Growth rate in forestry and logging was negative (-0.09 percent) during 1980's. It increased to 2.8 percent in 1990's but again decreased to 1.43 percent during 2000's. Growth rate in fishing sector was 12.80 percent during 1980's which increased to 18 percent during 1990's. In 2000's, it witnessed a sharp decline and its growth rate decreased to 5.64 percent.

The growth rate of secondary sector increased from 6.7 percent in 1980's to 7.3 percent during 1990s and to 9.31 percent during 2000's. In secondary sector, growth rate of manufacturing sector was 9.14 percent during 1980's. But, in 1990's, its growth rate declined to 7.4 percent but it again rose to 9.14 percent

during 2000's. Growth rate of electricity, gas and water supply was 6.20 percent during 2000's as against 5.8 percent in 1990's and 10.34 percent in 1980's. The construction sector witnessed highest growth among all the secondary sectors. Its growth rate increased from 0.78 percent in 1980s to 11.25 percent during 2000's.

Table 4.1
Sectoral Distribution of State Domestic Product (in %)(at 2004-05 prices)

Sectors	1980-81	1990-91	2000-01	2009-10
Agriculture	29.11	28.83	23.27	15.93
Livestock	8.42	9.50	9.59	7.82
Forestry and logging	2.45	1.60	1.46	1.01
Fishing	0.03	0.07	0.22	0.24
Mining and quarrying	0.01	0.02	-	0.02
Sub-total of primary	40.02	40.03	34.55	25.03
Manufacturing	8.46	12.87	16.44	20.11
Electricity, gas and water supply	1.92	2.95	3.09	3.00
Construction	6.70	4.74	5.56	7.73
Sub- total of secondary	17.07	20.55	25.08	30.84
Trade, hotels and restaurants	13.37	11.35	11.69	11.22
Transport, storage and communication	2.04	2.67	4.38	6.77
Banking and insurance	1.45	2.89	4.28	6.89
Real estate, ownership of dwellings	9.24	7.36	5.91	4.97
Public administration	3.11	3.93	4.64	4.88
Other services and sanitary services	13.70	11.23	9.46	9.40
Sub- total of tertiary	42.91	39.42	40.37	44.13

Source: Statistical Abstract of Punjab (Various Issues); www.indiastat.com

Like secondary sector, tertiary sector share in GSDP growth rate increased from 3.88 percent in 1980's to 5 per cent in 1990's and 6.55 percent in 2000's. In this sector, growth rate of trade, hotels and restaurants was 3.20 percent during 1980's which increased to 4.8 percent in 1990's and 5.26 per cent in 2000's. Banking and insurance sector performed better in 1980's as its growth rate was 12.33 percent during 1980s, but it came down to 10.8 percent during 1990's and again slightly improved to 11.7 percent during 2000s. Growth rate of real estate and ownership of dwelling was almost stable at 2 percent during 1980's and 1990's. In 2000's, its growth rate increased to 3.68 per cent. Growth rate of public administration was 6.91 percent in 1980's. In 1980's and 2000's, its growth rate was 7.1 percent and 5.76 percent respectively. Growth rate of other services was 2.50 percent in 1980's and 2.9 percent in 1990's which improved to 5.13 percent in 2000's. Thus, the analysis shows that different sectors show a change in economic structure over the period 1980-2000. Major sub-sectors like agriculture and livestock, mining and quarrying in primary sector; manufacturing, electricity gas and water supply in secondary sector; and banking and insurance, and real estate in tertiary sector showed deceleration of the growth process in the nineties compared with the eighties and the worst performance was of agriculture sector (Table 4.2).

Figure 4.1 describes the sectoral performance of Punjab during 1980-81 to 2009-10. This figure shows that growth rate of GSDP was highest in the fishing sector (15.25 percent) followed by banking and insurance (9.84 percent), transport storage and communication (9.74 percent), manufacturing (7.19 percent), public administration (6.88 percent). The growth rate was lowest in forestry and logging, real estate, agriculture and other services in that order.

4.3 Gross State Domestic Capital Formation

Punjab economy has been facing a chronic shortage of investment in capital formation over the last three decades. The investment-GSDP ratio remained below 20 per cent, which is the lowest among the 14 major states of India (CDEIS, 2012). The ratio of Gross State Domestic Capital Formation (GSDCF) with Gross State Domestic Product (GSDP) increased only marginally from 4.09 percent to 6.21 percent, while that in case of secondary sector increased from 23 per cent to 31 per cent and in case of tertiary sector declined

from 18 per cent to 13 per cent from 1980-81 to 2009-10. Thus, ratio of GSDCF to GSDP was highest in secondary sector (30.7 per cent) followed by tertiary (13 per cent) and primary sector (6.2 per cent) during 2009-10. Thus, state government is not giving any attention to the primary sector in general, agriculture and allied sectors in particular, which is reflected in meagre share of GSDCF in GSDP. The secondary sector witnessed an increase in share of GSDCF in GSDP which was also reflected in its better growth during 2000-01 to 2009-10 (9.3 per cent). Although GSDCF-GSDP ration in tertiary sector has declined, but this sector has grown by around 6 per cent during 2000-01 to 2009-10. Overall, GSDCF-GSDP ratio has initially increased from 13.2 per cent during 1980-81 to 18.7 per cent during 1990-91, but after that it declined to 17.7 per cent in 2000-01 and only 16.8 per cent during 2009-10. A comparison of GSDCF-GSDP ratio of Punjab with India reveals that the ratio is 16.7 per cent for Punjab in comparison with 40.2 per cent for India during 2009-10 (GOP, 2010-11).

4.4 Plan-wise Pattern of Sectoral Expenditure

Plan-wise expenditure on various sectors during sixth plan to eleventh plan reveals the predominance of expenditure on the irrigation and power sector. In the sixth plan, 60.24 per cent of the total expenditure was on this sector. It increased to 66.06 percent during the seventh plan. Subsequently, the proportion of expenditure on both irrigation and power sectors has declined. In the ninth plan and eleventh plan, it came down to 52.37 per cent and 32.53 per cent respectively. The share of expenditure on social and community services increased from 16.25 percent in the sixth plan to 28.59 percent during the eleventh plan period. The expenditure on agriculture and allied sectors has come down from 10.69 percent in the sixth plan to 2.98 percent during tenth plan period. Though, it slightly increased to 3.21 percent during eleventh plan period. The share of expenditure on transport and communication had increased from 3.68 percent during eighth plan to 20.24 percent during eleventh plan. The science and technology also started to assume importance as expenditure on it increased from negligible during sixth plan period to 0.50 percent during eleventh plan period. The expenditure on industry and minerals had come down to 0.16 percent during eleventh plan period from 3.92 per cent during sixth plan period. Thus, the sectoral

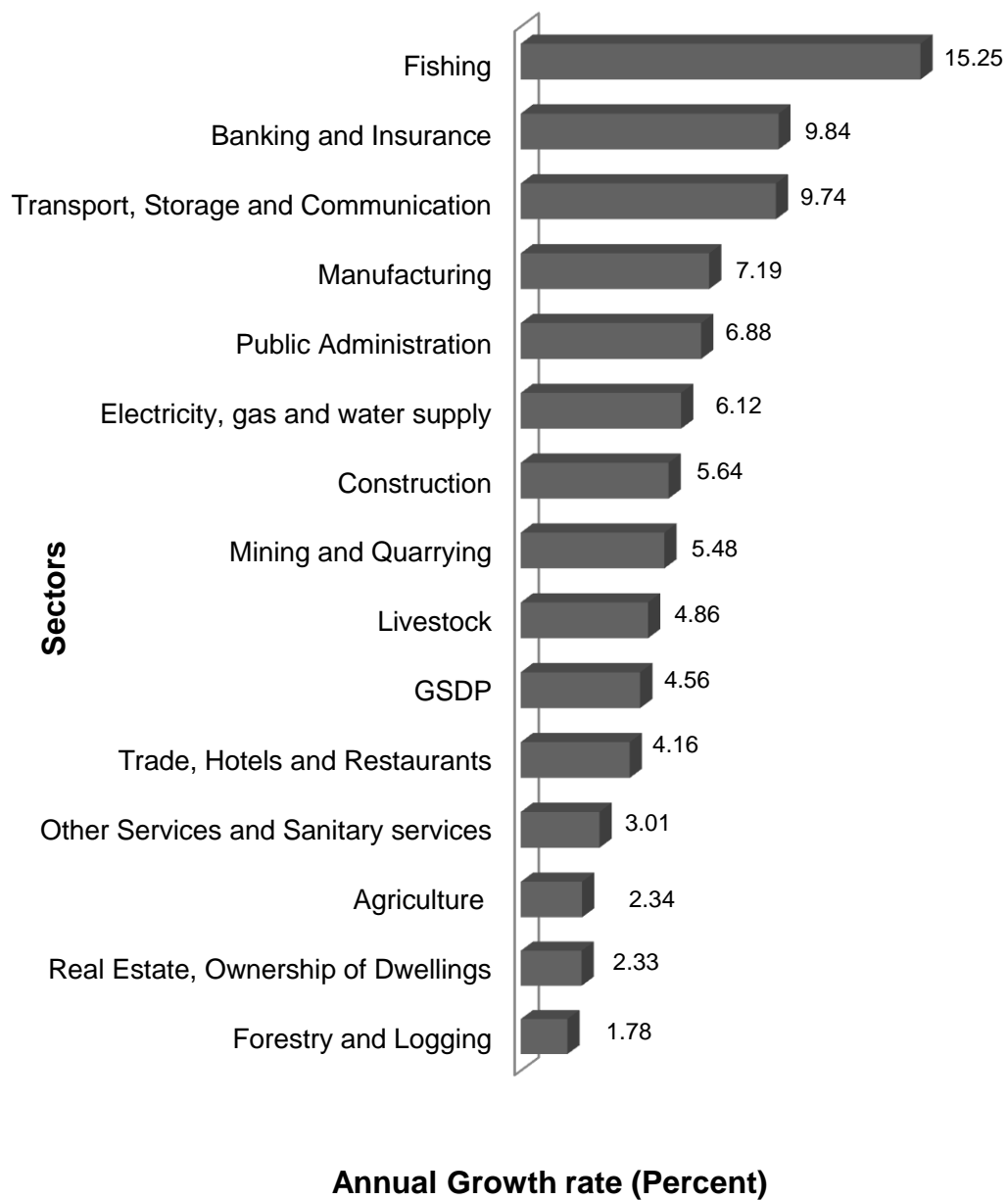
Table 4.2
Sector-wise Growth Rate in Punjab during Pre- and Post Reform Period
(At 2004-05 prices)

Sectors	1980-81 to 1989-90	1990-91 to 1999-00	2000-01 to 2009-10	1991-92 to 2009-10
Agriculture	4.78	1.4	1.56	1.40
Livestock	5.59	5.1	3.75	4.07
Forestry and logging	-0.09	2.8	1.43	2.80
Fishing	12.80	18.0	5.64	11.58
Mining and quarrying	15.19	-13.1	17.30	10.70
Sub-total of primary	4.72	2.4	2.24	2.25
Manufacturing	9.14	7.4	9.14	6.46
Electricity, gas and water supply	10.34	5.8	6.20	4.86
Construction	0.78	7.9	11.25	9.04
Sub-total of secondary	6.69	7.3	9.31	6.84
Trade, hotels and restaurants	3.20	4.8	5.26	5.12
Transport, storage and communication	7.34	10.1	10.33	11.69
Banking and insurance	12.33	10.8	11.71	10.34
Real estate, ownership of dwellings	2.96	2.2	3.68	2.76
Public administration	6.91	7.1	5.76	6.08
Other services and sanitary services	2.50	2.9	5.13	3.65
Sub-total of tertiary	3.88	5.0	6.55	5.74
GSDP	4.74	4.5	5.98	4.83

Source: Statistical Abstract of Punjab (Various Issues); www.indiastat.com

Figure 4.1: Sectoral Rates of Growth in Punjab 1980-81 to 2009-10 (at 2004-05 constant prices)

■ 1980-81 to 2009-10



Source: Statistical Abstract of Punjab (Various Issues); www.indiastat.com

Table 4.3

Gross State Domestic Capital Formation by Industry of use in Punjab at Constant Prices (2004-05) Ratio with GSDP at Constant Prices (2004-05)

Industries	1980-81	1990-91	2000-01	2009-10
Agriculture and live stock	4.13	5.23	6.34	6.52
Forestry and logging	3.53	2.21	1.26	0.50
Fishing, mining and logging	3.56	1.63	0.26	0.18
Primary sector	4.09	5.10	6.09	6.21
Manufacturing	27.36	44.59	30.50	38.15
Construction	0.64	0.46	0.98	5.31
Electricity, gas and water supply	85.69	90.60	46.23	46.92
Secondary sector	23.43	41.02	25.90	30.77
Transport, storage and communication	42.03	42.38	23.57	28.36
Trade, hotel and restaurant	32.45	43.69	42.23	12.57
Banking and insurance	5.79	2.88	5.77	2.51
Real estate, ownership of dwellings	5.55	5.54	5.45	5.05
Public administration	49.99	40.21	51.25	36.73
Other services and sanitary services	2.42	1.02	2.17	1.89
Tertiary sector	17.90	20.99	22.61	12.97
State	13.32	18.75	17.73	16.77

Source: Statistical Abstract of Punjab (Various Issues); www.indiastat.com

expenditure was the least on industry and minerals during eleventh plan. The expenditure on rural development was increased from seventh plan to tenth plan period, but subsequently, it decreased to 2.43 percent in eleventh plan period. General economic services and general services also assumed significance during eleventh plan period. The %age sectoral expenditure on these two sectors increased from 0.03 and 0.74 respectively in sixth plan to 1.84 and 1.54 respectively in eleventh plan. Government also gave stress on special area programs. The expenditure on these programmes was 8.95 per cent, which was negligible earlier. The deceleration of economic growth of Punjab has been rooted in declining development expenditure. Thus, during sixth plan period, sectoral expenditure was the highest on irrigation and power followed by social and community services, agriculture and allied sectors. However, during eleventh period, the expenditure was the highest on irrigation and power followed by social and community services, transport and communication, special area programme, agriculture and allied sectors (Table 4.4).

4.5 Different Types of Expenditure

The rate of growth of the economy also depends on expenditure of the state government. Table 4.5 shows the different types of expenditure by the government. The budgetary expenditure of government continuously increased from Rs. 549.53 crore in 1980-81 to Rs. 41166.66 crore during 2012-13. The division of budgetary expenditure between development (which include expenditure on social services like education, sports, art and culture, medical and public health, family welfare etc and on economic services like agriculture and allied activities, rural development, special area programs) and non-development expenditure (which include expenditure on fiscal services like collection of taxes and duties etc and secretariat-general services and grants-in-aid) heads shows that the development expenditure of the state government increased from Rs. 395.25 crore to Rs 22345.03 crore during the period of 1980-81 to 2012-13. On the other hand, the non-development expenditure of government increased from Rs. 154.28 crore to Rs. 19,237.40 crore during 1980-81 to 2010-11 but, it declined to Rs. 18,193.33 crore during 2011-12 and marginally increased to Rs 18,821.63 crore during 2012-13.

Table 4.4
Plan-wise Sectoral Expenditure in Punjab (Rs. in lakh.)

Major Sectors	VI (1980-85)	VII (1985-90)	VIII (1992-97)	IX (1997-02)	X (2002-07)	XI (2007-12)
Agriculture and Allied Services	20217.51 (10.69)	28058.06 (7.91)	36791.8 (5.40)	45157.52 (4.62)	40648.74 (2.98)	105075.94 (3.21)
Rural Development	-	7523.82 (2.12)	18119.04 (2.66)	43291.21 (4.43)	147845.61 (10.86)	79344.9 (2.43)
Co-operation	3957.47 (2.09)	-	-	-	-	-
Special Area Programme	-	2247 (0.63)	5405.99 (0.79)	8961.74 (0.92)	11003.79 (0.81)	292852.83 (8.95)
Irrigation and Power	113900.43 (60.24)	234309.43 (66.06)	401021.07 (58.81)	511502.56 (52.37)	526041.32 (38.62)	1063936.1 (32.53)
Industry and Minerals	7413.98 (3.92)	14901.46 (4.20)	18466.39 (2.71)	7309.77 (0.75)	16125.08 (1.18)	5234 (0.16)
Transport and Communication	11408.64 (6.03)	14121.58 (3.98)	25073.71 (3.68)	52529.51 (5.38)	182825.04 (13.42)	661974.84 (20.24)
Science Technology and Environment	-	260.78 (0.07)	244.29 (0.04)	302.83 (0.03)	1125.18 (0.08)	16455.73 (0.50)
Social and Community Services	30718.21 (16.25)	47653.32 (13.44)	155684.81 (22.83)	276813.26 (28.34)	331930.21 (24.37)	934919.99 (28.59)
General Economic Services	64.98 (0.03)	2531.81 (0.71)	7851.83 (1.15)	19418.9 (1.99)	90296.25 (6.63)	60292.67 (1.84)
General Services	1405.25 (0.74)	3077.28 (0.87)	13274.83 (1.95)	11424.43 (1.17)	14100.82 (1.04)	50386.95 (1.54)
Total	189086.47 (100.00)	354683.91 (100.00)	681933.76 (100.00)	976711.73 (100.00)	1361942.04 (100.00)	3270473.96 (100.00)

Source: Statistical Abstract of Punjab, 2012

The capital expenditure of government which is considered as the central force to create capacity in social and economic infrastructural facilities for the use of productive sectors of the economy (Singh and Singh, 2002) had increased from Rs. 267 crore to Rs. 2397.74 crore during 1980-81 to 2000-01 but, declined to Rs 2244.28 during 2005-06 and further increased from Rs 4162.84 crore to Rs

8743.88 crore during 2010-11 to 2012-13. However, growth in capital expenditure was 12.9 percent in 1980's which declined to 10.3 percent in 1990's and only 7.7 percent in 2000's. The ten years growth rate of expenditure shows that the budgetary expenditure of state declined from 16.46 percent in 1980's to 15.03 percent during 1990's and to 10.87 percent during 2000's. The growth rate of development expenditure was 15.85 percent during 1980's which declined to 10.51 percent during 1990's though it slightly increased to 12.88 percent during 2000's. The growth rate in non-developmental expenditure increased from 17.75 percent during 1980's to 21.92 percent during 1990's and declined to 9.21 percent during 2000's. Thus, during 1980-81 to 1999-00, growth in non development expenditure was higher relative to the development expenditure. However, since 2000-01, growth of development expenditure is more than non-development expenditure which shows the survival of Punjab economy (Table 4.5).

Table 4.5
Different Types of Expenditure in Punjab (in crores)

Years	Budgetary Expenditure	Development Expenditure	Non-Development Expenditure	Capital Expenditure
1980-81	549.53	395.25	154.28	267
1985-86	1162.9	773.19	389.71	800.27
1990-91	2519.91	1635.98	883.93	879.62
1995-96	5634.99	2552.94	3,082.05	1368.66
2000-01	11712.83	5093.22	6,619.61	2397.74
2005-06	18208.40	7318.13	10,890.27	2244.28
2010-11	32897.19	13659.79	19,237.40	4162.84
2011-12	36599.43	18406.1	18,193.33	6138.14
2012-13	41166.66	22345.03	18,821.63	8743.88
Compound Annual Growth Rate				
1980-81 to 1989-90	16.46	15.85	17.75	12.89
1990-91 to 1999-00	15.03	10.51	21.92	10.26
2000-01 to 2012-13	10.87	12.88	9.21	7.71
1980-81 to 2012-13	14.64	12.46	17.53	9.30

Source: www.rbidocs.rbi.org.in, www.statesofindia.cmie.com, www.planningcommission.nic.in

The proportion of different types of expenditures with NSDP also showed similar results. According to percentage of different types of expenditure with NSDP at current prices shows that the capital expenditure declined sharply from 6 percent in 1980-81 to 2.06 percent of NSDP during 2010-11. It increased marginally to 2.64 percent during 2011-12 and to 3.31 percent during 2012-13. The share of budgetary expenditure of NSDP increased from 12.35 percent to 18.99 percent from 1980-81 to 2005-06 but after that it declined to 15.56 percent during 2012-13. The share of developmental expenditure in NSDP declined from 8.88 percent in 1980-81 to 6.76 percent in 2010-11. After that it increased to 8.45 percent in 2012-13. The share of non-developmental expenditure in NSDP increased from 3.47 percent to 11.36 percent during 1980-81 to 2005-06 but declined from 9.52 percent to 7.11 percent during 2010-11 to 2012-13. Thus, evidently proportion of development expenditure in NSDP declined, while that of non-development expenditure in NSDP increased from 1980-81 to 2005-06. After that, proportion of development expenditure in NSDP started rising while that of non-development expenditure started falling. Thus, during 2012-13, the proportion of development expenditure in NSDP was 8.45 percent, while that of non-development expenditure was 7.11 percent which suggested that economy is showing signs of revival (Table 4.6).

Table 4.6
Percentage of Different Types of Expenditure with NSDP

Years	BE as % of NSDP	DE as % of NSDP	NDE as % of NSDP	CE as % of NSDP
1980-81	12.35	8.88	3.47	6.00
1985-86	13.93	9.26	4.67	9.59
1990-91	15.05	9.77	5.28	5.26
1995-96	16.47	7.46	9.01	4.00
2000-01	17.28	7.51	9.77	3.54
2005-06	18.99	7.63	11.36	2.34
2010-11	16.28	6.76	9.52	2.06
2011-12	15.74	7.92	7.82	2.64
2012-13	15.56	8.45	7.11	3.31

Note: BE-Budgetary Expenditure, DE-Development Expenditure, NDE-Non development Expenditure, CE-Capital Expenditure, CAGR-Compound Average Growth Rate, NSDP-Net State Domestic Product (at current prices).

Source: www.rbidocs.rbi.org.in, www.statesofindia.cmie.com, www.planningcommission.nic.in, Statistical Abstract of Punjab (Various Issues)

4.6 Structure of Work Force

The structure of main work force in Punjab has changed over the period of time (1981 to 2011). The main workers are those workers who worked for more than six months in a year (Census of India, 2011). The work force engaged in agriculture (cultivators and labourers) was 58.02 percent in 1981, which declined to 56.07 percent during 1991, 38.94 percent during 2001 and further declined to 35.17 percent during 2011 census respectively. Industrial workers were also declined according to 1981 to 2011 census data. During 1981, 13.50 percent workers were engaged in industrial sector, which declined to 12.28 percent in 1991, 3.66 percent in 2001 and 3.56 percent during 2011. The work force increased in 'Other sectors'. All workers who have been engaged in some economic activity during the last one year, but are not cultivators, agricultural labourers or in household industry are classified as 'Other Workers (OW)' in Census of India, 2011. The type of workers that come under this category include all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport, banking, mining, construction, political or social work, priests, entertainment artists etc. In 1981, 28.47 percent workers were in 'other workers' category, which increased to 31.65 percent in 1991, 57.40 percent in 2001 and 61.28 percent during 2011. The above analysis shows that the work force increased in 'other sectors', while the major two sectors (agriculture and industrial sectors) had witnessed decline in work force (Table 4.7).

Table 4.7
Structure of Work Force of Main Workers in Punjab

Workers	1981	1991	2001	2011
Cultivators	1767286 (35.86)	1917210 (31.44)	2065067 (22.62)	1803860 (21.35)
Agriculture labour	1092225 (22.16)	1502123 (24.63)	1489861 (16.32)	1168021 (13.82)
Industrial workers	665442 (13.50)	749136 (12.28)	333770 (3.66)	300660 (3.56)
Other workers	1402806 (28.47)	1929905 (31.65)	5238776 (57.40)	5178395 (61.28)
Total workers	4927759 (100.00)	6098374 (100.00)	9127474 (100.00)	8450936 (100.00)

Source: Gill and Singh, 2005; Census of India, 2011

4.7 Performance of Industrial Sector

The growth of industrial sector is given in Table 4.8. The SSI flourished during 1980-81 to 1989-90 as the growth rate of SSI was 13.9 percent as against 5.2 percent in case of large and medium industries. However, during 1990-91 to 1999-00, it was large and medium industrial units which grow better than small scale industries. The growth rate during this period was 6.5 percent in large and medium units as compared to around 2 percent in small scale industries. Consequently, employment during 1980-81 to 1989-90 was also higher in small scale industries (10 percent) as compared to large and medium units (4.7 percent). During 1990-91 to 1999-00, growth in employment was also slightly higher in case of small scale industries as compared to large and medium units (2.81 percent). A major change was observed in number of units and employment after 2000-01. During 2000-01 to 2009-10, both small scale industries and large and medium industries declined rapidly. The decline was much sharp in case of large and medium units (7 percent) as compared to small scale units (2.8 percent). As a result, growth in employment declined in large and medium units (-0.64 percent), while growth in employment was only 0.77 percent in small scale industrial units. Thus, number of industrial units declined after 2000-01. Growth in employment also witnessed a gradual decline. The level of growth of investment and production in large and medium and small scale industrial units was quit high during 1980-81 to 1999-2000. But both declined in between 2000-01 to 2009-10. Thus, the above analysis clearly points that industrial growth has slowed down particularly after 2000-01 period in term of decline in number of units, decline in employment in large and medium units, decline in growth of investment and production (Table 4.8).

Table 4.8
Performance of Industrial Sector in Punjab

Year	Units (No.)			Employment (No.)			Investment (Crore)			Production (Crore)		
	L & M	SSI	Total	L & M	SSI	Total	L & M	SSI	Total	L & M	SSI	Total
1980-81	228	43338	43566	109767	264869	374636	727.42	332.12	1059.54	1141.07	1118.44	2259.51
1990-91	373	160368	160741	187311	668845	856156	4003.8	1348.78	5352.58	7163.69	4049.84	11213.53
2000-01	629	200603	201232	229626	897642	1127268	16435.07	4109.14	20544.21	26577.08	18324.5	44901.58
2009-10	367	160062	160429	223995	978932	1202927	34693.82	6914.72	41608.54	59500.91	46357.44	105858.35
Average Compound Growth Rate												
1980-81 to 1989-90	5.25	13.91	13.88	4.67	10.08	8.73	17.02	15.05	16.40	17.56	12.69	15.38
1990-91 to 1999-00	6.49	1.99	2.00	2.81	2.97	2.94	17.38	12.17	16.23	17.80	17.70	17.80
2000-01 to 2009-10	-7.06	-2.78	-2.80	-0.64	0.77	0.50	8.38	5.21	7.80	10.12	10.69	10.36

Source: www.indiastat.com

4.8 Production and Employment Pattern in Different Industries

The pattern of production and employment in different industries shows the changes in the manufacturing sector in an economy. Table 4.9 shows the structure of production and employment in manufacturing industries in Punjab. This table shows that share of food product industries in production which was 22.70 percent during 1980-81, continuously decreased to 12.94 percent during 2009-10 period. The share of beverage and tobacco products, woolen textile silk synthetic including art silk hosiery, chemical and chemical products, basic metal and alloy industry and electrical machine apparatus, appliance supplies and parts in production decreased from 1.28 to 0.67 percent, 15.66 to 2.90 percent, 7.86 to 1.85 percent, 10.90 to 6.79 percent and 3.49 to 1.99 percent respectively from 1980-81 to 2009-10. On the other hand, production of cotton textile; wood and wood products; paper and paper products; printing publishing and allied industries; lather and fur products, rubber, plastic, petroleum, coal and products; non-metallic mineral products; metal product; machinery except electrical machinery; other industries; and repair and personal service increased from 6.72 percent to 21.66 percent, 1.1 percent to 1.51 percent, 0.86 percent to 2.11 percent, 2.19 percent to 3.01 percent, 2.02 percent to 3.02 percent, 1.18 percent to 2.90 percent, 5.36 percent to 8.30 percent, 7.21 percent to 8.63 percent, 1.59 percent to 3.15 percent and 0.22 percent to 0.37 percent respectively. The employment status of different industries shows that the share of work force in food products industries increased from 9.72 percent to 17.87 percent during 1980-81 and 2009-10 periods. The share in employment from 1980-81 to 2009-10 increased in some of industries such as beverage tobacco and tobacco products (1.28 percent to 1.53 percent), cotton textile (8.18 percent to 18.34 percent), paper and paper products printing publishing and allied industries (1.53 percent to 2.28 percent), chemical and chemical products (3.43 percent to 10.79 percent), basic metal and alloy industry (7.59 percent to 12.23 percent), and some other industries (1.53 percent to 2.98 percent). During 1980-81 and 2009-10, share in employment declined for some of the industries such as woolen textile silk synthetic including art silk hosiery (19.98 percent to 3.24 percent), wood and wood products furniture and fixture (2.36 percent to 1.22 percent), leather and fur products (2.28 percent to 0.43 percent), non-metallic mineral products (2.26 percent to 1.65 percent), metal product (12.68

percent to 3.18 percent), machinery except electrical machinery (7.93 percent to 6.09 percent), electrical machine apparatus appliance supplies and parts (2.65 percent to 1.25 percent), transport equipment and parts (13.09 percent to 11.28 percent) and repair and personal service (1.15 percent to 0.37 percent) respectively. The share of employment and production of manufacturing of furniture, manufacturing of NEC (Not elsewhere classified) were 0.85 percent and 4.46 percent during 2009-10 periods (Table 4.9).

4.9 Relative Economic Performance with Other States

4.9.1 Annual Growth Rate of Gross State Domestic Product (GSDP)

The comparative analysis of growth of GDP across states is helpful to understand the comparative economic performance of Punjab economy. Table 4.10 provides comparative analysis of growth of GSDP among 15 major states of India. It reveals that GSDP of Punjab grew 4.77 percent during 1980's and state achieved 4th rank in GSDP among 15 major states of India. Only states such as Rajasthan, Maharashtra and Tamil Nadu grew faster than Punjab. GSDP growth rate of Punjab was much better than that of Karnataka, Gujarat, and Tamil Nadu etc. During 1991-2000, Punjab grew at only 4.69 percent and its ranking slipped from 4th to 8th. During that period, growth rate of GSDP was highest in Gujarat (7.74 percent) followed by Karnataka (7.15 percent), West Bengal (6.56 percent), Tamil Nadu (6.46 percent) etc. During 2001 to 2010 period, growth rate of Punjab increased only marginally to 5.63 percent. But, rank wise its performance was very poor. It slipped to 13th rank among 15 major states of India. During that period, GSDP growth rate was the highest in Maharashtra (13.41 percent) followed by Gujarat (10 percent), Orissa (9.43 percent), and Haryana (9.41 percent) etc. Thus, above analysis, points that performance of Punjab in terms of GSDP growth rate was worst during post reform period in comparison with pre reform period (Table 4.10).

Table 4.9
Productions and Employment Pattern in Different Industries in Punjab (%)

Industries	1980-81		1990-91		2000-01		2009-10	
	P	E	P	E	P	E	P	E
Food products	22.70	9.72	20.97	12.47	18.89	12.59	12.94	17.87
Beverage tobacco and tobacco products	1.28	0.89	1.66	0.66	1.76	0.69	0.67	1.53
Cotton textile	6.72	8.18	1.05	5.70	7.24	4.29	21.66	18.34
Woolen textile silk synthetic including art silk hosiery	15.66	19.98	10.23	18.84	13.94	19.54	2.90	3.04
Wood and wood products furniture and fixture	1.10	2.36	0.96	3.62	0.73	3.55	1.51	1.22
Paper and paper products, printing publishing and allied industries	0.86	1.53	2.02	1.95	2.17	2.13	2.11	2.28
Lather and fur products (except repair)	2.19	2.28	1.35	3.88	0.77	3.35	3.01	0.43
Rubber, plastic, petroleum, coal and products	2.02	2.75	4.15	3.4	4.19	3.84	3.02	4.64
Chemical and chemical products (except product of petroleum)	7.86	3.43	15.6	3.37	11.16	3.48	1.85	10.79
Non-metallic mineral products	1.18	2.26	1.09	2.73	0.89	2.92	2.90	1.65
Basic metal and alloy industry	10.90	7.59	13.68	5.62	11.55	6.23	6.79	12.23
Metal product	5.36	12.68	3.88	9.98	3.6	9.4	8.30	3.18
Machinery except electrical machinery	7.21	7.93	4.29	6.49	5.35	6.03	8.63	6.09
Electrical machine apparatus, appliance supplies and parts	3.49	2.65	5.37	3.12	3.17	2.95	1.99	1.25
Transport equipment and parts	9.65	13.09	11.25	9.88	12.54	9.38	9.44	11.28
Mfg. of furniture, Mfg. of NEC	-	-	-	-	-	-	4.46	0.85
Other Industries	1.59	1.53	1.12	1.99	1	2.06	3.15	2.98
Repair and personal service	0.22	1.15	1.33	6.3	1.05	7.57	4.70	0.37
Total	100.00	100.00	100	100	100	100	100.00	100.00

Note: P-Production, E- Employment

Source: Annual Survey of Industries (Various Issues); Statistical Abstract of Punjab, 2012.

4.9.2 Annual Growth Rate of Net State Domestic Product (NSDP)

In term of growth rate of NSDP, Punjab achieved 5.30 percent growth rate and gained 6th rank among 15 major states of India during 1981-90 period. In this period, Haryana achieved 1st rank with 6.84 percent NSDP growth rate followed by Rajasthan, Maharashtra, and Andhra Pradesh etc. In 1991-00, Punjab's ranking slipped to 11th and Gujarat achieved 1st rank followed by West Bengal, Karnataka, and Rajasthan etc. During 2001-10 period, Punjab's ranking further slipped to 12th rank and its growth rate was only 6.58 per cent. Maharashtra achieved 1st rank during that period followed by Gujarat, Tamil Nadu, and Haryana. Thus, it is evident that Punjab lagged behind the other major Indian states in terms of growth in GSDP and NSDP particularly after liberalization period (Table 4.11).

Table 4.10
Annual Rate of Growth of GSDP at constant prices (2004-05 prices)

States	1981 to 1990	1991 to 2000	2001 to 2010
Andhra Pradesh	3.88(12)	5.84(6)	8.03(6)
Assam	-0.13(15)	2.74(13)	4.06(15)
Bihar	4.28(10)	2.55(14)	7.56(9)
Gujarat	4.50(7)	7.74(1)	10.01(2)
Haryana	4.10(11)	4.62(9)	9.41(4)
Kerala	1.68(14)	4.37(10)	8.33(5)
Karnataka	4.56(6)	7.15(2)	7.81(7)
Madhya Pradesh	1.93(13)	5.31(7)	5.57(14)
Maharashtra	5.25(2)	5.84(6)	13.41(1)
Orissa	4.34(9)	3.73(12)	9.43(3)
Punjab	4.77(4)	4.69(8)	5.63(13)
Rajasthan	6.32(1)	6.29(5)	6.81(10)
Tamil Nadu	5.03(3)	6.46(4)	7.73(8)
Uttar Pradesh	4.42(8)	3.83(11)	5.76(12)
West Bengal	4.59(5)	6.56(3)	6.55(11)

Source: CSO, 2012

Table 4.11
Annual Rate of Growth of NSDP at constant prices (2004-05 prices)

States	1981- 90	1991-00	2001-10
Andhra Pradesh	5.56(4)	5.61(9)	8.73(6)
Assam	2.91(15)	2.04(15)	5.04(14)
Bihar	4.68(11)	3.72(13)	9.24(4)
Gujarat	4.72(10)	6.88(1)	10.21(2)
Haryana	6.84(1)	5.31(10)	9.24(4)
Karnataka	5.20(7)	6.76(3)	8.02(8)
Kerala	3.60(14)	5.67(7)	8.37(7)
Madhya Pradesh	4.40(12)	5.63(8)	6.95(10)
Maharashtra	6.40(3)	6.32(6)	10.53(1)
Orissa	4.30(13)	3.54(14)	8.79(5)
Punjab	5.30(6)	4.46(11)	6.58(12)
Rajasthan	6.64(2)	6.54(4)	7.30(9)
Tamil Nadu	5.34(5)	6.41(5)	9.60(3)
Uttar Pradesh	5.10 (8)	3.77(12)	6.29(13)
West Bengal	4.84(9)	6.80(2)	6.68(11)

Source: RBI, 2012-13

4.9.3 Per Capita Income and Its Growth

In terms of per capita income, Punjab had 1st rank as compared to other states of India during 1980-81 and 1990-91. During 1980-81, the per capita income was highest in Punjab (Rs. 17780.54) followed by Haryana (Rs. 15935.16), Maharashtra (Rs. 15547.57), Kerala (Rs. 13206.99) etc. During 1990-91, per capita income of Punjab was increased to Rs. 24802.33 and maintained first place followed by Haryana (Rs. 23593.45), Maharashtra (Rs. 22239.09) and Tamil Nadu (Rs. 17115.75). But, during 2000-01 and 2010-11, Punjab did not maintain its first place of per capita income. Though per capita income of Punjab was increased to Rs. 31623.61 during 2000-01 and to Rs. 44752 during 2010-11, but its ranking relative to other states slipped to 2nd in 2000-01 and to 6th during 2010-11. Thus, the other states of India grew better than Punjab in terms of per capita income and Punjab lagged far behind among 15 major states (Table 4.12).

Table 4.12

Per Capita Income (in Rs.) of Different States at Constant Prices (2004-05 Prices)

states	1980-81	1990-91	2000-01	2010-11
Andhra Pradesh	9474.64(12)	14143.31(8)	20967.96(8)	40366(7)
Assam	11635.48(6)	13991.58(9)	14715.77(11)	21406(13)
Bihar	5447.68(15)	7111.09(15)	7410.34(15)	13632(15)
Gujarat	12450.18(5)	16948.93(5)	23422.06(6)	52708(3)
Haryana	15935.16(2)	23593.45(2)	29712.52(3)	59221(2)
Karnataka	10642.52(8)	14276.37(7)	23290.49(7)	39301(8)
Kerala	13206.99(4)	15895.68(6)	24493.87(5)	49873(5)
Madhya Pradesh	9950.03(9)	12426.54(11)	14495.29(12)	22382(12)
Maharashtra	15547.57(3)	22239.09(3)	31775.53(1)	62729(1)
Orissa	9935.61(10)	10457.35(14)	13149.87(13)	25708(11)
Punjab	17780.54(1)	24802.33(1)	31623.61(2)	44752(6)
Rajasthan	8227.23(14)	13074.69(10)	15600.41(10)	26436(10)
Tamil Nadu	11461.51(7)	17115.75(4)	27653.48(4)	51928(4)
Uttar Pradesh	8541.96(13)	11041.72(13)	12139.44(14)	17349(14)
West Bengal	9852.06(11)	11919.16(12)	18958.52(9)	32228(9)

Source: RBI, 2012-13

The growth rate of per capita income of Punjab during 1980-81 to 1989-90 was 3.49 percent and its rank was 2nd among 15 major states of India. The per capita growth rate was maximum in Haryana followed by Punjab, Tamil Nadu, Rajasthan, Maharashtra etc. Growth rate of Haryana was 3.72 percent during 1980-81 to 1989-90. The gap of annual growth rate of per capita income of Punjab from Haryana was only 0.23 percent. During 1990-91 to 1999-00 and 2000-01 to 2010-11, Punjab growth rate declined continuously. During 1990's, Punjab grew at only 2.48 percent and its ranking slipped to 10th in comparison to other major 15 states. Gujarat gained 1st rank in per capita growth rate followed by Karnataka, Tamil Nadu, and West Bengal etc. During 2000's period, growth rate in per capita income of Punjab was increased to 3.89 percent, but its ranking slipped to 13th place among 15 major states of India. During 2000's period, Gujarat attained the highest growth rate in per capita income followed by Kerala, Orissa, Maharashtra etc. in that order (Table 4.13). These evidence are enough to show that economic

performance of Punjab has reduced continuously particularly during post reform period in comparison with 15 major states of India, which made it to a laggard state from a leading state.

Table 4.13
Annual Growth Rate of Per Capita Income at Constant Prices
(2004-05 Prices)

States	1980-81 to 1989-90	1990-91 to 1999-00	2000-01 to 2010-11
Andhra Pradesh	3.03(7)	3.76(8)	7.22(7)
Assam	1.10(15)	0.32(14)	3.70(15)
Bihar	2.53(10)	-0.44(15)	6.85(8)
Gujarat	2.77(9)	6.03(1)	8.62(1)
Haryana	3.72(1)	2.23(12)	7.28(6)
Karnataka	3.18(6)	5.38(2)	6.44(9)
Kerala	1.14(14)	4.83(5)	7.62(2)
Madhya Pradesh	1.17(13)	3.36(9)	4.45(12)
Maharashtra	3.21(5)	4.75(6)	7.39(4)
Orissa	2.92(8)	2.39(11)	7.57(3)
Punjab	3.49(2)	2.48(10)	3.89(13)
Rajasthan	3.22(4)	4.01(7)	5.50(10)
Tamil Nadu	3.46(3)	5.30(3)	7.36(5)
Uttar Pradesh	2.40(11)	1.34(13)	3.87(14)
West Bengal	2.34(12)	5.07(4)	5.43(11)

Source: RBI, 2012-13

4.9.4 Human Development Index (HDI)

According to Human Development Index, Kerala and Punjab have maintained 1st and 2nd rank respectively since 1981. During 1981, Kerala had attained 1st rank followed by Punjab, Maharashtra, Haryana, and Gujarat in that order. In 1991, 3rd and 4th rankings were achieved by Tamil Nadu, and Maharashtra. Though Punjab has occupied 2nd rank among all major states in HDI, but further improved in HDI in the state is very low. It is evident from the fact that improvement in HDI since 1981 was only 38 percent. The improvement in HDI is the highest in Bihar followed by Madhya Pradesh, Uttar Pradesh, and Rajasthan

etc. The improvement in these states was higher as these states had very small HDI during 1981 compared with other states. Thus, Punjab had performed well in ranking of HDI during 1981-2011 among 15 major Indian states but further improvement in HDI is not happening in the state (Table 4.14).

Table 4.14
State-wise HDI values from 1981 to 2011

States	1981	1991	2001	2011	Improvement in HDI (%)
Andhra Pradesh	0.298(9)	0.377(9)	0.416(10)	0.485(9)	62.8 (8)
Gujarat	0.360(5)	0.431(6)	0.479(6)	0.514(6)	42.8 (13)
Haryana	0.361(4)	0.443(5)	0.509(5)	0.545(4)	51.0 (11)
Karnataka	0.346(6)	0.412(7)	0.478(7)	0.508(8)	46.8 (12)
Kerala	0.500(1)	0.591(1)	0.638(1)	0.625(1)	25.0 (15)
Maharashtra	0.363(3)	0.452(4)	0.523(4)	0.549(3)	51.2 (10)
Punjab	0.411(2)	0.475(2)	0.537(2)	0.569(2)	38.4 (14)
Tamil Nadu	0.343(7)	0.466(3)	0.531(3)	0.544(5)	58.6 (9)
Assam	0.272(10)	0.348(11)	0.386(14)	0.474(10)	74.3 (5)
Bihar	0.237(15)	0.308(15)	0.367(15)	0.447(13)	88.6 (1)
Madhya Pradesh	0.245(14)	0.328(13)	0.394(12)	0.451(12)	84.1 (2)
Orissa	0.267(11)	0.345(12)	0.404(11)	0.442(14)	65.5 (7)
Rajasthan	0.256(12)	0.347(10)	0.424(9)	0.468(11)	82.8 (4)
Uttar Pradesh	0.255(13)	0.314(14)	0.388(13)	0.468(11)	83.5 (3)
West Bengal	0.305(8)	0.404(8)	0.472(8)	0.509(7)	66.9 (6)
All India	0.302	0.381	0.472	0.504	66.9

Source: Planning Commission, 2011a; UNDP, 2011

Chapter 5

Pattern of Agricultural Development in Punjab

This chapter analyses the pattern of agricultural development observed by Punjab since 1981 by studying the land utilization pattern, productivity of major food crops, input use, pattern of irrigation etc.

5.1 Land Utilisation Pattern in Punjab

The land use classification of state is presented in Table 5.1. The total geographical area of the state is fixed at 5036 thousand hectare. The net sown area was not stable in Punjab. It was 4391 thousand hectare in 1980-81, 4218 thousand hectare in 1990-91, 4250 thousand hectare in 2000-01 and decreased to 4158 thousand hectare in 2009-10. The gross cropped area (GCA) of Punjab increased from 6763 thousand hectare in 1980-81 to 7502 thousand hectare in 1990-91 and 7941 thousand hectare in 2000-01, but it declined to 7876 thousand hectare during 2009-10. Land put to non agricultural use had increased over time. In 1980-81, area of land under non agricultural use was 436 thousand hectare in 1980-81, 343 thousand hectare in 1990-91, 410 thousand hectare in 2000-01 and increased to 503 thousand hectare in 2009-10. Area under forest was 216 thousand hectare in 1980-81 which increased to 222 thousand hectare during 1990-91 and to 280 thousand hectare during 2000-01 and 295 thousand hectare during 2009-10. Area under barren and uncultivated land had declined from 96 thousand hectare to 25 thousand hectare during 1980-81 to 2009-10. Total area under total fallow land and uncultivated land excluding fallow was 94 thousand hectare during 1980-81. It increased to 167 thousand hectares in 1990-91 thousand hectare, but again declined to 65 thousand hectare during 2000-01 and to 52 thousand hectare during 2009-10 (Table 5.1).

5.2 Shift in Cropping Pattern

The shift in cropping pattern is given in Table 5.2. This table shows that about 41.58 per cent of the GCA in 1980-81 was under wheat which increased to 44.72 per cent during 2009-10. Rice, which occupied around 17.49 per cent of the GCA in 1980-81 increased to 26.86 per cent in 1990-91, to 32.89 per cent during 2000-01. It further rose to around 35.58 per cent in 2010-11. The GCA under cereals increased from 66.73 per cent in 1980-81, to 73.65 per cent in 1990-91,

Table 5.1
Change in Land Utilisation Pattern in Punjab (in thousand hectares)

Land use details	1980-81	1990-91	2000-01	2009-10
Geographical area	5036	5036	5036	5036
Net area sown	4391	4218	4250	4158
Total cropped area	6763	7502	7941	7876
Area under forest	216	222	280	295
Land put to non agriculture Use	436	343	410	503
Barren and uncultivated land	96	83	28	25
Total fallow land	45	110	43	41
Uncultivated land excluding fallow	49	57	22	11

Source: Statistical Abstract of Punjab, 2012

to 78.37 percent in 2000-01 and 82.50 percent during 2009-10. The percentage of GCA under food grains also increased from 71.77 per cent to 82.50 per cent during 1980-81 to 2009-10 period. The area under cotton was 9.60 per cent in 1980-81 and 9.34 per cent during 1990-91. After mid 1990s, the area under cotton has been adversely affected due to inclement weather and pest attack, its share in GCA went down to 5.97 per cent in 2000-01. With introduction of Bt varieties in 2007-08, area under cotton started increasing. It increased to 6.49 per cent during 2009-10. Area under sugarcane decreased from 1.05 per cent to 0.76 per cent during 1980-81 to 2009-10, while area under potatoes marginally increased from 0.59 per cent to 0.94 per cent during same period. Respective share of pulses and oilseeds in GCA had recorded a sharp decline from 5.04 per cent and 3.52 per cent in 1980-81 to 0.23 per cent and 0.79 per cent in 2009-10. The GCA under fruits and vegetables increased slightly from 1.38 per cent to 2.26 per cent during 1980-81 and 2009-10. The cropping intensity increased from 161.37 per cent to 189.42 per cent during 1980-81 and 2009-10 period (Table 5.2). This clearly indicates that imbalance in the cropping pattern due to two main cereal crops-rice and wheat. This happened due to better relative profitability of these crops with minimum production and marketing risk as compared to other crops (Singh *et. al.*, 2012).

Table 5.2
Shift in Cropping Pattern in Punjab (%)

Crops	1980-81	1990-91	2000-01	2009-10
Rice	17.49	26.86	32.89	35.58
Wheat	41.58	43.63	42.92	44.72
Total cereals	66.73	73.65	78.37	82.28
Pulses	5.04	1.91	0.68	0.23
Total food grains	71.77	75.55	79.05	82.50
Oilseeds	3.52	1.39	1.08	0.79
Cotton	9.60	9.34	5.97	6.49
Sugarcane	1.05	1.35	1.52	0.76
Potatoes	0.59	0.31	0.76	0.94
Fruits and vegetables	1.38	1.65	1.82	2.26
Cropping intensity	161.37	177.86	186.85	189.42

Source: Statistical Abstract of Punjab, 2012.

5.3 Area, Production and Yield of Principal Crops

Area, production and yield of principal crops are given in Table 5.3. In wheat and rice, growth in area, production and yield had declined although there was small improvement in yield of rice during 2000's. Area under wheat increased from 2.81 million hectare to 3.53 million hectare, production increased from 7.68 million tonnes to 17.28 million tones and yield increased from 2730 kg/ha to 4898 kg/ha from 1980-81 to 2011-12. The growth rate of area, production and yield shows stagnation in 1990s and 2000s. The growth rate of area of wheat was 1.26 percent during 1980's, which declined to 0.27 percent during 1990's with marginal increased to 0.36 percent during 2000's. The area, production and yield of rice also showed almost similar trend as wheat crop. The area under rice increased from 1.18 million hectare to 2.82 million hectare during 1980's to 2000's, while production increased from 3.22 million tonnes to 10.54 million tonnes and yield increased from 27.36 qtl./ha to 37.41 qtl./ha during 1980's to 2000's. Further, expansion of area under rice was also not happening as growth rate of area under rice declined from 5.39 percent during 1980's to 2.48 percent during 1990's and further to 1.02 percent during 2000s. The growth rate of rice production also declined from 6.74 percent in 1980's to 2.50 percent in 1990's and 2.02 percent during 2000's. The growth of yield of rice declined from 1.28 percent to 0.02

percent during 1980's and 1990's with marginal improvement to 0.99 percent during 2000's.

Area, production and yield of all food grains increased significantly during 1980's, but during 1990's and 2000's, all food grain crops witnessed stagnation in area, production and productivity. It was evident from the fact that area under food grains increased from 4.84 million hectare during 1980's to 6.51 million hectare during 2011-12, while production increased from 11.90 million tonnes to 28.39 million tonnes and yield increased from 2458 kg/ha to 4364 kg/ha during 1980's to 2000's. However, growth trend of total food grain shows that growth in area under food grains declined from 1.58 percent during 1980's to 0.73 percent during 1990's and to 0.49 percent during 2000's. The growth rate in production declined from 4.52 percent during 1980's to 2.22 percent during 1990's and 1.36 percent during 2000's. Growth rate yield of food grains declined from 2.90 percent, to 1.48 percent and to 0.87 percent during 1980's, 1990's and 2000's respectively. Thus, Table 5.3 clearly shows the stagnation in productivity of all food grain crops in Punjab (Table 5.3).

Table 5.3

Area, Production and Yield of Principal Crops in Punjab (Area in million ha., Production in million tonnes and Yield in kg/ha)

Particular	1980-81	1989-90	CAGR	1990-91	1999-00	CAGR	2000-01	2011-12	CAGR
Wheat									
Area	2.81	3.25	1.26	3.27	3.39	0.27	3.41	3.53	0.36
Production	7.68	11.68	4.30	12.16	15.91	2.26	15.55	17.28	0.98
Yield	2730	3593	3.00	3715	4696	1.98	4563	4898	0.62
Rice									
Area	1.18	1.91	5.39	2.02	2.60	2.48	2.61	2.82	1.02
Production	3.22	6.70	6.74	6.54	8.72	2.50	9.15	10.54	2.02
Yield	2736	3510	1.28	3229	3347	0.02	3506	3741	0.99
Food grain									
Area	4.84	5.62	1.58	5.75	6.26	0.73	6.28	6.51	0.49
Production	11.90	19.03	4.52	19.30	25.20	2.22	25.32	28.39	1.36
Yield	2458	3386	2.90	3356	4028	1.48	4032	4364	0.87

Source: Agricultural Statistics at a Glance, 2012

5.4 Contribution of Wheat and Rice to Central Pool

The contribution of wheat and rice to the central pool is given in Table 5.4. This table shows that the state contributed 45.3 per cent of rice to central pool in 1980-81, which was declined to 41 per cent in 1990-91, 33.3 per cent in 2000-01 and 25.3 per cent in 2010-11 but the decline in the share of wheat was much sharper than of rice because Punjab contributed 73 per cent wheat to central pool in 1980-81 which declined continuously to 61 per cent in 1990-91 and 45.4 per cent in 2010-11. Decline in share of Punjab in wheat and rice to the central pool shows that contribution of other states in central pool has increased in comparison with Punjab (Table 5.4).

Table 5.4
Contribution of Punjab in Wheat and Rice to Central Pool (lakh tonne)

Year	Rice		Wheat	
	Contribution to central pool (lakh tonne)	% share	Contribution to central pool (lakh tonne)	% share
1980-81	25.2	45.3	42.8	73.0
1990-91	48.2	41.0	67.5	61.0
2000-01	69.4	33.3	94.2	57.6
2010-11	86.3	25.3	102.1	45.4

Source: Statistical Abstract of Punjab, 2012

5.5 Pattern of Operational Holdings

Pattern of operational holding is depicted in Table 5.5. It shows that there is unequal distribution of operational holdings among different farmer categories and there is no much change in that trend for the past thirty years. In 1980-81, the proportion of small and marginal farmers in the state was about 39 per cent, while that of semi-medium, medium and large farmers was 28.18 per cent, 25.1 percent and 7.25 percent respectively. Thus, around 39 percent of small and marginal operated only on 10 percent of the area while 25 per cent of the medium farmers operated on around 40 per cent of the total area and 7 per cent of the large farmers operated over 29 per cent of the area. In 1990-91, about 44 per cent of

the operational holdings were of small and marginal farmers and the area operated by them was about 12 per cent. The proportion of semi-medium, medium and large operational holdings was 26 per cent, 23 per cent, 6 per cent, while the area operated by them was 21 per cent, 40 per cent and 27 per cent respectively. Similarly during 1995-96, about 35 per cent of the small and marginal farmers operated on only 8.7 per cent of the area. The proportion of small and marginal farmers drastically reduced to 29.6 per cent during 2000-01 and the area cultivated by them was also reduced to nearly 8 per cent. Thus, it points to the fact that small and marginal farmers were pushed out of the agriculture during this period. However, the trend again reversed during 2005-06 when about proportion of small and marginal farmers again increased to 31.6 per cent and the area operated by them was 8.6 per cent. During 2010-11, percentage of small and marginal holdings in the state was 34 per cent which operated only on 10 per cent of the area. The average size of land holding which was 3.82 ha during 1980-81 was marginally reduced to 3.77 ha during 2010-11.

Table 5.5

Number, Area and Average Size of Operational Holdings in Punjab (No. of holdings in '000 and area in '000 ha)

Size Class	1980-81*			1990-91*			1995-96**			2000-01**			2005-06**			2010-11 (P) [#]		
	No.	A	ASLH	No.	A	ASLH	No.	A	ASLH	No.	A	ASLH	No.	A	ASLH	No.	A	ASLH
Marginal (≤ 1 ha.)	198.06 (19.42)	118.23 (3.04)	0.60	295.67 (26.47)	164.22 (4.07)	0.56	203.88 (18.65)	122.37 (2.95)	0.60	122.76 (12.31)	77.52 (1.93)	0.63	134.76 (13.42)	83.34 (2.10)	0.62	164.43 (15.62)	101 (3)	0.61
Small (>1.0 -2 ha.)	199.37 (19.55)	280.9 (7.22)	1.41	203.84 (18.25)	328.22 (8.04)	1.61	183.45 (16.78)	239.83 (5.78)	1.31	173.07 (17.35)	241.99 (6.02)	1.40	183.06 (18.22)	258.43 (6.52)	1.41	195.44 (18.57)	269 (7)	1.38
Semi Medium (>2-4 ha.)	287.42 (28.18)	790.86 (20.32)	2.75	288.79 (25.86)	841.54 (20.87)	2.91	320.34 (29.31)	832.73 (20.08)	2.60	328.23 (32.91)	876.44 (21.79)	2.67	319.93 (31.85)	854.25 (21.55)	2.67	324.52 (30.83)	855 (22)	2.63
Medium (>4 to 10 ha.)	261.2 (25.16)	1565.7 (40.22)	5.99	261.48 (23.41)	1621.81 (40.22)	6.20	305.79 (27.98)	1753.9 (42.29)	5.74	300.95 (30.17)	1730.7 (43.03)	5.75	295.75 (29.44)	1700.50 (42.91)	5.75	298.45 (28.35)	1713 (43)	5.74
Large (>10 ha)	73.94 (7.25)	1136.8 (29.20)	15.37	67.17 (6.01)	1076.89 (26.76)	16.03	79.61 (7.28)	1198.2 (28.89)	15.05	72.36 (7.26)	1095.6 (27.24)	15.14	70.96 (7.06)	1066.77 (26.92)	15.03	69.72 (6.62)	1029 (26)	14.76
All	1019.99 (100.00)	3892.49 (100.00)	3.82	1116.95 (100.00)	4032.68 (100.00)	3.61	1093.07 (100.00)	4147.03 (100.00)	3.79	997.37 (100.00)	4022.25 (100.00)	4.03	1004.47 (100.00)	3963.29 (100.00)	3.95	1052.55 (100.00)	3967 (100.00)	3.77

Note: ASLH: Average size of land holding. A: Area and No. : Numbers.

Source: *www.indiastat.com, **Agricultural Census, 2012; #Statistical Abstract of Punjab, 2012

5.6 Consumption of Fertilizers

The consumption of nitrogen, phosphate and potassic fertilizers in Punjab increased from 762 thousand tonne to 1866 thousand tonne during 1980-81 to 2009-10. The consumption of nitrogen was increased from 526 thousand tonne in 1980-81 to 1358 thousand tonne while that of phosphate increased from 207 thousand tonne to 434 thousand tonne and that of potassic fertilizers also increased from 29 thousand tonne to 74 thousand tonne. The consumption of fertilizers per hectare doubled from 1980-81 to 2009-10. It increased from 113 kg in 1980-81 to 237 kg during 2009-10. The compound average growth rate also showed a growth in use of N, P and K fertilizers (Table 5.6). The over-use of nitrogenous fertilisers due to higher subsidies on urea has led to an imbalanced use of fertilisers in the state. The N:P:K ratio in Punjab is one of the most distorted, at 27.8:7.3:1.0 as against the generally recommended 4:2:1 ratio (Sharma, 2007).

Table 5.6

Consumption of Chemical Fertilizers in Punjab ('000 nutrients tonne)

Years	Nitrogenous (N)	Phosphate (P ₂ O ₅)	Potassic (K ₂ O)	Total NPK	Consumption per hectare (kg/ha)
1980-81	526	207	29	762	113
1990-91	877	328	15	1220	163
2000-01	1008	282	23	1313	165
2009-10	1358	434	74	1866	237
CAGR	34.78	23.00	38.23	31.79	25.19

Source: Statistical Abstract of Punjab, 2012

5.7 Consumption of Pesticides

The consumption of pesticides in Punjab has continuously increased from 3200 metric tonne in 1980-81 to 6500 metric tonne during 1990-91 and to 7005 metric tonne during 2000-01, but in 2012-13, it decreased to 5725 metric tonne, primarily due to the reduction of sprays on cotton. The percentage share of consumption of pesticides in Punjab in India increased from 7 per cent in 1980-81

to 16 per cent during 2000-01. However, it declined to 12.6 per cent due to the reason given above (Table 5.7).

Table 5.7
Consumption of Pesticides in Punjab and India
(Technical grade in metric tonne)

Years	Punjab	India	%
1980-81	3200	45000	7.11
1990-91	6500	75033	8.66
2000-01	7005	43584	16.07
2012-13	5725	45386	12.61

Source: www.indiastat.com; RBI, 2012-13.

5.8 Agriculture machinery and implements

The over capitalisation in farm mechanisation and its under utilization leads to higher cost of production and lower net income to farmers, making it economically unviable. In the state with crop intensification, agriculture has become highly machinery dependent (Singh *et. al.*, 2012). Table 5.8 gives data about number of different type of farm machinery in Punjab. The table shows that the number of tractors in Punjab increased from 1.1 lakh in 1980 to 4.34 lakh in 2010-11. Like-wise number of disc harrows tripled from 71 thousand in 1980 to 210 thousand in 2010-11. The number of tube well increased from 6 lakh to 13.8 lakh from 1980 to 2010-11. Similarly, tractor operated and self propelled combines witnesses huge increase in number. Number of thresher increased from 25 thousand to 740 thousand in 2010-11. Thus, the table shows the huge mechanisation of Punjab agriculture which resulted in its under utilization (Table 5.8).

5.9 Net irrigated area

Net irrigated area by different sources in Punjab increased from 33.8 lakh hectare during 1980-81 to 40.7 lakh hectare during 2009-10. The area irrigated through canals increased from 14.30 lakh hectare to 16.69 lakh hectare during 1980-81 to 1990-91. But in 2000-01, it decreased to 9.62 lakh hectare. After that period, it again increased to 11.14 lakh hectare in 2009-10. The area irrigated through tube wells and wells increased from 19.39 lakh hectare to 30.74 lakh thousand hectare from 1980-81 to and 2000-01, but it had come down to 29.55

lakh hectare during 2009-10. Thus, about 57 per cent of area was irrigated through tube wells and wells, and the remaining 43 per cent was irrigated through canals. However, about 73 per cent of the area was irrigated by tube wells and wells and only 27 per cent was irrigated through canals. The prominent feature of irrigation pattern is that about 81 per cent of the net sown area was irrigated in 1980-81 which increased to about 98 per cent in 2009-10.

Table 5.8
Agriculture Machinery and Implements in Punjab (in thousands)

Machines	1980	1991	2001	2010-11
Tractors	110	265	405	434
Disc harrow	71	215	245	210
Seed-cum fertilizer drill	19	100	175	166.48
Tractor operated combine	-	-	5.2	6.05
Self propelled combine	-	-	3	8.13
Thresher	25	297	250	740
Tube wells	600	800	1073	1383
Spray pumps	-	-	565	600

Source: Singh *et. al.*, 2012; Environment Statistics of Punjab, 2011

Table 5.9
Net Irrigated Area in Punjab by Source (000' hectare)

Year	Canals	Tube wells and wells	Other sources	Total	% of net area irrigated to net sown area
1980-81	1430 (42.28)	1939 (57.33)	13 (0.38)	3382	81
1990-91	1669 (42.70)	2233 (57.12)	7 (0.18)	3909	93
2000-01	962 (23.82)	3074 (76.13)	2 (0.05)	4038	95
2009-10	1114 (27.36)	2955 (72.59)	2 (0.05)	4071	97.9

Source: Statistical Abstract of Punjab, 2012

Chapter 6

Conclusions and Policy Suggestions

Punjab which holds the pride place during the green revolution in the mid 1960's witnessed many structural transformations since 1980's, which turned it to a laggard state from being a leading state. This study analyses the structural changes and pattern of agricultural development witnessed by Punjab economy over 1981-2010 period. Typically, it presents a quantitative analysis of sectoral trends in Punjab economy and its relative economic performance with major Indian states. The study finds that Punjab is no more an agrarian state. In sectoral distribution of GSDP, share of primary sector in GSDP has declined from 40 per cent in 1980-81 to 25 per cent in 2009-10, while that of secondary and tertiary sectors has increased from 17 per cent to 30.8 per cent and 42.9 per cent to 44 per cent respectively during the same period. The GSDP growth rate during 1980-81 to 2009-10 was only 3 per cent in primary sector as against 6.6 per cent in secondary and 4.76 per cent in tertiary sector. The work force engaged in agriculture (cultivators and labourers) declined from 58 per cent in 1981 to 35 per cent in 2011. The decline in capital and development expenditure and rise in non-development expenditure has a capacity to crowd out private and public investment.

The investment-GSDP ratio remained below 20 per cent, which is the lowest among the 14 major states of India, while it was 40.2 per cent at India level during 2009-10. Thus, state government is not giving any attention to the primary sector in general, agriculture and allied sectors in particular, which is reflected in meager share of GSDCF in GSDP. The secondary sector witnessed an increase in share of GSDCF in GSDP which was also reflected in its better growth during 2000-01 to 2009-10 (9.3 per cent). Although GSDCF-GSDP ration in tertiary sector has declined, but this sector has grown by around 6 per cent during 2000-01 to 2009-10. The share of work force increased in 'other sectors', while two major sectors (agriculture and industrial sectors) had witnessed decline in work force during 2011. The industrial growth also slowed down particularly after 2000-01 period in terms of decline in number of units, decline in employment in large and medium units, decline in growth of investment and production. The pattern of production and employment of different industries shows that the combined share

of top three industries i.e. woollen textile, food products and transport equipments was declined during 2009-10 as compared to 1980-81. The production and employment in cotton industries has increased during 1980-81 to 2009-10.

The relative economic performance vis-à-vis other major Indian states shows that Punjab has slipped from a leading state to a laggard state. The down turn in economic growth was more severe during post reform period. The rate of growth of GSDP of Punjab was ranked 4th followed by the ranking of Rajasthan, Maharashtra and Tamil Nadu during 1980's. Now, it has come down to 13th place during 2000's. The per capita income of Punjab was at number 2nd place during 1980's after Haryana but during 2000's, it had shifted to 13th place. In human development index (HDI), although Punjab is stable at rank 2nd since 1981, but further improvement in HDI is not happening.

The agriculture sector is largely dominated by the monoculture of wheat and rice crops. The productivity of these two crops has stagnated. The area under crops such as pulses, oilseeds, cotton, and sugarcane has declined. The increase in area under potatoes and fruits and vegetables is marginal. The cropping intensity has significantly increased from 161 in 1980-81 to 189 during 2009-10. Further, contribution of wheat and rice to the central pool has also declined. There is high inequality in the ownership of land holdings in the state as about 34 per cent of the small and marginal farmers operate on only 10 per cent of the area. The overcapitalization of farm machinery and over use of pesticides and fertilizers has resulted into decline of returns from the crops.

In short, the study concluded that deceleration of economic growth of the Punjab economy in general and agriculture sector in particular had increased the crisis of capitalistic path of economic development especially in the liberalization and globalization era. The declining importance of agriculture and industry sector and increasing importance of tertiary sector is not a healthy sign of structural transformation in the backdrop of deceleration of growth of the productive sectors of the economy. Therefore, agricultural sector should be diversified to more commercial agri-business sector which will also take care of industrialization, particularly in rural areas. Only those crops should be promoted in the state which have high export potential and can act as raw material for the agro processing

industries in the state. Cooperative production and marketing can also help to revive agricultural sector of the economy. Amul in Gujarat and industrialization of grape in Maharashtra for cultivation are some of the success stories which can be followed easily (Gill and Singh, 2005). The rural economic transformation of Punjab economy is also desired for long run goal of economic development. This transformation is possible if primary producers were integrated with both manufacturing and marketing activities for reaping the surpluses generated by them (CDEIS, 2012). Providing basic infrastructure to the industry which includes uninterrupted power supply and good road infrastructure can go a long way to make the industrial sector more competitive. At the same, providing irrational free subsidy to farm sector and costly power to industrial sector needs to be checked. Punjab can emulate the Industrial Model Township (IMT) model of Haryana, where it can create model townships in huge wastelands. Enhancing educational qualification and imparting skills to commensurate with the needs of the industry should be the top priority (Khanna, 2013). Last but not the least, the coordination between centre and state in different activities is also essential for development process of the state.

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