3. Economy and Livelihoods

This chapter is an attempt to examine the level and rate of material development of Punjab. It examines shifts in income, the nature of the workforce, relative development of various sectors and associated issues. The analysis of problems is accompanied by suggestions for improvement. An attempt is also made to provide a brief review of the various alternative policy options currently being discussed for Punjab.

Per Capita Income and Punjab's Rank

Punjab remains one of India's most advanced states. Growth rates of Net State Domestic Product (NSDP) have been dynamic for most of the post-Independence period. Being the cradle of the Green Revolution, it acquired a very high growth rate in the decade and a half since the mid-1960s. In the 1970s, Punjab was projected as a role model of development for other states. In per capita income, Punjab ranked fourth in 1960-61 but took first position in 1964-65.

The new technology in agriculture: Harvesting combine

The state continued to occupy the first rank among the major states until 1992-93. In 1993-94, Maharashtra displaced Punjab's position and became the highest income state among the major states. Although Punjab continues to rank second in per capita income, the gap between the per capita income of Punjab and Maharashtra fluctuates between one to ten percent of each other. In 1992-93 at constant prices of 1980-81, Punjab's per capita income was higher than that of Maharashtra by 2.45 percent. But in 1998-99 Maharashtra's per capita income was higher than that of Punjab by 12.47 percent. Punjab's per capita income had grown to more than double of the all India average in 1979-80. But in 1998-99 Punjab's per capita income was only 44.30 percent higher than the all India average.

The changes in Punjab's rank in per capita income among major states and its relative position vis-à-vis the all India average is explained by the behaviour of growth rates of the gross state income. Table 3.1 shows that till 1978-79, Punjab continued to record higher growth rates in the gross state income compared to growth rates of gross national income of India as a whole. The annual compound growth rate (ACGR) of the state's gross income was 3.6 percent between 1960-61 and 1965-66 compared to growth of gross national income of the country at the rate of 2.7 percent during this period. The state's annual compound growth rate became the highest during the late 1960s. The state recorded a growth-rate of 8.4 percent compared to the all India annual

Table 3.1: **Average Annual Compound Growth Rate of Gross State/National Income (in Percentage)**

Time Period	Punjab				India			
	P	S	T	O	P	S	T	O
1960-61 to 1965-66	2.4	6.0	4.5	3.6	-0.9	6.9	5.6	2.7
1965-66 to 1968-69	9.9	6.7	6.8	8.4	4.5	2.9	3.9	4.0
1970-71 to 1975-76	2.86	5.87	5.95	4.21	0.5	3.9	4.5	2.5
1974-75 to 1978-79	5.74	8.70	7.93	6.87	3.62	6.39	6.49	5.14
1980-81 to 1984-85	5.37	5.04	5.14	5.23	5.63	6.05	5.42	5.66
1985-86 to 1989-90	5.24	8.65	5.22	5.98	3.58	6.49	7.41	5.79
1992-93 to 1996-97	3.08	7.10	5.78	4.81	3.85	8.28	7.87	6.76
1997-98 to 2001-02 (Prov.)	1.84	6.20	5.38	4.08	2.21	4.52	7.77	5.34

Source: Statistical Abstract of Punjab (Various Issues).

Note: (i) P - Primary sector, S - Secondary sector, T - Tertiary sector and O - Over all growth-rate.

(ii) Up to 1968-69 growth rates are at 1960-61 prices; for period between 1970-71 to 1978-79; at 1970-71 prices; between 1980-81 and 1996-97, at 1980-81 prices, and for 1997-98 to 2001-02, at 1993-94 prices.

growth rate of 4.0 percent. It is evident that Punjab's growth performance was higher than the all India average between 1960-61 and 1978-79.

State policy in the 1980s was concentrated on the fight against insurgency, and development policies took a back seat. Consequently, Punjab's growth performance slowed down. For the first time since 1960-61, Punjab's annual compound growth rate (ACGR) fell to lower than the all India average during the period 1980-81 to 1984-85. The state recorded an annual compound growth rate of 5.23 percent compared to the all India growth rate of 5.66 percent during the same period. In the following five years (i.e. 1985-86 to 1989-90), Punjab's growth rate of 5.98 percent was marginally higher than the all India average of 5.79 percent. Thus, on an average, Punjab's growth rate roughly matched the all India average for the entire decade of 1980s. The 1990s, despite being a time of political stability with two popularly-elected governments, was not a decade of satisfactory growth.

Between 1992-93 and 1996-97 (coinciding with the Eighth Five Year Plan period), the average annual growth rate of Punjab was 4.8 percent compared to a national average of 6.8 percent. Punjab's position reversed in the 1990s as compared to the 1970s. The average annual growth rate of Punjab during 1974-75 to 1978-79 (Fifth Five Year Plan period) was 6.8 percent compared to the all India average of 5.1 percent. In fact, during 1997-98 to 1998-99, Punjab's growth rate had fallen to 3.58 percent against 5.91 percent of India as a whole. The economies of Maharashtra, Gujarat, West Bengal, Kerala and Rajasthan grew at a much higher rate during the 1990s. The average annual growth rate of Maharashtra was 9.5 percent during 1991-92 to 1996-97 followed by Gujarat (8.0 percent) and Rajasthan (7.2 percent).

The relative slowdown in the growth rate of Punjab's economy vis-à-vis that of the Indian economy and fast growing states like Maharashtra, Gujarat and Rajasthan is a cause of concern. The decade of the 1990s has seen liberalisation, privatisation and globalisation, but these have not helped Punjab to improve its growth performance.

Several factors at the macro level have led to the poor performance of Punjab's economy. These include: Punjab's comparatively low share in the level of proposed investment, low share of assistance disbursed by the Punjab State Financial Corporation and by all India financial institutions and a low credit-deposit ratio. Credit-deposit ratio on the last Friday of March 1998 in Punjab was 38.6 percent compared to 72.3 percent in

Maharashtra and 48.2 percent in Gujarat. Punjab's share in India's total population is 2.37 percent (Census 2001) and share in all India income was 3.5 percent in 1996-97. However, the state's share in the financial assistance provided by all India financial institutions cumulative up to 31 March 1997 was only 2.3 percent.

The share of assistance disbursed by the Punjab State Financial Corporation cumulative up to March 1997 was 3.6 percent and the state's share of the proposed investment under industrial memoranda (August 1991 to March 1998) was 3.3 percent. But in the case of Maharashtra and Gujarat, these shares were much higher than their share in the-all India income (N. J. Kuriyan, 1999). Further, the share of the state domestic product of Punjab used for capital formation has been either stagnating or declining. It stood at 22.98 percent in 1993-94 but varied between 20.21 percent and 23.71 percent up to 2000-01 except for the year 1995-96, when it rose abnormally to 32.41 percent (Table 3.2). This rise was experienced largely in the manufacturing sector. The share of development expenditure in the total government expenditure, which stood at 75.85 percent in 1991-92, declined to 54.46 percent in 1997-98. In order to improve Punjab's rank, both public and private investment must increase, the credit-deposit ratio of the commercial banks must rise to the all India average and the Punjab State Financial Corporation must play a more productive role.

Table 3.2: **Percentage Share of Capital Formation of Gross State Domestic Product of Punjab**

Years	Share of Gross State Domestic Product
1993-94	22.98
1994-95	23.71
1995-96	32.41
1996-97	20.21
1997-98	21.32
1998-99	21.05
1999-2000	20.50
2000-01	21.41

Source: Statistical Abstract of Punjab (Various Issues)

Sectoral Growth and Sectoral Shift in Income

The primary sector of Punjab's economy is agriculture and livestock. The contribution of other components such as forestry and logging, fishing, mining and quarrying has always been negligible in the gross state domestic product. The combined share of the three components has been less than 1 percent (0.56 percent in 2000-01) of the gross state domestic product since 1960-61. On the other hand, the combined share of agriculture and livestock is more than 40 percent (41.93 percent in 2000-01) of the gross state domestic product.

Agriculture and livestock are organically linked, as most people engaged in agriculture also rear milch cattle as a subsidiary occupation. Traditionally, livestock provided animal power for most agricultural operations such as ploughing and levelling of land, harvesting of crops, as well as for well irrigation and transport of agricultural produce. However, with the mechanisation of agriculture, tractors, motor pumps, threshers and power-operated combines have almost replaced the bullock. Bullocks have been replaced by buffaloes and cows as milch animals.

Except for the period of 1965-66 to 1970-71 the share of the primary sector in the net state domestic product (NSDP) has been declining. In the primary sector, the share of agriculture increased marginally till the 1970s but has since been continuously on the decline. Contrary to this, the share of livestock in the state domestic product continuously increased till early 1990s, after which it stagnated. The higher growth rate of the livestock sector has contributed to an increase in the rate of growth of the primary sector and increased the share of the livestock sector in the state domestic product.

The growth rate of the secondary sector has remained above 5 percent for all the years since

1960-61. In this sector, the registered industries have performed the best. Construction has also shown improvement in its share of NSDP. The share of unregistered manufacturing and electricity & water supply has remained stagnant in the NSDP. While unregistered manufacturing has shown a decline in its share of NSDP from previous decades except for 1990-91, electricity and water supply experienced considerable increase before their share fell. The tertiary sector of the state has generally grown at a rate closer to the overall rate of growth of Punjab's economy. The activities which have improved their share in NSDP are banking, insurance, real estate, ownership of dwellings and public administration. Activities like transport, communication and storage, trade, hotel and restaurants and other services experienced minor decline in their share of NSDP. Table 3.3 reflects the percentage contribution of various sectors in NSDP of Punjab in 1980-81 and 1990-91.

Workforce and its Sectoral Shift

Economic development is always accompanied by changes in economic structure. Incomes in various sectors change and there are changes in the workforce's share in employment in various sectors.

Changes in the sectoral share of the NSDP of Punjab have been discussed in the preceding section. Shifts in income in various sectors are accompanied by shifts in employment. Agriculture (and livestock) remains the major employer of the Punjab workforce. It accounted for 62.66 percent of the total workforce in 1971, 58.02 percent in 1981, 55.26 percent in 1991 and 39.4 percent in 2001. Employment in agriculture includes self-employed cultivators and agricultural labourers. The loss in the share of employment by the primary sector (agriculture) has been due to a shift of the workforce to the secondary and tertiary sectors. The share of manufacturing increased from 11.30 percent in 1971 to 12.28 percent in 1991.

Table 3.3: **Percentage Distribution of Net State Domestic Product of Punjab at Factor Cost at Constant Prices (at 1980-81 prices)**

Sector	1980-81	1990-91
Agriculture	48.46	47.63
(i) Agricultural Proper	32.22	30.69
(ii) Livestock	16.24	16.94
Forestry & Logging	0.99	0.59
Fishing	0.03	0.09
Mining &Quarrying	0.02	0.02
Sub Total Primary	**49.50**	**48.33**
Manufacturing	11.01	16.27
(i) Registered	5.91	9.41
(ii) Unregistered	5.10	6.86
Electricity, Gas & Water supply	1.31	2.45
Construction	6.15	3.82
Sub Total Secondary	**18.47**	**22.54**
Trade Hotels & Restaurants	14.59	11.33
Transport, Storage &communication	2.05	2.32
Banking & Insurance	2.55	4.67
Real Estate, ownership of dwellings and Business services	4.26	3.21
Public Administration	2.82	3.28
Other services	5.76	4.32
Sub-Total Tertiary	**32.03**	**29.13**
Total SDP	**100**	**100**

Source: Statistical Abstracts of Punjab

Table 3.4: **Distribution of Workforce in Punjab**

Year	Agriculture	Manufacturing	Construction	Transport, storage & communication	Others	Total
1971	2451858 (62.66)	442070 (11.30)	77356 (1.98)	109611 (2.80)	831697 (21.26)	3912592 (100.00)
1981	2859511 (58.02)	648592 (13.16)	100663 (2.04)	183877 (3.73)	1135116 (23.04)	4927759 (100.00)
1991	3370038 (55.26)	749136 (12.28)	156045 (2.55)	233787 (3.83)	1589368 (26.06)	6098374 (100.00)

Source: (i) Data For 1971, 1981 and 1991 are from Census of India

Note: Data in parenthesis denotes percentages.

The share of construction improved by 0.57 percent and that of transport and communication by 1.0 percent during 1971 and 1991. Service activities have been the major gainers in terms of their share in total absorption of the state workforce. The share of these increased from 21.26 percent in 1971 to 26.06 percent in 1991 (Table 3.4).

The comparative study of Table 3.3 and Table 3.4 indicates that a shift in workforce from agriculture to non-agriculture sectors is taking place at a rate less than the rate of shift in income share to the non-agricultural sectors. This also explains the cause of the shift of the workforce from agriculture to non-agricultural sectors. The income share of the non-agricultural sector in the NSDP is higher than its share of the workforce. This indicates that the per worker income in these sectors is higher than the per worker income in agriculture. If we just take the per worker distribution of income in different categories by dividing the share of income to share of workers, we find that the per worker share in agriculture was 86.6 percent in 1971, as against 123 percent for non-agriculture workers and this trend has been maintained over the years. It is obvious that the higher per worker income available in non-agricultural activities is pulling workers out of agriculture.

The differences in per worker income between agriculture and non-agricultural activities have widened over time. The per worker income in agriculture as a ratio of average per worker income in the state declined from 91.69 percent in 1971 to 82.62 percent in 1991 while that of workers in non-agricultural activities increased from 114.54 percent in 1971 to 123.90 percent in 1991. The average per worker income in non-agricultural activities in 1991 was 50 percent more than that of workers in the agriculture sector.

The relative shift of the workforce from agriculture to non-agricultural activities conforms to the Fisher-Clark-Kuznets hypothesis on structural change in the economy. Although the direction of structural change is indicative of a progressing economy, yet in terms of employment requirements, the pace of shift of the workforce is slow. This indicates that a large number are trapped in agriculture and need to be shifted elsewhere. Given the present level of development in Punjab, the fact that more than 50 percent of the workforce remains employed in agriculture is not a healthy indicator. Unless the manufacturing sector accounts for more than 20 percent of the workforce, the state cannot be treated as industrially advanced.

Workforce Utilisation and Unemployment

Punjab's total population is 2,42,89,296 (Census 2001), out of which 66 percent resides in rural areas and 34 percent in towns and cities. As per the Census 2001, the work participation rate (WPR) in

Punjab increased from 30.9 percent in 1991 to 37.6 percent in 2001, though it is less than the national average of 39.3 percent. There is a marked shift in workforce from agriculture sector to non-agriculture sector – the percentage of agricultural workers (cultivators and agricultural labourers) has declined from 55.2 percent in 1991 to 39.4 percent in 2001.

The 55th round survey conducted by the National Sample Survey Organisation (referred to as NSS or NSSO) recorded a labour participation rate of 29.2 percent for rural Punjab and 32.5 percent for urban areas using the Usual Principal Status Approach. In rural areas, labour participation rate is considerably lower than the all India average of 38.0 percent and is equal to the all India average (32.4 percent) in urban areas. The rural male participation rate is 52.6 percent, which is comparable to the all India average (52.5 percent), but the rural female participation is abnormally lower at 4.0 percent compared to the all India rate of 23.1 percent. The urban male participation rate is 54.1 percent and is higher than the all India average of 51.3 percent. Urban female participation rate is 7.3 percent, though higher than that of the rural Punjab, is still considerably lower than the all India rate of 11.7 percent. This indicates a high gender bias against women, which is supported by the fact that the state has the second lowest sex ratio (874 females per 1000 males) in the country.

The utilisation of the workforce in the state is less than the all India average. The unemployment rate in Punjab stood at 2.3 percent for rural males, 6.2 percent for rural females and 2.6 percent for rural persons, compared to all India average respective rates of 2.1 percent, 1.5 percent and 1.9 percent for males, females and persons, during 1999-2000. Workforce utilisation is better in the urban areas and unemployment rates are lower compared to the all India average but are higher compared to rural areas. The unemployment rate was 3.1 percent for urban males, 3.5 percent for urban females and 3.2 percent for urban persons compared to all India rates of 4.8 percent for urban males, 7.1 percent for females and 5.2 percent for urban persons as per usual status in 1999-2000 (NSS 2001).

The Planning Commission of India projected an alarming state of unemployment in Punjab. It was estimated that the rate of growth of employment per annum during the Ninth Five Year Plan (1997-2002) would be 0.73 percent compared to a per annum growth rate of the labour force at 2.27 percent during this period (Planning Commission, 1999). The major part of this unemployment was expected to be amongst the youth, particularly among the educated youth. A survey of unemployed youth in Punjab, conducted in 1998, showed that there were 14,71,527 unemployed youth in the age group of 15-35 years (Economic Census 1998, Economic & Statistical Organisation, Punjab). This indicates that nearly 20 percent of the 75 lakh workforce is unemployed. Evidence also suggests that unemployment in the state is increasing. As high income levels are achieved, the workforce in the state aspires for better quality of work.

Along with unemployment, which is fairly widespread among the youth, there is a high level of underemployment among those engaged in agriculture. Since agriculture is highly mechanised, it generates seasonal activities, which are partially supplemented by dairy as a subsidiary occupation. There has been a considerable decline in the labour absorption in agriculture. Per hectare wheat-paddy labour absorption stood at 153.78 days triennium, ending 1983-84, and declined to 106.16 days triennium ending 1996-97. With half of the work being done by hired labour, a cultivator with 2 hectares of land would be working for 106.16 days if he/she were not engaged in dairy as a supplementary activity. Even if dairy activity is duly accounted for, it is estimated that on an average cultivators/farmers get work for only half the year

(Gill, 2001). This indicates a very high level of underemployment for cultivators. The situation is not much better for casual labour engaged in agriculture, particularly in the districts away from the Amritsar-Delhi railway line and in villages which are distant from the major towns in the state.

There is a need to increase the labour participation rate particularly amongst women, to make proper use of human resources in Punjab. This requires an expansion of economic activities and job creation and also demands an improvement in the quality of jobs. Experience over the past decade shows that private sector jobs shrink when public sector employment diminishes and vice versa. The situation demands that the government shoulder the role of a major job creator, particularly in infrastructure development and social sectors like health and education. At the same time, it must create conditions for the private sector to undertake agro-processing and related activities. The government must also ensure minimum labour standards in the private sector to improve the quality of jobs.

Agriculture Development and its Sustainability

Agriculture and dairy are the major sources of livelihood in Punjab. In 1991, agriculture and dairy employed 55.26 percent of the workforce and contributed to 47.63 percent of NSDP. Today, certain basic questions are being raised regarding the sustainability of agricultural development.

Over-exploitation of Resources

First, it is argued that the physical resources and environment have been over-exploited and further exploitation would not only be economically expensive but also ecologically hazardous. Punjab has a geographical area of 50,36,000 hectares. The area under cultivation is 42,37,000 hectares, which constitutes 84.13 percent of the total area. Another 8.06 percent area is under non-agricultural use such as for houses, roads, railway lines, industrial sheds/ factories, hospitals, schools, etc. Thus, there is little possibility of more area being brought under cultivation. The forest cover is abnormally thin at only 5.56 percent. For a healthy environment, at least 15 percent of the total area is required to be under forests. Ninety-five percent of the net sown area is irrigated and the state's cropping intensity stands at a very high 185 percent.

Wheat and paddy rotation, which accounts for more than 70 percent of the gross cropped area, dominates the cropping pattern. This cropping pattern has increased the demand for water for irrigation purposes to a level that simply cannot be met in the years to come. The total demand for irrigation water in the state is estimated at 4.38 million-hectare metres with the existing technology and cropping pattern. But the total supply from both surface and annual recharge of ground water is only 3.13 million-hectare metres. The annual deficit turns out to be 1.25 million-hectare metres (Sondhi and Khepar, 1995). The deficit is met from over-exploitation of ground water resources through tubewells. As a result, the water table has been falling fast. In the central plains, the ground water table declined in the range of 0.7 metres to 1.7 metres during 1974-84 but it declined between 1.5 metres to 5.1 meters during 1984-94 (Sidhu and Johl, 2001). Most of the area in the central plains is labelled as 'dark area' from the point of view of ground water. There is the possibility that shallow tubewells will be rendered useless and instead there will be a requirement of massive investment on deep tubewells.

In the southern districts, where ground water is not fit for irrigation, intensive use of canal irrigation has led to a decline in the water table. This had made the land prone to waterlogging. The rise in the level of rainfall leads to flooding in these areas. Besides, these districts are traditionally cotton-growing areas, but are now shifting to irrigation- intensive paddy cultivation and thus putting further pressure on water resources. In addition to scarcity of irrigation water,

the quality of water has also become poor. Industrial and sewerage waste of cities is thrown into rivers, *nullahs* and drains, untreated. This is leading to pollution of surface and ground water resources. Intensive use of chemicals and poisons (insecticides and pesticides), along with untreated industrial water (heavy metals), has polluted the water in certain areas to such an extent that it is unfit for human and animal consumption.

The over exploitation of land through intensive use of chemical fertilisers, keeping land under cultivation during most of the year and returning little biomass to it (instead burning paddy and wheat straw) have reduced fertility and led to the quality of land becoming very poor. Organic carbon in the soil is making it deficient in nitrogen (N). Phosphorous (P) content has also been depleted due to wheat-paddy rotation. The fall in micro-nutrients in the soil is reducing productivity, leading to rising cost of production. The shift to high yielding varieties (generally mono varieties) has made crops more prone to pests and diseases. This has further led to greater use of chemicals to control weeds and pests. Massive use of chemical poisons has killed many friendly pests, birds and worms, leading to further ecological deterioration. From an environmental point of view (water scarcity, soil depletion, depletion of flora and fauna) the present cropping pattern simply cannot be sustained.

Non-sustainability of Agriculture

Second, the development of Punjab's agriculture is not sustainable. This development had centred around wheat and paddy crops with a view to supplying foodgrains to other states. This worked very well till the mid-1990s, but now large stocks of foodgrains (nearly 60 million tonnes) have been built up and their proper use and distribution have become a serious problem. India is unable to sell in the international market due to the depressed price of foodgrains and also due to the poor quality of stocked foodgrains. Within the country, several deficit states have increased foodgrain production and some find it cheaper to import from other countries. In the present circumstances, there are no takers for Punjab's wheat and paddy.

Non-sustainable Pattern of Cultivation

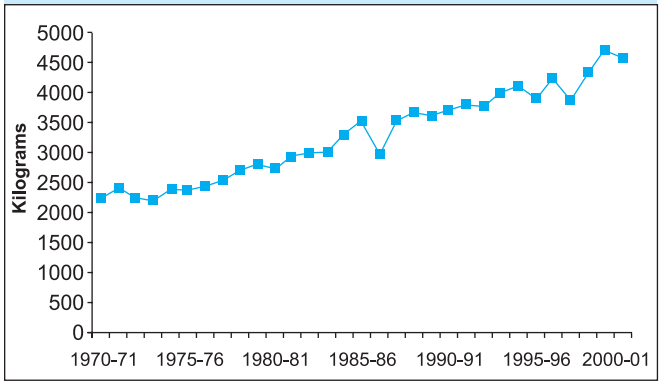
Third, the present pattern of organisation of cultivation has also become unsustainable for a large number of cultivators in the state. Since the production process is highly mechanised, bullock cultivation has been replaced by tractor cultivation. The harvesting of crops, and irrigation (tubewells) are also mechanised. Moreover, a massive amount of working capital is required to carry on daily operations along with the stock of machinery. It is extremely difficult for the marginal and small (poor) cultivators to access this capital. Thus small and marginal farms have become non-viable. A study by the Punjab Agriculture University shows that the economic condition of farmers owning 2 hectares of land (small) is unsatisfactory and the economic condition of farmers owning less than 1 hectare (marginal) is worse and cannot be improved with the existing technology and cropping system. Thus, a large proportion (35.43 percent in 1995-96) of the cultivators are facing ruin and a crisis of existence. Since work outside agriculture is not available to such cultivators and many of them know no other type of work, a large number of such cultivators are trapped in agriculture and doomed to a miserable life.

To sum up, Punjab's agriculture with its present level of technology and cropping pattern is ecologically unsustainable. The present level of foodgrain production is unwarranted. The pattern of cultivation based on individual resources of the cultivator is simply non-viable for a large number of cultivators.

Crisis of Agriculture

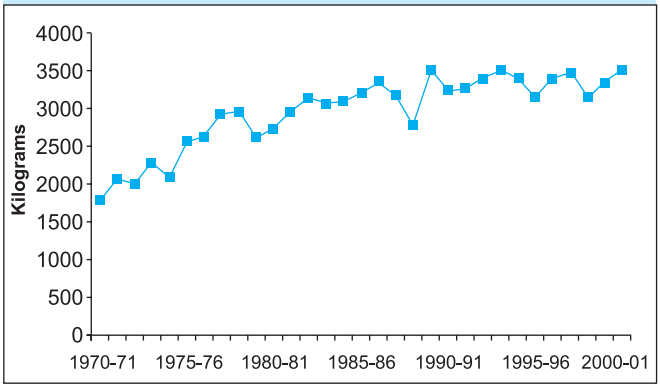
Scholars and analysts in Punjab have been concerned about the crisis of Punjab's agriculture for the decade and a half. The Government of

Figure 3.1 (a): **Per Hectare Yield of Wheat in Punjab (in kg)**



Source: Statistical Abstract of Punjab (various issues)

Figure 3.1 (b): **Per Hectare Yield of Rice in Punjab (in kg)**



Source: Statistical Abstract of Punjab (various issues)

Punjab appointed an expert committee in 1985 headed by S.S. Johl, which submitted its report on diversification of agriculture in May 1986. The committee was concerned about stagnating productivity levels, as well as the deteriorating environment due to a cropping pattern dominated by wheat-paddy rotation (Government of Punjab, 1986). The findings of the committee have come into sharper focus in the 1990s.

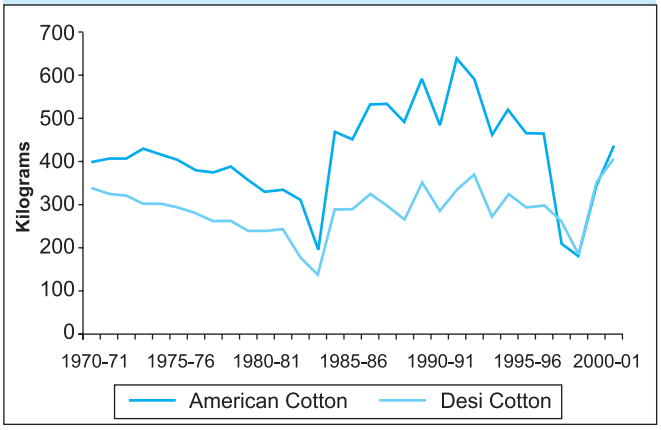
The data presented in Figures 3.1 (a) and 3.1 (b) indicate that per hectare yield of wheat and rice rose in 1981-82 over 1971-72 (three years moving average) respectively by 26.05 percent and 73.64 percent. The per hectare yield of these crops rose in 1991-92 over 1981-82 respectively by 30.25 percent and 11.78 percent. The yield further increased in 1997-98 over 1991-92 in case of wheat by 10 percent and rice by 3.22 percent. In fact, the per hectare yield of wheat fluctuated between 3,853 kg and 4,332 kg between 1993-94 and 1998-99 and in case of rice between 3,132 kg and 3,507 kg.

This indicates that with existing levels of technology the per hectare yield of wheat and paddy have reached their peak and have stabilised around 4000 kg in case of wheat and around 3,350 kg in case of rice.

The cotton crop in the state has shown signs of decline in the level of per hectare yield particularly in the 1990s (Figure 3.2). Though there have been wide fluctuations in the per hectare yield of both American as well as *desi* cotton, overall, yields declined in the 1990s. Since wheat, rice and cotton account for nearly 80 percent of the gross cropped area, the declining or stagnating yield of these crops has naturally affected all the cultivators in the state.

Contrary to the yield trend, the cost of cultivation has continuously risen. This is due to a rise in prices of inputs, and an increased requirement for inputs due to deterioration in the quality of soil and

Figure 3.2: **Per Hectare Yield of Cotton in Punjab (in kg)**



Source: Statistical Abstract of Punjab (Various Issues)

Table 3.5: **Decennial Rate of Growth of Per Hectare Returns at Cost A1, B2, and C2**

(in percentage)

Year	Wheat			Paddy			Wheat + Paddy		
	A1	B2	C2	A1	B2	C2	A1	B2	C2
1980s	3.93	2.76	3.55	1.90	-0.17	1.06	2.90	1.24	2.20
1990s	0.35	-6.48	-8.27	-2.83	-7.58	-11.38	-2.18	-1.03	-15.46

Source: R. S. Ghuman "World Trade Organisation and Indian Agriculture with Special Reference to Punjab: Crisis and Challenges", Man and Development Vol. XXIII No. 2, June 2001.

Note: 1. Cost A1 includes all actual expenses in cash and kind incurred in production by owner.

2. Cost B2 includes A1+ interest on value of owned fixed capital (excluding land) + rental value of owned land (net of land revenue) and rent paid on leased land.

3. Cost C2 includes B2 + imputed value of family labour.

degradation of the environment. The resultant fast increase in cost of production has led to a decline in returns from agriculture. Decennial trends in growth rates of per hectare returns show that in the 1980s these growth rates were positive. But during the 1990s the growth rates on returns were negative. This is shown in Table 3.5

The negative growth rate in per hectare rate of return on wheat and paddy in the 1990s has led to a reduction in the income of cultivators. Falling income has added to the difficulties of poor cultivators who do not have enough cushion for adjustment.

Besides falling income and negative growth in the rate of returns, the crisis of procurement has shaken the vast majority of cultivators. In the wake of India becoming a founder member of the World Trade Organisation (WTO) and the internal policy of liberalisation, the Union Government announced in the budget of 2001-2002 that but for public distribution requirements (PDS), procurement of foodgrains would be transferred to the states. States like Punjab have neither the financial resources nor logistic arrangements to undertake this function.

Problems related to the procurement systems of crops and ensuring a minimum support price (MSP) still remain and farmers continue to suffer from uncertainty.

To pull Punjab out of its agricultural crisis, high investment in research and development (R & D) is required to ensure the introduction of new technology, which could introduce new viable crops with a high level of productivity giving returns comparable to those of wheat and paddy. The alternative crops have to be such that they put minimum strain on exhaustible resources such as water and soil. At the same time, arrangement for MSP, along with a system of procurement, should be ensured. Simultaneously, there is need for investment in agro-processing of the proposed new crop. For this purpose, farmers need to be supported materially as well as through human resource development and above all through the creation of an environment which removes the uncertainties created by contemporary liberalisation and globalisation.

The state government is proposing to shift towards value-added, water light crops such as fruit and vegetables, maize, oilseeds, pulses, sugarcane and floriculture, and to revive allied occupations such as dairy farming, poultry, piggery, mushroom cultivation, bee keeping and others by launching a programme called 'Second Push in Punjab Agriculture and Allied Sectors'. The programme aims to create a voluntary shift in the cropping pattern, introduce income/employment-generating, productivity oriented programmes directly benefiting the farmers of Punjab; and safeguard

the valuable and scarce resources of land, water and environment from further deterioration.

Changing Pattern of Land Holdings

Since agriculture is dependent on capital-intensive technology, it requires massive investment both in fixed as well as working capital. This has resulted in marginal and small holdings fast losing their viability.

The data of operational holdings since 1970-71 indicates that the number and proportion of small and marginal holdings are decreasing. The number of marginal holdings (with less than one hectare land) in 1970-71 was 5,17,568; this declined to 2,03,876 in 1995-96. Similarly, the number of small holdings (with 1-2 hectares of land) declined from 2,60,083 in 1970-71 to 1,83,453 in 1995-96.

Marginal and small holdings constituted 56.54 percent of the total holdings in 1970-71 but declined to 35.43 percent in 1995-96. The number of medium, large and extra large holdings has increased respectively from 281103, 247755 and 68883 in 1970-71 to 320340, 305792 and 79612 in 1995-96. The combined share of these holdings (medium, large and extra large) increased from 43.46 percent in 1970-71 to 64.57 percent in 1995-96. The largest gain in number and proportion occurred in large holdings. They gained by 9.97 percentage points, followed by medium holdings with a gain of 8.87 percentage points and extra large holdings with a gain of 2.28 percentage points. Loss in the marginal holdings in number and proportion is the largest, followed by small holdings. While marginal holdings have lost by 18.98 percentage points, small holdings have lost by 2.13 percentage points. In absolute terms the number of holdings in 1995-96 over 1990-91 was less by 20.53 percent (Table 3.6). This means one-fifth of the operational holdings have declined/ disappeared from the scene, with mainly marginal and small holdings accounting for this disappearance.

The situation in 1995-96 reversed compared to 1970-71. In 1970-71 marginal and small holdings accounted for 56.54 percent of total holdings but in 1995-96, medium and large holdings accounted for 57.29 percent of total holdings. The longer term trend shows an increase in the number of medium and large holdings, thereby contributing towards

Table 3.6: **Distribution of Operational Land Holdings in Punjab, 1970-71, 1980-81, 1990-91 and 1995-96**

(In numbers)

Size Class (in hectares)	1970-71	1980-81	1990-91	1995-96
Marginal	517568	197323	296131	203876
(0-1)	(37.63)	(19.21)	(26.50)	(18.65)
Small	260083	199368	203842	183453
(1-2)	(18.91)	(19.41)	(18.24)	(16.78)
Medium	281103	287423	288788	320340
(2-4)	(20.44)	(27.99)	(25.85)	(29.31)
Large	247755	269072	261481	305792
(4-10)	(18.02)	(26.20)	(23.40)	(27.98)
Extra Large	68883	73941	67172	79612
(10 and above)	(5.00)	(7.19)	(6.01)	(7.28)
Total	**1375392 (100.00)**	**1027127 (100.00)**	**1117414 (100.00)**	**1093073 (100.00)**

Source: Director of Agriculture, Agricultural Census of Punjab 1970-71, 1980-81, 1990-91 and 1995-96, Government of Punjab, Chandigarh.

Note: Figures in parentheses are percentages.

disappearance of marginal holdings. The size of marginal holdings makes them non-viable given the present technology of production in Punjab. In the absence of job opportunities in other sectors of the economy, non-viability of the marginal, and to some extent, small holdings is a cause of worry. The cultivators with marginal land holdings are very poor, lack capital resources and have no other skill that can help them join the ranks of labour in rural or urban areas. This leads to lowering of their social status and loss of an assured source of livelihood. The situation demands the launch of a massive programme of human resource development through education and training for the marginal, small and poor cultivators. This has to be accompanied by financial support for setting up of enterprises in the chosen areas of training or their deployment in assured areas of employment.

Indebtedness of Farmers

The prosperity of the early years of the Green Revolution raised consumption standards in rural areas, particularly among cultivators. There was also considerable withdrawal of family labour from manual agricultural work among farmers. When cost of production continued to increase while productivity/ hectare stagnated in case of major crops, the majority of cultivators found themselves cash strapped. Additionally, family budgets were upset when there was a crop failure or a sudden spurt in consumption expenditure due to social ceremonies such as marriage, birth or death. This was reflected in a mounting debt burden on families.

It is estimated that the debt burden of farmers in Punjab is to the extent of Rs 5,700 crores. In per acre terms the incidence of indebtedness is highest among small and marginal farmers. The average per acre debt of these farmers is Rs. 10,105. The per acre debt of farmers of land holding in size group 5-10 acres was Rs. 7941, that or farmers with land holdings of 10-15 acres was Rs. 4230 (Shergill, 1998). Within these classes of farmers, the level of indebtedness is much higher for some farmers. The most vulnerable among them have four times the debt of the average estimated by Shergill. Debt of farmers with up to 2.5 acres of land is Rs. 40,965 per acre while it is Rs. 34,297 per acre for farmers with land of 2.5-5 acres.

The high debt burden on marginal and small cultivators has ruined many and they have had to either sell or mortgage their land. Economic hardship, high incidence of debt burden and harassment by bank officials and moneylenders have triggered instances of suicides by many cultivators. This phenomenon started during the second half of the 1980s and gathered momentum during the 1990s (AFDR, 2000; Iyer and Manick, 2000). The number of suicides has now increased to several hundred. Studies and newspaper reports on suicides have highlighted farmers' indebtedness and harassment by recovery staff of the loan-giving agencies. These include commercial and land mortgage banks and moneylenders (commission agents). The Government of Punjab has recognised this fact and in the budget session (March 2001) announced a programme of rehabilitation of the families in which members committed suicide due to economic distress and indebtedness. It was stated that Rs. 2.5 lakh would be given as compensation by the government to the suicide victim's family.

Although this announcement has not been concretised and details and procedures are yet to be worked out, it is undoubtedly a step in the right direction. The announcement needs to be supplemented by a massive programme of regeneration of rural education with emphasis on skill creation and re-organisation of the rural economy so that a large number of jobs are created in allied agricultural activities on farms, and in off-farm activities. At the same time the credit

market, particularly the non-formal market operated by commission agents, needs to be regulated and poor cultivators need to be protected from the demands of modern moneylenders.

Livestock, Animal Husbandry and Dairy

In the primary sector, after agriculture, livestock is the second largest contributor to the state domestic product. The share of livestock stood at 7.09 percent in NSDP in 1960-61 but increased to 15.27 percent in 1997-98. Its share increased steadily between 1960-61 and 1980-81 from 7.09 percent to 14.44 percent. The share of this sub-sector recorded a very slow improvement between 1980-81 and 1990-91—less than one percentage point—and virtually stagnated between 1990-91 and 2000-01 (Table 3.3). This indicates that during the earlier years, the rate of growth of livestock, as well as income of this sector, was growing at a rate much higher than the rate of growth of NSDP. But in the recent decade (1990s), the growth rate of income from livestock is matched by the rate of growth of NSDP, which has also slowed down. Thus, the overall slowdown is also reflected in this sector.

The trend in livestock numbers shows that they are growing over time. Table 3.7 shows that the number stood at 89.96 lakh in 1977, which increased to 96.78 lakh in 1990 and 98.57 lakh in 1997. In the livestock population, the number of cows (both male and female) has registered a decline from 33.12 lakh in 1977 to 26.39 lakh in 1997. The population of buffaloes (both male and female) increased from 41.10 lakh in 1977 to 61.71 lakh in 1997: an increase of 50.14 percent.

The population of other animals, mainly of sheep and goats, has been declining all through the last two and a half decades. There was a sizeable increase in poultry birds between 1977 and 1990, but subsequently there has been a decline in their numbers. This may be due to the militant 'diktat' against meat eating and threat to close down meat shops during the early 1990s.

If we go by animal population, the loss of the cow and other animal population is more than compensated for by an increase in the buffalo population resulting in a net gain in the total animal population in 1997 over 1990 and 1977. Since there is a decline in the use of animal power in agriculture as also in transport activities, (replaced by

Dairy farming in Punjab

Table 3.7: **Livestock Population in Punjab – 1977, 1990 and 1997 (in lakhs)**

Year	Cows (males & females)	Buffaloes (males & females)	Others	Total	Poultry Birds
1977	33.12	41.10	15.74	89.96	55.39
1990	28.32	55.78	12.68	96.78	152.76
1997	26.39	61.71	10.48	98.57	114.57

Source: Statistical Abstract of Punjab 2002.

machine power) income generation in this sector is now based mainly on milk.

The population of cows and buffaloes (88.10 lakh) constitute 89.37 percent of the total animal population in Punjab in 1997. In this population, 32.86 lakh (37.30 percent) were milch animals, the remaining being male animals, dry females and others. Among milch animals, 6 percent consisted of *Desi* cows, 19-21 percent cross-breed cows and 74.79 percent buffaloes (Figure 3.3). Thus, more than 80 percent of milch animals are of a traditional variety. If the production of milk is to be increased in a sustained manner, buffaloes and Desi cows will have to be replaced by cross-breed cows of a good variety (Kahlon, 2001).

Figure 3.3: **Composition of Milch Animals in Punjab – 1997**

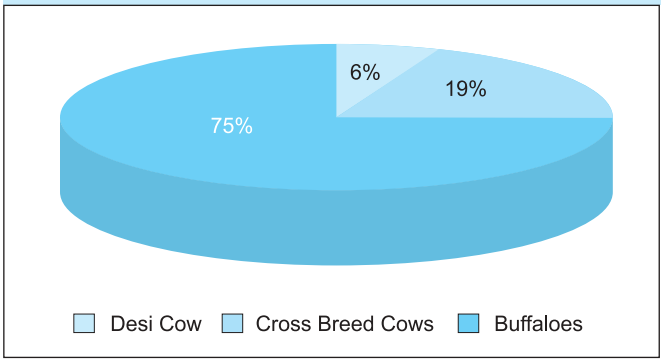


Table 3.8: **Composition of Milch Animals in Punjab – 1997**

Type of Animal	Number
Desi cows	1,97,300
Cross-breed cows	6,31,100
Buffaloes	24,57,400
Total	**32,85,800**

Source: Statistical Abstract of Punjab 2000.

At present, the dairy sector in Punjab functions as a subsidiary activity of agriculture. Most farmers and agricultural labourers rear one or two milch animals and sell their surplus milk to supplement their income. Milch animals are not reared on a commercial basis and many animal owners have no specialised knowledge of rearing milch animals commercially. Punjab dairying must be transformed from subsistence to commercial dairying by providing small and marginal farmers the necessary financial support, technical training and quality infrastructure in veterinary services (Kahlon, 2001). This needs to be supplemented by improved marketing services and by taking steps to remove various malpractices in adulteration of milk and milk products.

Agricultural Labour

Agricultural labour is the second largest category of total workers in the state. The share of this category, as well as its absolute number, has increased consistently since 1971. The number of agricultural labourers increased from 7,86,705 in 1971 to 14,52,228 in 1991. The share of agricultural labourers in the total workforce of the state increased from 20.10 percent in 1971 to 23.81 percent in 1991 (Table 3.9). Males dominate this category of workers. The highest proportion of females, recorded in 1991, was 4.43 percent of the total agricultural labourer.

Table 3.9: **Agricultural Labour in the Total Workforce of Punjab, 1971, 1981 and 1991**

Number of Agricultural Labourers				Total Workforce	Agricultural Labour as percentage of total workers
Year	Male	Female	Total		
1971	7,78,613	8,092	7,86,705	39,12,592	20.10
1981	10,47,175	45,050	10,92,225	49,27,759	22.16
1991	13,88,159	64,669	14,52,228	60,98,374	23.81

Source: Census of India, 1971,1981 and 1991

Information from Census of 2001[1] says that the number of agriculture labourers in the state is 16.4 percent of all workers in the state. This is not strictly comparable to the data table from the earlier census, as the earlier census data includes only main workers while the 2001 Census data pertains to both main and marginal workers. Amongst main and marginal workers, women agriculture labourers constitute 25.3 percent in 2001.

Agricultural labourers can be classified into two categories on the basis of nature of employment: casual labourers and attached labourers. In 1975-76, attached labourers constituted 38.27 percent of the total labour force, while the share of casual labourers was 61.73 percent. (Sidhu, 1991). Over a period of time, the category of attached labourers (commonly referred to as siris, they worked on contractual terms) disappeared. Now, relatively well off cultivators employ labourers on a contract basis for six months to a year. Though precise information is not available, it is estimated that these contractual labourers constitute approximately 30 percent of the agricultural labourers.

Agricultural labourers do not own land or other means of livelihood and depend on wage labour for survival. They belong to the lowest income strata in rural society. Agricultural activity being seasonal in nature, a large number of agricultural labourers are forced to seek work outside agriculture in the lean season. A sudden spurt in economic activities increases the demand for labour, which is often met through migrant labour from Uttar Pradesh and Bihar. The actual days of employment for local labour in agriculture, therefore, have been further reduced. Agricultural labourers living near cities try to find work in the urban informal sector in the lean periods, but those living far away from cities have to make do with a reduction in the days of employment.

Most agricultural labourers are not unionised. In those areas where they were unionised, their organisations have shrunk or become dormant. This is partly due to a large inflow of migrant labour and partly due to the threat to labour organisations from the terrorist movement which was hostile to them (Gill, S.S., 1996).

Unorganised and mostly illiterate, agricultural labourers are not in a position to obtain their due share of agricultural prosperity. When migrant labour did not have a strong presence in the state, the per capita earning of agricultural labour was 43.67 percent of per capital overall income in the state and 58.23 percent of the per capita income in rural areas. At present, they are suffering because of the death of the unions and because of the withdrawal of the state from enforcement of minimum wages. In the post-reform period, the real wages of casual agricultural labour declined by 3.69 percent between 1991 and 1996 (Gill and J.S. Brar 2001).

[1] Census of India, Paper III 2001, Registrar General of India, New Delhi.

Table 3.10: **Distribution of Main Workers in Punjab (in Percentage)**

Sectors	1971	1981	1991
Cultivators	42.56	35.86	31.44
Agricultural Labourers	20.11	22.16	23.82
Livestock, Forestry etc.	0.95	1.00	0.81
Mining and quarrying	0.01	0.02	0.01
Manufacturing:			
a. In household industry	3.17	2.58	1.33
b. Other than household industry	8.13	10.58	10.95
Construction	1.98	2.04	2.56
Trade and Commerce	8.22	9.47	10.55
Transport storage and communications	2.80	3.73	3.83
Other Services	12.07	12.54	14.70
Total	**100**	**100**	**100**

Source: Census of Punjab, 1971, 1981 and 1991.

Agricultural labourers belong to the lowest economic as well as social strata. Most are Scheduled Castes or backward castes. There is an urgent need to devise special programmes for their economic upliftment and upward mobility. Besides, they need to get organised so that they can participate in their own improvement through consultation and are able to implement decisions. There is a need to empower agricultural labour through its unionisation, and back it by implementation of statutory provisions for its improvement.

Non-Farm Sector

The role of the non-farm sector in the transformation of a developing economy is crucial. To understand the size and nature of the non-farm sector, first of all, it is necessary to examine the interaction between population and economy. The share of the main workers in the total population of the state increased from 28.81 percent in 1971, to 29.35 percent in 1981, and to 30.07 percent in 1991. A person is being described as a main worker if he/ she participates in any economically productive activity and remains in work during the major part of the year.

The share of non-workers in the total population of the state was 69.12 percent during 1991[2]. Table 3.10 provides the distribution of main workers into nine broad industrial categories during 1971, 1981 and 1991.[3] The share of cultivators among the main workers declined considerably from 42.56 percent in 1971 to 31.44 percent in 1991. However, the share of agricultural labourers increased marginally from 20.11 percent in 1971 to 23.82 percent in 1991. The share of main workers in the manufacturing sector increased from 11.3 percent in 1971 to 12.28 percent in 1991. Within the manufacturing sector, the share of the non-household sector increased over time. Similarly, the share of main workers in construction, trade and commerce, transport, storage and communication, and other services recorded some increase. The combined share of all these activities increased from 25.07 percent in 1971 to 31.64 percent in 1991. The share of main workers in livestock, forestry, fishing, hunting and plantations, orchards and allied activities declined from 0.95 percent in 1971 to 0.81 percent in 1991. Thus the share of main workers in non-farm activities increased from 36.37 percent in 1971 to 43.92 percent in 1991. The significance of the non-farm sector in the Punjab economy can

[2] Primary Census Abstract, Punjab Tables, Census of 1991, Registrar General of India, New Delhi

[3] Data pertaining to main workers in different industrial categories from the Census of 2001 was not available at the time of publication of this report.

be further ascertained by examining the various aspects of non-agricultural activities. This analysis has been carried out with the help of the data gathered from various Economic Census of the state.

In Punjab, the total number of non-agricultural enterprises was 7,01,267 in 1998. Out of these, the number of establishments was 2,28,184 and own account enterprises[4] was 4,73,083. Further, as many as 20,64,823 persons were usually working in such enterprises. Among these persons, the number of hired workers was 11,89,150. Thus, an average of 2.94 persons were usually found to be working for every non-agriculture enterprise. Out of these the number of hired workers per enterprise was 1.70 and that of non-hired workers was 1.24 persons (Statistical Abstract of Punjab, 2000, P.779). The various features of 'non-agricultural establishments' and 'non-agricultural own account enterprises' have been discussed in detail by using Table 3.11 and Table 13 (Statistical Tables) respectively. A perusal of Table 3.11 establishes that the number of non-agricultural establishments operating increased from 1,31,584 in 1980, to 1,86,537 in 1990 and to 2,28,184 in 1998. The number of establishments operating increased by 41.76 percent in 1990 over 1980, and by 22.33 percent during 1998 over 1990. Thus the growth in the number of non-agricultural establishments operating slowed down during the 1990s.

The analysis of data further reveals that out of these enterprises the number of seasonally operating ones was 6,065, those without premises was 5,151, with power fuel 72,205, co-operatives 3,656 and public 39,844, during the year 1998. Out of the total establishments, 12,765 (5.59 percent) were owned by Scheduled Castes. In these establishments 13,94,872 persons were usually found to be working in 1998. Out of these persons, 11,89,150 were hired workers. The share of the rural areas in non-agricultural establishments operating in the state was 36.37 percent in 1980, which increased to 37.60 percent in 1998. This implies that the rural areas had 47,370 establishments in 1980, 65,287 in 1990 and 86,790 in 1998. The number of persons

Table 3.11: **Number of Non-Agricultural Establishments and Persons usually Working**

Item	Year 1980	1990	1998
A. Total Establishment Operating	131584	186537	228184
Seasonally	3284	5640	6065
Without premises	1913	2223	5151
With power/fuel	37739	58434	72205
Co-operative	4662	5839	3656
Public	41512	35334	39844
Social Group of owner:			
(i) Scheduled Tribes	—	—	—
(ii) Scheduled Castes	3866	8786	12765
B. Persons usually Working:			
(i) Total	873082	1215353	1394872
(ii) Hired workers	758808	1062062	1189150
C. Share of Rural Area in Percentage:			
(i) Number of establishment	36.37	34.59	37.60
(ii) Total number of persons usually working	28.58	27.85	31.87
(iii) Number of hired workers	26.06	25.69	33.81

Source: Economic Census 1980,1990 and 1998.

[4] An own account enterprise is one having no hired worker; it is carried out solely by the family members.

working in these establishments was 2,53,193 in 1980, 3,40,298 in 1990 and 4,46,359 in 1998. This implies that, on an average, each establishment generated employment for five persons. Furthermore, the number of hired workers was 33.81 percent out of the total persons usually working in 1998. Thus, 1,51,762 persons worked in such establishments on a hired basis in 1998. Hence, per establishment the average employment was 1.74 persons on a hired basis and 3.26 persons on non-hired basis during 1998.

To further understand the nature of non-agricultural enterprises, the distribution of own account enterprises into major economic activity groups has been given in Table 13 (Statistical Tables). The table provides information for twelve categories of major activity groups. In 1998, there were as many as 4,73,083 non-agricultural own account enterprises operating in the state. Out of these, 2,05,943 (i.e. 43.53 percent) were in rural areas and 2,67,140 (i.e. 56.47 percent) in urban areas. These enterprises were dominated by three types of activities, i.e., manufacturing, retail trade and 'community, social and personal services', constituting 13.89 percent, 47.35 percent and 27.23 percent respectively of enterprises at the state level. The combined share of these three activities stood at 88.47 percent in 1998. Thus, the non-farm sector in the state economy experienced growth in terms of an increase in the proportion of main workers, number of non-agricultural establishments, own account enterprises as well as an increase in the number of persons usually working both in the rural and urban areas.

Inter-Sectoral Relationships

The flow of resources among different regions of an economy takes the form of commodity and financial flows. The Punjab economy, being a typical case of advanced agrarian capitalism supplies agricultural products, particularly wheat and paddy to the rest of the country. The state uses agrarian, mechanical and chemical inputs in quantities larger than the rest of the country. The agricultural produce of the state has been exchanged with the manufactured products of the rest of the economy. The exchange of primary sector output with secondary sector output raises the question of terms of trade.

Financial transfers between the state and the Centre become very important in a federal polity. The flow of resources from the Centre to the state takes the form of: (a) share of the state in central taxes and duties (b) plan and non-plan grants (c) plan and non-plan loans. There is a return flow from the state to the Centre as interest payments and repayments of accumulated loans from the Centre. Apart from terms of trade and statutory and non-statutory transfer between the Centre and the state, the transfer of financial resources by the scheduled commercial banks are of crucial importance. Savings collected by banks in a region and the advances made by those banks in that region determine the extent of resources transferred.

The finances of the state government reveal serious imbalances. The gross fiscal deficit of Punjab increased from Rs1,242.2 crore in 1990-91 to Rs 3,674.2 crore in 2000-2001 (B.E.). A substantial part of this deficit was to be financed by loans from the Centre. The gross devolution of resources from the Centre to the state was budgeted to the order of Rs. 4,682.2 crore during 2000-01. By contrast devolution from Centre to state was Rs. 1,620.5 crore during 1990-91. Gross loans from the Centre to the state have increased from Rs. 1,191.2 crore in 1990-91 to Rs. 3103.5 crore during 2000-01 (B.E.). The outstanding liabilities of the state, at the end of March 2001, stood at Rs. 28,307 crore. Out of these, the loans and advances from the central government stood at Rs. 16,357 crores (i.e. 57.78 percent) (Economic and Political Weekly, 2001: 1901-28). Thus, central transfers play a critical role in a state's fiscal management.

Table 14 (Statistical Tables) demonstrates the transfer of resources from the Centre to the state over the period 1990-91 to 2000-2001. The table demonstrates the resource transfer at three levels: share in central taxes, grants from the Centre, and net loans from the Centre. The amount of central taxes that accrued to the state increased from Rs. 248.2 crore in 1990-91 to Rs. 671.1 crore in 2000-2001. Similarly, grants increased from Rs. 181.1 crores to Rs. 907.6 crore and net loans from Rs. 745.2 crore to Rs. 1719.8 crore during the corresponding years. Thus, the total transfer from the Centre to state increased from Rs. 1,174.5 crore in 1990-91 to Rs. 3,298.5 crore in 2000-01. It is to be noted that from this total transfer the amount of interest payment made by the state to the Centre has not been excluded. The actual transfers are of much smaller amounts. Thus, column 5 of Table 14 (Statistical Tables) has been introduced, which shows the amount of net transfer from the Centre to Punjab. The net budgeted transfer from the Centre to the state stands at Rs. 1,451.77 crore during 2000-01. The total net transfer from the Centre to Punjab was to the order of Rs. 3770.30 crore during 1994-95 to 1998-99.

Table 15 (Statistical Tables) depicts the 'advance-deposit ratio' of public sector banks for nine selected states over the period 1971 to 1999. In the case of Punjab, the average 'advance-deposit ratio' was 39.76 percent during the decade 1971-80 and 43.96 percent during the decade 1981-90. Such ratios in the case of the rest of the states were substantially higher than that of Punjab. The all India average was 70.82 percent and 64.16 percent during the respective decades. Thus, the state experienced adverse 'advance-deposit ratios' for two decades continuously (1970 to 1990); the situation remained the same during the third decade from 1991 to 1999, for which yearly behaviour of such ratios have been demonstrated. The low 'advance-deposit ratio' observed in the state indicates that the banks have been collecting funds from Punjab and investing in states with a high ratio. The adverse 'advance-deposit ratio' indicated the creation of assets in other parts of the country. The Reserve Bank of India (RBI) prescribed an 'advance- deposit ratio' norm of 55 percent. If this norm had been upheld during the period of five years (i.e. 1994-95 to 1998-99) the state would have gained to the extent of Rs 21,900 crore in the form of additional investment by the banks.

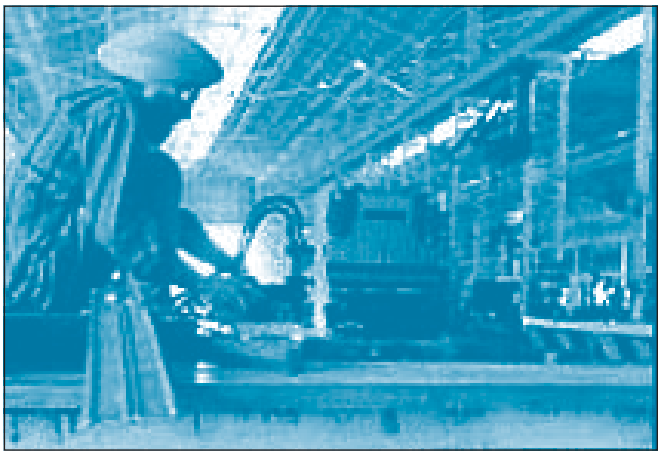
Industrial Development, Structure of Industries and Employment

The industrial sector is considered to be the most dynamic and vital sector of a growing economy. This sector rapidly adopts modern technology, provides a strong base for new employment and investment opportunities and absorbs the surplus workforce of the traditional sectors. The existence of a large modern industrial sector, therefore, ensures the expansion and growth of the economy, and is treated as a symbol of a modern economy.

Industrial growth in Punjab

At the time of Independence, Punjab was relatively industrially backward (Singh, L., 1992). Punjab's Partition in 1947 and reorganisation of the state in 1966 further weakened Punjab's industries. (Pandit, 1985, Raikhy and Mehra, 2000). After Independence, India embarked upon an ambitious

programme of planned industrial development. Under this strategy, massive public investment was made in the industrial sector. However, the industrial sector of Punjab was virtually by-passed as far as public investment was concerned and nor did the private corporate sector come forward (Banerjee and Ghosh, 1985). In the process, Punjab remained deficient in large-scale industrial units and its industrial structure is constituted mainly by small-scale and medium-sized industries.



Industrial work in progress

Industrial Development

The industrial sector of Punjab has grown at a faster rate since 1966; showing an 8.64 percent per annum growth rate in value of output at 1980-81 prices during the period 1966-67 to 1998-99 (Table 3.12). This seems to be an impressive growth rate. Further, growth rate in the manufacturing sector remained much higher than the agricultural sector growth rate during the same period. Since the average rate of growth for such a long period can conceal many facts related to a short period, the whole period (1966 to 1998-99) is divided into three sub-periods. The growth rate for the first sub-period 1966-67 to 1979-80 was 8.22 percent. Thereafter, the growth rate in the output from the manufacturing sector speeded up to 9.12 percent during 1980-81 to 1990-91. Since then, industrial growth rate has decelerated to 8.49 per annum between 1991-92 and 1998-99.

Growth rate trends in the organised manufacturing sector of Punjab, at disaggregated level, have shown a differential performance (Table 3.13). An analysis reveals that in terms of output growth, there are eight two-digit industry groups, which recorded more than a 10 percent growth rate between 1979-80 to 1996-97. Six industry groups recorded an output growth between 5 percent and 10 percent per annum each. Even capital stock was growing at the rate of 10 percent or more for all industry except three groups, namely, (i) rubber, plastic, petroleum and coal products; (ii) basic metals and alloys; and (iii) machinery, excluding electrical machinery. However, employment growth was substantially lower as compared to output growth and capital stock growth rates across industries. Only textile products, leather, chemicals, electrical and transport equipment industry groups, had employment growth rates of 5 percent or more. The food products and cotton textiles industry groups had a very modest growth rate in employment. Both the basic metal and alloys and

Table 3.12: **Trend of Growth Rates in Output of Manufacturing and Agricultural Sectors of Punjab**

Period	Trend of growth rate per annum (percent)			
	Industry	Agriculture and livestock	(a) Agriculture	(b) Livestock
1966-67 to 1998-99	8.64	4.29	3.68	5.68
1966-67 to 1979-80	8.22	3.79	3.18	6.10
1980-81 to 1990-91	9.12	5.15	4.87	5.70
1991-92 to 1998-99	8.49	2.16	0.37	5.10

Source: Lakhwinder Singh and Sukhpal Singh, 2001

Table 3.13: **Trend of Growth Rate of Factory Sector Industries in Punjab 1979-80 to 1996-97 (at 1981-82 prices)**

(In percent)

Industry Code	Name of Industry Group	Fixed Capital	Employment	Output
20-21	Food products	11.41	3.29	6.69
22	Beverages, tobacco and tobacco products	13.19	4.83	11.05
23	Cotton textiles	10.56	2.14	9.00
24	Wool, silk and synthetic fibre textiles	15.23	2.48	10.06
26	Textile products (including wearing apparel)	17.02	9.00	7.11
27	Wood and wood products	13.11	-2.73	-0.70
28	Paper and paper products and printing, publishing and allied industries	15.51	6.41	17.71
29	Leather and leather products	12.61	8.20	4.47
30	Rubber, plastic, petroleum and coal products	0.28	2.86	9.83
31	Chemicals and chemical products	16.26	8.85	13.88
32	Non-metallic mineral products	17.47	2.01	13.57
33	Basic metal and alloys	8.88	0.04	8.85
34	Metal products and parts except machinery and transport equipment	11.83	2.79	8.08
35	Machinery except electrical machinery	6.24	0.15	5.87
36	Electrical machine apparatus, appliances and parts	21.38	6.66	17.60
37	Transport equipment and parts	15.57	6.45	11.10
38	Other industries	5.13	1.81	11.89

Source: Estimated from the Annual Survey of Industries (various issues), Central Statistical Organisation, Government of India, New Delhi.

machinery sectors, excluding electrical machinery, have shown very low growth rates in employment. Thus, the employment elasticity of output is low and it differs across industry groups in Punjab.

Due to fast growth in these industries, the share of the manufacturing sector in the NSDP has improved substantially. Its share rose consistently from 8.00 percent in 1970-71 to 15.37 percent in 1990-91, and thereafter decreased by 2.15 percentage points to 13.22 percent in 1998-99 (Table 3.14). On the other hand, the share of the manufacturing sector in India as a whole is quite high as compared to the corresponding share in Punjab. Further, India's manufacturing sector has produced more than two-thirds of the output of the secondary sector, during all these years, which is more than that of Punjab.

A mention here of various government initiatives to give Punjab's industrial growth a further fillip is both

Industrial work in progress

Table 3.14: **Selected Indicators of Industrial Progress in Punjab (in percent)**

Year	Punjab			India		
	Secondary sector in NSDP	Manufacturing sector in NSDP	Manufacturing sector in secondary sector	Secondary sector in NSDP	Manufacturing sector in NSDP	Manufacturing sector in secondary sector
1970-71	15.31	8.00	52.26	19.79	14.19	71.70
1980-81	18.47	11.01	59.58	23.00	16.95	73.67
1990-91	22.28	15.37	68.96	25.51	18.14	71.08
1998-99	21.11	13.22	62.60	26.72*	18.57*	69.49*

*Year 1996-97

Source: Statistical Abstract of Punjab, Various issues

Statistical Abstract of India, Various Issues.

appropriate and necessary. Twenty-six Industrial Focal Points in an area of 6,217 acres have been developed in the state so far, and 9633 industrial plots have been given to the entrepreneurs. In the next five years 23 more Industrial Focal Points will be developed. With a view to taking industry to the rural areas, especially small-scale industries and creating jobs in villages 594 Rural Focal Points have been decided on. Keeping in mind the potential in information technology (IT), the state government has also created a Special Package of Incentives under the I.T. Policy for software and I.T. units to be set up in Punjab.

In this direction, the government has set up an Earth Station at Mohali and with the laying of fibre optics in the state by the Department of Telecommunication, infrastructure has been established for the growth of the I.T. industry. The government has also launched the Venture Capital Fund for providing financial assistance to I.T. units. Other areas in which the government is attempting to boost industrial growth are the setting up of a Regional Cleaner Production Centre, to improve efficiency in industrial production and protect the environment; and, setting up of an Export Promotion Industrial Park in Dhandari Kalan.

Industrial Labour

Census data is helpful on employment in the industrial sector. The data shows that industrial workers, in absolute numbers, had grown from 4,42,070 in 1971 to 6,48,592 workers in 1981 and to 7,49,136 workers in 1991. The distribution of the

Table 3.15: **Industrial Workforce in Punjab – 1971,1981 and 1991 Census**

	Industrial workforce working in			
Year	Household Industry (unit)	Non-Household Industry (unit)	Total (unit)	As percentage of total population
1971	1,24,102	3,17,968	4,42,070	3.26
	[28.07]	[71.93]	[100]	
	(3.17)	(8.13)	(11.30)	
1981	1,27,186	5,21,406	6,48,592	3.86
	[19.60]	[81.40]	[100]	
	(2.58)	(10.58)	(13.16)	
1991	81,084	6,68,052	7,49,136	3.69
	[10.82]	[89.18]	[100]	
	(1.32)	(10.95)	(12.28)	

Source: Census of Punjab, 1971,1981 and 1991.

Note: 1. Figures in index brackets are percentages, 2. Figures in brackets are percentage share of total workforce.

workforce in the manufacturing sectors of Punjab by household and non-household enterprise shows some interesting results (Table 3.15). First, the share of workforce employed in the manufacturing sector increased from 11.30 percent in 1971 to 12.28 percent in 1991. Second, within the manufacturing sector, the household sector employed 28.07 percent of the workforce in 1971. Its relative share dwindled to 19.60 percent in 1981 and 10.82 percent in 1991. This means that the household sector is employing far lesser numbers than it used to. Third, the workforce engaged in non-household enterprises as a percentage of the total workforce of the state, increased from 8.13 percent in 1971 to 10.58 percent in 1981 and 10.95 percent in 1991. Lastly, the census data clearly reveals a marked rise in the number of non-household enterprises on the one hand and a declining importance of the household sector on the other. This fact shows that economic development has a destructive effect on the household industry in Punjab. The workforce displaced by a disintegrating household sector was absorbed partly in the agricultural and partly in the modern factory sector, mainly in the form of unskilled labour (Singh and Bhangoo, 1988).

A classification of the registered factory sector, according to the size of workers employed, shows that the percentage share of workers in small factories declined considerably during the period 1971-1999. Table 16 (Statistical Tables) reveals that the share of employment in factories employing less than 50 workers was 41.51 percent in 1971. It declined to 32.48 percent in 1981 and 20.93 percent in 1999. The relative share of the largest size-group (1,000-5,000) consistently increased from 13.88 percent in 1971 to 33.94 percent in 1999. The two other large size-groups i.e. 100-500 and 500-1,000 recorded a 28.67 percent share in 1971 and their share increased to 31.08 percent in 1999. Obviously, the registered manufacturing sector has undergone an important change. The relative importance of small-size factories in total employment declined during this period, and, there was an increase in the share of large-size factories. Interestingly, in 1999, there was no factory in Punjab that employed more than 5,000 workers.

Industrial Structure

Punjab's industrial structure is dominated by small scale and unregistered tiny units. Unregistered units constituted 50.67 percent of the manufacturing sector output in Punjab in 1970-71 (Table 17–Statistical Tables). Corresponding percentages in Maharashtra and Gujarat were 22.25 percent and 24.24 percent respectively (Raikhy and Mehra, 2000). The share of the unregistered sector in Punjab declined to 42.81 percent in 1990-91 and 36.63 percent in 1998-99. The fact that the registered sector has gained importance is evident from its increasing share in the income generated in the manufacturing sector and the growing number of registered working factories in Punjab. As shown in Table 18 (Statistical Tables), registered working factories increased from 4,553 in 1971 to 11,705 in 1991 and 13,382 in 1999. Thus, during a period of 28 years the number of working factories has tripled. The workforce employed in these working factories has grown 3.77 times during the same period, which is higher than the growth in number of factories. The simple growth rate in the number of working factories was also lower during all sub-periods than the growth rate in employment. It needs to be noted here that the average number of workers per factory was only 26 in 1971, and it increased to 33 in 1991 and 34 in 1999. This shows that, contrary to the all-India experience, small-sized factories exist in Punjab (Patil, 1987).

Dominance of small-scale industries is evident from the composition of the number of industrial units and workers employed in the sector (Table 19 – Statistical Tables). The share of the small-scale sector in total employment was 67.85 percent in 1974-75 and increased to 79.14 percent in 1998-99. In terms of numbers, a tiny proportion of units are in the medium/large category. However, medium/

large industrial units have accounted for the increasing share of industrial output. Their share was 38.22 percent in 1970-71 and it increased to 50.51 percent in 1980-81 and remained 64 percent between 1990-91 and 1998-99. A similar trend has been shown in the capital stocks employed in medium/large industries. It is also evident from this table that small-scale industries involved less capital per worker as compared to medium/large industries. The output per worker in medium/large industries has been more than that of the small scale sector.

The significance of dominance of small scale and unregistered units lies in the fact that these units are not subject to regulations of labour laws which protect workers in terms of minimum wages, working hours, sanitation, old age security/ retirement benefits, etc. In fact, workers employed in these units are paid very low wages. This type of employment is therefore, not attractive for the educated youth or even for the non-educated local youth (Gill, S. S., 1994).

The structure of Punjab industries can also be examined from the distribution of manufacturing sector output and workforce employed by major industry groups. The analysis shows (Table 20 – Statistical Tables) that agricultural and allied input based industry groups (Codes 20 to 29) accounted for 47.28 percent of total workers and 58.96 percent of output in 1974-75. Though the share of these industry groups in employment over the time period has remained the same (47 percent), the share of output of these groups has declined from 50.51 percent in 1980-81 to 43.30 percent in 1990-91 and 42.27 percent in 1998-99. On the other hand, the mineral and metal-based industry groups (codes 32 to 35) employed 24.31 percent of the total workforce in 1974-75. Over the time period between 1974-75 and 1998-99, the employment share of these groups remained the same. However, this group's share in industrial output increased from 19.14 percent in 1974-75 to 23.23 percent in 1998-99, revealing a structural change in industrial output (Singh, Sukhwinder, 1988). Further, the share of chemical products (except petroleum products) in total employment remained static at 3.4 percent between 1974-75 and 1998-99. The transport equipment and parts industry group recorded a decline in the share of employment from 15.36 percent in 1974-75 to 9.39 percent in 1998-99. Interestingly, over this time period, repair and personal services groups have gained tremendous importance both in terms of share of output and employment.

Such an industrial structure reveals that agricultural development still continues to be the main source of industrial growth. The interdependence between agriculture and industry is directly shown by the growth of agro-processing industries. In the agro-processing sector, food-processing industries improved their share between 1966 and 1985 (Singh, Sukhpal, 1992) and also between 1974-75 and 1998-99 (Table 20–Statistical Tables). Agro-processing industries are being seen as a factor for diversification and further expansion of the agricultural sector in Punjab (Johl, 1988). Although agriculture-industry linkages continue to be a noteworthy factor in Punjab's industrial development, yet there are also signs that the links are weakening (Gill, S. S., 1994). Major industries are increasingly producing for export abroad and to other parts of India. In 1974-75, industrial exports from Punjab were worth Rs. 62.03 crore which consistently increased to Rs. 769.20 crore in 1990-91 and Rs. 3,629.13 crore in 1998-99 (Table 3.16). Industrial exports as a percent of value of industrial output in Punjab increased from 8.3 percent in 1974-75 to 9.11 percent in 1998-99.

The wide fluctuations in the share of exports to industrial production in other years have revealed the fragility of the industrial structure. Several industries such as sports, iron steel, woollen and silk textiles depend exclusively upon imported raw material, as well as outside markets for finished products; either in other states of India or abroad.

Table 3.16: **Value of Exports and Industrial Production of Industrial Goods in Punjab, 1974-75 to 1998-99**

(Rs. In crore)

Year	Value of Export	Value of Industrial production	Percent share
1974-75	62.03	744.54	8.33
1980-81	162.13	2259.51	7.18
1985-86	245.20	4685,52	5.23
1990-91	769.20	11213.51	6.86
1995-96	2564.61	26370.10	9.26
1998-99	3629.13	39820.08	9.11

Source : Statistical Abstract of Punjab, various issues.

The composition of industrial output is also showing slow signs of a shift in output towards intermediate and producer goods. Thus, in spite of fast growth and changes in the industrial sector of Punjab, it remains less significant than either agriculture or livestock, both in terms of its share in value added and workforce employed.

Punjab's industrial sector has grown mainly through private initiatives. The public sector's role in direct industrial activities has been very limited. For example, between 1971 and 1998, the share of the public sector in registered working factories was hardly 2 or 3 percent, and the number of workers employed in them varied between 10 and 13 percent (Table 3.17). On the whole, public sector industrial units in Punjab employed less than 6 percent of the total industrial workforce (both in registered and unregistered units) in 1998.

Another striking feature of the industrial structure of Punjab is ancilliarisation or sub-contracting. In this form of organisation, a number of small and tiny units operate around big units. There may be several forms of ancilliarisation/sub-contracting, but in Punjab, three prominent forms are commonly seen (Gill, S. S., 1994). These are: (i) component/ process ancilliarisation—such a pattern is largely found in engineering industries like sewing machines, bicycle, tractors, automobiles, etc.; (ii) assembly ancilliarisation—this type is found mainly in the electronic goods industries; and (iii) market ancilliarisation—this type has been developed in industries like hosiery, sports goods,

Table 3.17: **Share of Industrial Workforce in Public and Private Sectors in Punjab 1971-98**

Year	Public Sector		Private Sector		Total	
	Factories	Workers	Factories	Workers	Factories	Workers
1971	65	11,745	4,488	106,758	4553	118,503
	(1.43)	(9.91)	(98.57)	(90.09)	(100)	(100)
1981	184	20,571	7,132	188,161	7316	208732
	(2.52)	(9.86)	(97.48)	(90.14)	(100)	(100)
1991	313	50,664	11,392	333,434	11705	383,798
	(2.67)	(13.20)	(97.33)	(86.80)	(100)	(100)
1998	339	55012	13043	391,941	13382	446,953
	(2.53)	(12.31)	(97.47)	(87.69)	(100)	(100)

Source: Statistical Abstract of Punjab, various issues

Note: Figures in parentheses are percentage share

textile fabrics, carpet weaving, electric appliances, etc. (Singh, Balbir, 1995 and Singh, Manjit, 1990). This pattern of industrial development might create close links between small scale and large units and ensure transfer of sources from the large to the small. However, in practice, small units are exploited because of their weak bargaining power. The small units, in turn, pass on this burden to hired labourers who are largely unorganised. This pattern, in the past, has allowed some slow upward mobility to workers. Provided with incentives, they have become small-scale entrepreneurs/ sub-contractors (Singh, Balbir, 1995 and Singh, Manjit, 1990).

Thus, the industrial sector of Punjab shows both positive and negative trends. The sector has grown at a faster rate compared to the growth rate of the agricultural sector between 1966-67 and 1998-99. As a result, its relative share in the NSDP has improved substantially. The rate of growth of the industrial sector accelerated during the 1980s as compared to the Green Revolution period. However, deceleration in industrial growth set in during the 1990s. The industrial structure of the state continues to be dominated by small scale unregistered industries, yet it is showing healthy signs that medium/large units are becoming increasingly important.

Although a majority of small and unregistered units are free from labour laws, yet they are completely outside the modern manufacturing sector. These units are being integrated with the medium/large units through various forms of ancilliarisation/sub-contracting. In fact, these small and tiny industries, based mainly on family labour, do not represent the traditional industrial sector, but are part of the modern manufacturing sector. These units are governed by market forces and they are expected to respond quickly both to local and global market changes.

Moreover, the factory sector of the state, which was showing inefficient use of resources earlier (Dhesi and Ghuman, 1983) has shown signs of improvement (Singh, L., and Sukhpal Singh, 2001). Further improvements in efficiency can be brought about by introduction of new technology in various industries. With the introduction of NEP initiatives since 1991 and creation of the WTO in 1995, the industrial sector has been confronted with global market forces. In this context, two major constraints of the industrial sector have been identified.

First, the linkage between the agricultural and industrial sector remains relatively weak. To remove this constraint, more agro-industries need to be set up in Punjab. This step has been identified on the basis of comparative advantage across industries and states (Sidhu, H. S., 1996).

Second, the declining capacity of Punjab's industry to absorb labour and that too local labour— removal of this constraint requires massive intervention by the state and farmers' organisations. Although state intervention during globalisation is rather difficult, yet innovative and strategic intervention has become crucial, particularly in human capital formation, which requires massive investment in education, training and health.

The survival and growth of the industrial sector in Punjab will depend on greater efficiency in resource use, upgradation of production technology and promotion of skills of the producers, scientists and engineers engaged in production and development.

Strategy and Policy Options

Punjab at its present stage of development requires a strategy, which delivers a high as well as sustainable growth rate. It must conserve its exhaustible resources such as soil, sweet water (both surface and ground), while putting them to optimum and intensive use. It has to renew resources such as capital formation (including human capital), develop efficient (world class) infrastructure in transport, communication, quality educational institutions, health services, banking,

electricity, marketing facilities, etc. At the same time, development and its fruits have to be shared with all sections of the population.

When the 'crisis of the economy' began to be seriously noticed, the Punjab Government appointed an Expert Committee on Diversification of Agriculture in Punjab, popularly known as the Johl Committee, which submitted its report in 1986 (Government of Punjab, 1986). The committee while examining the crisis of agriculture made policy recommendations, which had implications for the entire economy. It suggested that 20 percent of the area presently under wheat and paddy must be shifted to fruits, vegetables and fodder cultivation.

For achievement of crop diversification, three conditions were worked out: (i) improvement in production technology for these crops, (ii) remunerative prices and (iii) quick market clearance. For the latter two conditions, it was suggested that the government and private sectors be involved—first, in the form of regulated marketing, based on the pattern of wheat and paddy procurement with minimum support prices and secondly, creation of storage facilities through construction of a chain of cold stores. It was further suggested that the success of these solutions depended on the establishment of agro-processing industries, which would ultimately ensure remunerative prices, as well as quick market clearance for the suggested crops.

As part of the discussion, further suggestions were made (Gill, 1988) where solution to the development crisis in Punjab was linked to planned development of the state. Diversification of agriculture would not be possible without diversification of the economy, in the form of massive industrialisation of the state dependent on its resources. Industrialisation of the economy would be relevant so long as it could absorb the labour force being released or not being absorbed in agriculture.

For this purpose, a change in pattern of industrial development from small-scale to medium and large-scale enterprises was recommended. The suggested pattern was to be based on state enterprises, private enterprises and a large number of co-operatives (with a changed Co-operative Act). The involvement of co-operatives was suggested to ensure participation of rich, capitalist farmers in industrial development. This would also encourage peasant-based co-operative processing activities. Enterprises must ensure that first, they employ at least 50 percent of local labour and second, that they strictly observe labour legislation, particularly in the matter of wages, salaries and hours of work. To achieve this successfully, it was suggested that massive personnel planning through planned educational restructuring, industrial planning and planning of crop diversification should be taken up simultaneously.

An exhaustive study of the Punjab economy (Bhalla and Singh, 1996) in the light of the GATT agreement 1994, and its possible impact on Punjab's agriculture, while accepting crop diversification and agro-processing as a solution to problems of Punjab's agriculture, made very interesting suggestions. It suggests ways of ensuring the viability of irrigation institutions, viz, State Irrigation Department and Punjab State Electricity Board through a system of rational irrigation charges, electricity pricing and improvement in operational efficiency. There are other suggestions on how to strengthen and sustain the irrigation system by replacing water-intensive crops with less water-intensive crops. Also, encouraging water economising technologies, simultaneous use of ground and surface water, lining of water channels, under-grounding of water courses and enacting of legislation to check over exploitation of groundwater resources. In the light of the GATT treaty (particularly TRIPS), emphasis must be placed on strengthening the public research system through the agricultural university. Appropriate market interventions (based on price fluctuation

differentials), agro-processing, strengthening of infrastructure are recommended, in comparison with competing states and international competitors. The policies of Punjab's competitors need to be studied continuously in order to take appropriate steps at the state level. As a measure to ensure wider participation, the role of farmers' co-operatives is also recommended.

Kahlon (2001) has recommended involvement of farmers' co-operatives in the dairy sector and suggested replacement of subsistence milk production by commercial dairying. The involvement of the state government in creation of infrastructure and facilities remains a key factor.

Since 1997, decentralised planning has been discussed as a mode of planning in the state. On an experimental basis, block plans for 24 development blocks have been prepared, in which area-specific solutions have been recommended.

In October 1998, Punjab Agricultural University organised a two-day brain-storming session to discuss the crisis of Punjab agriculture. This was a unique meeting, in which policy makers, experts working on Punjab from within and outside the state and senior bureaucrats of the Punjab government participated (PAU, 1998). Specific recommendations included diversification of Punjab's agriculture, reduction of pressure on land through industrialisation, strengthening of infrastructure—roads, water, power, health, education and agricultural research—increasing public investment in agro-processing, market information, market development, etc.

The crisis in the Punjab economy in general and that of Punjab agriculture in particular has been the focus of attention of many scholars working on Punjab.

In view of India's integration with the global economy following the country becoming a founder member of the WTO, and recent changes in internal policies, Punjab needs to formulate a long-term plan for its economy. The plan has to work out the direction and level of changes in economic activities in various sectors. The changes would have to be meticulously worked out in agriculture and industrial activities. For this, the state would have to create a structural adjustment fund of Rs. 5,000 to 10,000 crore. In the changed circumstances, the economy has to adjust to a new policy environment. The adjustment period itself would be 10-15 years. New areas of production have to be encouraged. They would need help, support and protection in various forms so that they can become as efficient as possible after the adjustment period.

The one common aspect of the various recommendations is the critical and substantial role that needs to be played by the government. The government has to make massive investments as well as encourage private investment. Private investment would follow but cannot lead public investment in view of the small size of private sector enterprises in the state. The government must mobilise the necessary resources and invest them judiciously (populism of all sorts needs to be avoided). Along with the massive public and private investment, the political will to perform in order to resolve the crisis has to be created. An energetic and no-nonsense capability to get work done and make things happen has to be created in the government sector.

This energy has dwindled and almost vanished during the last two decades. Without creating these conditions, it would not be possible to put Punjab on a high growth path.

The government cannot overlook its responsibility towards the disadvantaged groups such as agricultural labour, industrial labour, migrant workers, poor farmers, Scheduled Castes and backward communities. The economy cannot grow rapidly if its benefits are not widely shared. Welfare measures that promote weaker sections would also

help raise the growth performance of the economy. Gender discrimination is more pronounced in the state compared to India's other forward states. This discrimination needs to be corrected through concrete measures. These would include special educational and training programmes along with other measures of women's empowerment.

The role of economic growth cannot be under stated in any discussion on human development. As the chapter clearly demonstrates, quality of life, farmers' indebtedness, jobs and the opportunities for growth are directly associated with economic growth. Wages, incomes and work environment, which affect people directly, are in turn influenced by overall economic growth. If growth takes place equitably in most sectors, especially the primary sector, then the economy is further accelerated leading to a rise in real wages, and better working conditions.

Punjab's long period of economic prosperity is slowing down and there are signs of an emerging crisis. The state must invest in backward regions and build the infrastructure necessary for modern agriculture and modern manufacturing.