SUMMARY OF CONCLUSIONS
The present thesis is aimed at examining the change experienced by the state of Haryana in its agricultural sector in the post green revolution period on the basis of thrusts in the sphere of agriculture, its development and sustainability. The changes in the agrarian social structure, impact of agro-technology upon the relations between the landless agricultural labourers and landed agricultural household has also been looked into.

This involved (i) an understanding of Haryana’s agricultural development particularly in the post-green revolution period encompassing the socio-economic, geographical, political dimensions; an inquiry into agricultural development and its sustainability, the rate of various inputs and land management systems; (ii) an examination of trickle down effects of the green revolution and its sustainability during the post-green revolution period: socio-economic conditions of landed and the landless peasantry; (iii) an analysis of employment pattern, wage rates, working conditions, mechanization and irrigation and their changing patterns; (iv) an analysis of agrarian prosperity and indebtedness among various agrarian classes; (v) an evaluation of role of government policies for the sustainability of agriculture.

The present research work is an empirical study of the agricultural development and change in the post green revolution period in Haryana. Only limited secondary data could be obtained from sources like the Census of India, Economic Adviser to Government of Haryana. Hence most of the requisite data was
collected through personal field work. A questionnaire based household survey of four villages, selected through multi-stage sampling techniques, was conducted to gather detailed information.

In this first stage the 16 districts, as per 1991 census, of Haryana were ranked on computing standard scores of the chosen indicators of agricultural development through Z-score transformation method. The indicators include:

**Input Indicators (Agricultural Infrastructure)**

1. Percentage of gross irrigated area to gross cropped area.
2. Percentage of area sown more than once to net sown area.
3. Percentage of area under commercial crops to total cropped area.
4. Consumption of fertilizers (kgs) per hectare of gross cropped area.
5. Number of tubewells and pumping sets per '000 hectare of net area sown.
6. Number of tractors per 100 operational holdings.

**Output Indicators (Agricultural Productivity)**

1. Agricultural produce (kgs) per hectare of gross cropped area.
2. Agricultural productivity per cultivator in rupees.
3. Agricultural productivity per hectare of gross cropped area in rupees.
On the basis of indicators of agricultural development the state was regionalised into two zones - agriculturally more developed and agriculturally less-developed regions. Sirsa represented the former and Bhiwani the latter. The former is the district in Haryana where the first ranking crop is cotton followed by wheat, rapeseed and mustard. Bhiwani is the district where Bajra is the first ranking crop followed by gram, rapeseed and mustard. Thus the two district, selected besides being at different levels of agricultural development also typify two different agro-ecological zones.

While selecting villages from these two districts all the villages of the districts individually where ranked on the basis of population in 1991. From this rank order first-half in hierarchy in the districts were called as large villages and second half as small villages. From each of these categories one village was randomly selected. The villages selected from Sirsa district were Alikan and Sahami and from Bhiwani district were Makran and Sanwer.

The selection of the agricultural household, both cultivators and agricultural labourers, was done on a first phase of census of household. All the landed cultivators and agricultural labour households were included in our sample from the small villages chosen from the two districts of each region. These two villages were
Saharni from Sirsa district and Makrani from Bhiwani district. From the big villages, namely Alikan and Sanwer, 50 percent of agricultural labour and landed peasantry were drawn on the basis of simple random sampling.

The data has been analysed at two levels: the state and at the level of four sample villages derived from two different regions. At the level of state the focus has been on the pattern and trends of development in the agricultural sector and the role of state in promoting agriculture. Detailed analysis of agrarian structure and relations between the landed and landless peasantry have been examined through field survey at the village level.

A perusal of literature shows that studies on various themes of agriculture such as growth of output and yield and its impact on different sections of agricultural population; agricultural development in reference to income, employment, wage levels and consumption pattern of the landless agricultural labour households in relation to the changing agrarian structure; incidence of poverty among farmers, to name a few have been taken up for analysis. All such works are scattered through different writings. The present analysis attempts to fulfill this gap by providing a comprehensive view of agricultural development and change as reflected in various aspects highlighted earlier.
The state of Haryana prior to advent of green revolution was marked by subsistence agriculture, low agricultural productivity and poor agricultural infrastructure. But the state witnessed vast changes in its agriculture ever since it experienced green revolution, which incidentally coincided with its formation in 1966. This was despite the fact that the state is not much favourably placed in terms of its physical resource base. Inadequacy of fresh water in general, presence of brackish water over a large part, and low and variable rainfall are its basic problems. The progress on the agricultural front was achieved through (i) introduction of canal irrigation in the northern and western part of the state; which had facilitated reclamation of new agricultural land; (ii) consolidation of land holdings which among other things, promoted tubewell irrigation; (iii) colonisation of new agricultural land; (iv) a rural based political power which gave a high priority to allocation of resources to the agricultural sector under the various plans; (v) rehabilitation of displaced persons from Pakistan who were enterprising and progressive and enriched the human capital of state.

All these vital inputs had gone into the agricultural development of the state before the green revolution ushered in. The basic economy of the state being rural, agriculture and its related aspects were accorded priority. Consequently disparities in
agricultural infrastructure such as irrigation, use of fertiliser and adoption of high yielding variety seeds declined in various regions of the state. Agricultural productivity levels improved even in areas which suffered from physical constraints. All this, however, could not ameliorate the disparity situation. Productivity rise was more pronounced in areas which were already at a higher level of productivity assisted by both physical and technical factors. Moreover productivity per cultivator was also observed as having increased over time. Its impact among the different classes of peasantry was examined at the household level through survey.

Agriculture continues to be the dominant sector of economy in the state with majority of workforce engaged in it. However there has been a decline in primary sector and a move towards tertiarisation. This shift in agriculture can be interpreted as part of the healthy process of moving workers out of low productivity jobs. But in agriculture, the process has begun at the cultivators end of the ‘agricultural workers’ spectrum and not with respect to hired farm labourers.

With the spread, intensification of irrigation and use of modern farm inputs there has been a change in cropping pattern. These
changes are a positive development since low yield and low value coarse cereals are being replaced by high value industrial crops without adversely affecting foodgrains output.

In order to have a deep insight into changes brought about by the new agro-technology in the wake of green revolution, its impact on the landuse, crops, and overall sustainability of agriculture and the socio-economic conditions and relationships between the landed and landless, an extensive survey at household level was carried out. Four villages, two each Saharan and Alikan from Sirsa district and Sanwer and Makrani from Bhiwani district were intensively studied.

Village Saharan and Alikan (Sirsa region) form part of Ghaggar flood plain. The soil is fertile. They are characterised by high irrigation and cropping intensity and a fairly mechanised agriculture. However prolonged irrigation has lead to problem of water logging. Villages Sanwer and Makrani (Bhiwani region), have loam and sandy loam soils suffering from moderate salinity and slight alkalinity. The irrigation and therefore the cropping intensity is not high as one of the selected village Makrani is infested with sand dunes and has low water table. Along with mechanisation, traditional methods of farming with the assistance of bullocks and camels still continue.
Results and Discussion

Of the total net cultivated area in both the regions (sample villages) more than 3/4th is held by upper castes followed by backward castes and a negligible proportion by scheduled castes. Again in both regions the average size of land holdings for the upper castes is high. Thus the land is not ubiquitously distributed. In villages Saharan and Alikan, the principal crops are wheat in rabi season and cotton and paddy in kharif season. In village Sanwer and Makrani, the major crops are wheat and mustard in rabi and bajra and cotton in kharif season. In Makrani a large cultivable area remains fallow during rabi season. It is essentially a village practising dry farming. However the farmers having assured irrigation facility have intensified cultivation thus leading to better land use management. The farmers in Sirsa region are replacing cotton with paddy and in Bhiwani region, gram is being replaced with cotton because in Sirsa region cotton yield is diminishing due to infestation of pests and growing problem of water logging and salinity whereas in Bhiwani region gram crop is often destroyed with blight. Prolonged and faulty irrigation practices is leading to degradation of rich fertile land due to water logging and subsequent problem of alkalinity and salinity. This demands a serious concern of the agencies involved in the reclamation of land. This
tendency is likely to decrease the productivity levels.

It is also observed that the agriculture is no more remunerative. Distress selling along with increase in prices of fertilizers, pesticides irrigation charges reduces the total earning and their use in large doses by the farmers especially in agriculturally developed region, depletes the soil fertility in the long run.

With the introduction of the new agro-technology, unlike the past, the employment of labour to carry out agricultural operations has tilted in favour of casual labourers. Attached labour and siri/sajhis are on the decline. Wherever available the working conditions of attached labour continue to be stringent but the signs of bondage are missing although many a times advance payment to the attached labour is done for maintaining assured supply of labour in peak season. The agricultural labourers do not themselves prefer the former kind of attachment while the cultivator discourages the latter since keeping sanjhis means sharing benefits of the new technology. There is institutionalisation of formalized contract system where mode of payment, its periodicity, duration of contract, advances to be made are all entered in the landlords account book and an agreement is formulated in the presence of three witnesses.
More and more farmers are availing the facility of agricultural credit. Whereas the big farmers preferred institutional debt mainly for productive investment, the small and marginal farmers have to be contented with informal debt which has exorbitant interest. The agricultural labourers too fall in line with the latter. Regular earnings of small/marginal farmers and agricultural labourers are not sufficient to fulfil their needs. It was also found during the survey that the rate of interest charged from casual labourers is higher than that charged from attached labourers.

This indebtedness of peasants on formal and informal institutions overtime is a disconcerting factor of agriculture in the studied regions. The indebtedness in peasants is because of crop failure due to frequent attack of pests and growing problem of salinity and waterlogging whereas in landless labourers it is on account of fulfilling social obligations such as wedding in a family, renovation of house serious or prolonged illness etc. Of recent, the non-payment of loan had lead the farmers to commit suicide. The incidence of committing suicide is more in small and marginal farmers.

It was found that indebtedness is becoming an individual burden in a nuclear family. Nuclearization created a lonely individual surrounded by others. On the contrary, indebtedness in joint family
was not an individual problem. The joint family was playing a dominant role in defusing the crisis in which individual was not the sole bearer of the crisis. The breakdown of the institutional framework vis-a-vis the joint family system or the village homogeneous groups like the 'panna' panchayats or the village panchayats are no more crisis defusing institutions that they once were.

Distress selling, was prevalent at a very large scale. Although the government declares support price for different crops, their non-procurement by the government agencies in time compelled the farmers to sell off their produce at much lower prices. Obviously, the small and marginal farmers are affected the most. The issue of agricultural sustainability has come to be questioned as a result of these problems confronting the farmer.

The region of Haryana Punjab Plain has come to be recognised for wheat, paddy/cotton rotation. Here crop diversification is very less. Not only are the ecological hazards of lack of diversification well documented but it also at times leads to crisis of plenty -- of food grains rotting due to glut. The farmers, although may be well bread in the techniques of traditional agriculture require greater input of extension services followed by government support to go in for diversification towards more remunerative crops and vegetables.
It is assumed that in the agriculturally advanced region the use of agro-technology, whether it is HYV seeds, pesticides, insecticides and fertilizers or lift irrigation, mechanisation of farm operation, the agricultural labour would be at a greater loss. This assumption in both the regions was seen to be untrue due to the fact that the mandays of employment even in the agriculturally developed region (Sirsa district) did not show any downward trend because the labour displaced owing to mechanisation is compensated by higher cropping intensity and the kind of crops grown, for instance, the number of days work available is higher in Sirsa than in Bhiwani although in the former agriculture is more mechanised. This is because of the labour-intensive crops like paddy and cotton grown in the former region. On the other hand, in Bhiwani where irrigation facilities are lacking, substantial proportion of area is devoted to coarse grains requiring less or no labour. The average wage rate for both the regions is higher than that of country. Local labourer charges higher wage rate than the migrant. Thus the common belief that the new agro-technology is labour displacing is negated as is made out in the study.

One of the fallout of the new agro technology in the regions is the increasing rate of accidents while carrying out agricultural operations. Most of the victims were invariably hired casual labourers.
During the field work it was observed that the case of accidents were not reported to the police or to the civil surgeon but were hushed up on some payment made by the employer.

It was noticed that the overall productivity has increased in the post green revolution period but it has differentially affected the socio-economic condition of various landed classes in rural Haryana. The farmers with large land holdings benefitted disproportionately to those who had small/marginal holding leading to interclass disparity.

The intensification of physical, socio-economic infrastructure has opened up new avenues of employment in the non-agricultural sector. It seems that the non-agricultural occupations has taken over the dependency of rural labour only on agricultural occupations. The sustained growth in agriculture along with diversification reduced the rural poverty. Region with greater occupational diversification has led to greater saving for the agricultural labour sometime even more than the net saving of small/marginal farmers.

In the post green revolution period large number of agricultural labour households went into non-agricultural occupations. It seems that sustained growth in agriculture, occupational diversification, rural infrastructure, upgraded by state government played a key role in the creation of non-agricultural occupation for the
rural poor. Thus, the diversification of economy along with increased productivity has initiated the "trickle down" processes and its benefits to reach the rural poor.

The various centrally sponsored schemes implemented by Haryana government under Integrated Rural Development Programme for the upliftment of agricultural labour household could not make any dent. Public expenditure on some programmes has been to a large extent a waste of money. However there were indirect benefits to the rural community which flowed to them from the rural prosperity engendered. They have also created an environment for the greater awareness among farmers.

Note of Caution

With the implementation of World Trade Organisation, the country shall enter into a still new economic era of 'a buyer's market'. The agreement calls for withdrawal of all subsidies and allows free imports. If the subsidies are curtailed or withdrawn the most affected are likely to be small and marginal farmers. It may lead to a large proportion of them joining the agricultural labour force. Free trade in foodgrain will increase price variations in the economy and adversely affect agricultural production and food security. Those regions which make large investment in rural infrastructure including irrigation,
electricity, communication and new technologies, will benefit from the World Trade Organisation (WTO). Similarly large farmers with their greater capability to diversify for exports shall benefit more.

Keeping in view the challenges arising from economic liberalisation and globalisation there is need to encourage and educate the farmers on crop diversification, income enhancing crops, for example fruit trees, and economic activities (pastoral agro forestry) that are less water and land intensive; to assure the farmers of protection of their rights to retain and exchange seeds; to strengthen rural infrastructure and promote technology oriented agricultural development strategy such that the impact of vagaries of nature are minimised; promote the growth of agro-business; promote the growth that is based on efficient use of resources, conservation of soil, water and biodiversity. Ultimately a growth that is sustainable technologically, economically, environmentally is the desired goal. Only then can we hope for a prosperous agriculture for the benefit of all sections of the rural society.