Research Study 2009/07

Impact Assessment Study of Agricultural Market Reforms in Uttrakhand and Haryana

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Table of Contents

Preface

This study was planned by the Centre in the wake of some important policy changes associated with the marketing of agricultural produce made by the government such as amendments in the APMC Acts through the model Act, permission to start contract farming, opening up of agricultural trade, i.e., liberalization of exports and imports of agricultural commodities and permission to start future trade in agricultural commodities. These measures became necessary with the signing of the WTO and other Free Trade Area Agreements. More important than that was the assumption that with the opening up of trade huge opportunities for Indian agriculture will emerge and for the farmers to get benefit of that it was envisaged that they should be linked with the corporate sector to encourage private investment in agricultural production, marketing, storage transportation and even retail trade.

The organizations like the Mother Dairy and NGOs like Chirag have already prepared the background for that. The corporate houses like Birla, Reliance etc. have also entered in the field.

Therefore, the study was planned to have first hand assessment of the impact on cropping pattern, production, employment and income of farmers due to these measures.

On the advice of the Academic Advisory Committee of the Centre horticultural crops in Uttrakhand and Haryana, two vastly different states with regard to agriculture, were taken up for the study.

The data were collected by a private agency, which however, did not deliver satisfactorily. We therefore have to reject some of the

schedules and base our analysis on lesser number of households and without important information on prices and margins. A ‘with and without approach’ was followed for the analysis.

The study finds a clear trend in shift in cropping pattern, changes in production and employment pattern in the agriculture sector and indications of enhancement in farmers’ income.

Acknowledgement: I have greatly benefited with the advice of the Academic Advisory Committee, particularly the chairman Prof. P.K. Joshi, who himself has a rich experience of hill agriculture and its problems. At the centre, earlier Mrs. Prem Bhasin and after her superannuation, Mrs. Perveen Taneja provided all the help in scrutinizing the schedules, inputting the data and even going through the draft report. I was helped to a great extent by our serving and retired investigators, Mr. K.K.Shangari, Mr. Mool Chand and Mr. Balbir Singh in verifying the schedules and data collected by the private agency. Mr. Narinder Singh did all the calculation and tabulation work for the project, and Mr. Debasis Manna carried out all the corrections and necessary setting of the report. Dr. Ranveer Singh meticulously reviewed the report and offered his valuable comments, which have been helpful in revising the draft.

I wish to place on record my sincere thanks to all of them.

I am also thankful to the officials of the mother dairy, the Chirag and our valued respondents for their whole hearted cooperation.

D.S.Bhupal

15th December, 2009

Research Study 2009/07

Executive Summary

Impact Assessment Study of Agricultural Market Reforms in Uttrakhand and Haryana

Introduction:

The study was planned by the centre in the wake of some important policy measures taken by the Govt. in the field of agricultural marketing, such as changes in the APMC Acts, permission to contract farming, liberalization of trade in agricultural commodities and permission to start futures trade in agricultural commodities. These changes were necessitated under the signing of international trade agreements like WTO and other Free Trade Area pacts. More than that, as the policy was to enhance investment in agriculture, private investment in particular, it was necessary that the corporate sector be allowed captive production, marketing (domestic retail trade), storage, processing, transportation facilities and export and import of agricultural commodities. All this was envisaged on the assumption that with free trade lot of opportunities will emerge for Indian agriculture, and farmers will be able to share the benefits only if they are linked with international agriculture and associated with trade and industry.

It was basically to study the impact of these changes on the cropping pattern, production, employment and farmers' income. The specific objectives of the study, thus, were as follows:

Objectives:

i. to find out changes in the cropping pattern. Whether commercial crops of high value have replaced other crops with lower margins,
ii. to examine changes in production and farmers' income, and
iii. to analyze changes in the form and nature of employment in the rural sector.

Methodology and Data:

On the directions of the Academic Advisory Committee of the Centre, we selected fruits and vegetables from Uttrakhand and vegetables from Haryana. The data for the study were collected by a private agency as the centre's own investigators were superannuated and replacement could not take place. The data were not satisfactorily collected. Hence, we have to work with a smaller number of schedules, 69 from Haryana and 45 from Uttrakhand. The households were divided into two groups – farmers selling directly in the market/s and the farmers selling their produce through either the Mother Dairy or through other players like Chirag in Uttrakhand and Birla and Reliance groups in Haryana. The idea was to assess the difference in two groups of farmers with regard to cropping pattern, their income and employment. In other words, with and without approach was followed for the study.

Background of Area and Households: On the one side, Haryana is an agriculturally advanced state with regard to soil fertility, farmers' awareness to production technology, irrigation facilities, marketing infrastructure, viz. vast coverage under the regulated market yards with nearly adequate facilities, good road network, storage, procurement arrangement by the government agencies etc, and most importantly its location advantage of being in the vicinity of the National Capital, which always provides boost to certain agricultural activities and commodities. On the other side, is Uttrakhand, a far flung state with almost no matching infrastructure to boost agriculture production such as production technology, marketing infrastructure, roads, storage, procurement etc. and on that it is a hill region where size of fields would necessarily be like that of kitchen gardens. It has certain plus points also such as major source of production of some fruits due to its geo- climatic conditions, which no where else can be produced and suitability of its weather to certain vegetables during off season in the rest of the country, in other words almost monopoly conditions due to natural endowments.

Land Details:

The difference in land ownership and cultivated emerges clearly between the two states. For example, in Uttrakhand, because of obvious reasons we did not observe any leasing in or leasing out of land whereas in Haryana, in both categories of farmers we find cultivated area more than owned area. In other words, extra land is leased in by the households growing vegetables in Haryana. The reasons were obvious – one, growing vegetables was more profitable than cereal crops. Two, most of the cultivation of vegetables is done by small and marginal farmers, who generally not finding other work in the village go for vegetables cultivation and for that have to lease in land. This practice was noted in and around Delhi also. In Uttrakhand, modern technology, viz. use of tractors, desired level of irrigation, use of chemical fertilizers and pesticides can hardly be applied. Most of the operations are to be carried out manually just like in kitchen gardens. Therefore, the question of leasing in and leasing out of land does not arise. Secondly, as the male members from the area come down to plains for want of work, most of the agricultural operations in the villages are carried out by female members who can do that only to a limited scale or on the owned land. Thirdly, almost every one in the area does farming, therefore, leasing in and leasing out is almost ruled out.

Most of the area under both types of sample households is rain-fed. Irrigation takes place only with the natural rain water collected in small ponds by a few households. Whereas in Haryana, the entire area is irrigated, and for that every measure, be it canal, tube well and pump sets, is used. Even the leased in area which has increased during the three year period by about 6% is irrigated fully.

Cropping Pattern:

With regard to cropping pattern some interesting results emerge. First of all, there is difference in cropping pattern between plain areas and hill areas. In the hills fruit trees are grown on almost every part of area and vegetables and other crops are planted by intermixing. Therefore, change in area under fruit trees may

be only due to replacement of trees or addition of new area, which however was not the case during the period of the study.

As far as Haryana is concerned a few observations are made. First, in the sample region most of the area is devoted to vegetables and other crops. Unlike Uttrakhand, there is no area under fruits. Though some fruits in Haryana, particularly in the hill region in Panchkula are grown and citrus fruits, Kinoo particularly, and guava, ber etc. are grown largely in Sirsa, Fatehabad and Hissar districts.

During the three year period, 2005-06 to 2007-08, for which data were collected, it is observed that in the control group of households in Uttrakhnad area under fruits as % of GCA went up from 57% to 58%, at second place are vegetables with area going down from 41% to 39% during the period, then comes maize with 1.3 to 1.4% of area during the three years and finally it is wheat which gets less than 1% area coming down from 0.81% to 0.62% during the period.

Two conclusions can be drawn from the trend. One, that as the farmers from this group of households sell generally in the market on their own, sometimes in the nearby markets like Bhimtal, Nainital, Bhowali and mostly in Haldwani, which is about 75- 80 kms away from the sample villages, carrying fresh and perishable produce like vegetables daily to such a distance may not be economical in comparison to fruits, which can be considered as semi-perishable, particularly in comparison with vegetables, that is why the area under fruits is on the rising trend and that under vegetables declining. Secondly, area under cereals like wheat is also on the descending path that may be due to the fact, that as fruits and vegetables from the area are now moving down to plains in larger quantity due to the entry of some NGOs like Chirag, private players like Birla and Reliance groups and mother dairy, returns from their cultivation may be becoming remunerative in comparison to crops like wheat, oil seeds etc.

In comparison, area under the same crops during the three years period in the non-control group is in absolute variance. For example, area under fruits is about 37-38% and under vegetables about 55 -56%. Also, in this group we find the

trends of area just reversing, in the case of fruits on decline, may be marginally, from 37.44% to 36.84% and under vegetables increasing from 55.1% to 56%. Possibly, because vegetables are being taken away by the agencies to their retail points, thus creating enough market space for these perishable commodities. As far as area under wheat is concerned, there is not much difference in both types of sample groups. It is on the decline. But under maize mostly being cultivated for the purpose of sweet corn and baby corn, is on the increase.

However, area under maize has increased by about 12.5% in control group households and by about 7% in non-control group sample households.

But most important point is about decline in area under cereal crops, particularly, wheat, which declined by about 20% in control group households and by about 26% in other households. It has serious implication on food security of the area. It was noted that about a decade back, when there was no private agencies to buy horticultural crops from the area people were growing wheat. Now they have to purchase wheat and even edible oils to meet their household consumption needs. Almost their total food grain demand could be met locally and now about 25% of wheat is purchased from the markets like Haldwani.

The increase in area under maize could have neutralized the shortfall in area under wheat thereby availability of cereals, had area under maize been used to produce corn. But it is being used to produce sweet corn and baby corn for supplying to Delhi and other vegetable markets, which will enhance farmers' income but would not help meet food needs.

In Haryana about 19% area of control group households has increased under vegetables during the last three years, and by 7% for the non-control group whereas area under wheat of the control group households decreased by about 2% and that for the non-control group by about 11%, which is a huge area. if the pattern continues, it may be a serious cause for food security, particularly food grains.

We have seen that in Uttrakhand and there are reports about area under food grains, particularly under coarse cereals in Rajasthan also shifting towards

commercial crops like Jathropa. As far as area under maize in Haryana is concerned, that has gone down by about 17% in non-control group households. There was no area under maize in the control sample households.

Production:

The production of fruits in the control group households increased by about 9% during the period, whereas that in the non-control group households marginally by less than 2%. However, production of vegetables in both the sample groups increased by about 11 and a half % in the control group and by about 8% in the non-control group, thus leading to overall increase in production by about 20%. However, production of food grains, area under which has been declining, particularly of wheat fell by about 18% in both sample groups. As far as production of maize in control group households is concerned, it increased by about 23% but fell by about 21% in non-control group households. Thus overall there may not be major change in the production of maize. But certainly there is shortfall in the production of wheat.

As far as production in Haryana is concerned, area and production of vegetables in both sample groups have increased, and production increased significantly by more than 17% in control group and by more than 33% in the non-control group. Thus aggregate production increases by about 51% in the three years period. This not only leads to increase in farmers' income and more employment, but also provides nutritious food to city consumers where the produce is sold. But there is shortfall in the production of wheat by about 2% in control group and by about 9% in the non-control group. That needs to be addressed.

In sum, impact on cropping pattern and production is visible, there is increase in area and production of fruits and vegetables, the increase in production is more than the increase in area. This shows increase in productivity as well which should be beneficial to the farmers of the area and consumers in the far off areas. On field employment in the case of horticultural crops, particularly vegetables, has also increased. This extra requirement of labour is met by the women labour mostly in the case of Uttrakhand, who are already overburdened.

Growing of horticultural crops is beneficial in comparison to growing of cereals or pulses or edible oil crops. That is why there is shift in area. The marketed surplus of fruit and \vegetables is going up due to intervention by Mother Dairy and other players in the sample area. Not only the marketed surplus of sellers to these players has gone up but that is true also in the case of other group of sample households, who are left with more market space in absence of sellers to the Mother Dairy and other players

Income:

The very fact, that area under cereal crops is being shifted towards fruit and vegetables, which are more prone to weather, price fluctuations, and moreover are not as much crucial as food grains, particularly for the poor, is not for nothing. There cannot be any other reason for that except major difference in returns both due to difference in production (quantity) and margins (difference in costs and prices) in both the states. The generation of extra income, in comparison to traditional crops to the producers of high value crops is supported by the benefit cost ratio also.

Employment:

Employment opportunities do increase in the case of shifting towards horticultural crops. But unfortunately, most of the agriculture related work in the hill areas is done by female members who are already overburdened. In states like Haryana, where cropping pattern is shifting in favour of cash crops, specifically in the sample area, extra labour absorption is useful to only those families who have family labour, but not enough land to work on. The labour cost in Haryana is already almost highest in the country. It helps to immigrant labour to earn some extra income. Overall, irrespective of the fact, that which labour benefits, the extra employment in vegetable cultivation is generated. And mostly female members find that work.

Suggested action:

In the light of above discussion it can be concluded that with the intervention of Mother Dairy and other players change in cropping pattern and production is taking place which should be helpful to enhance farmers' income, employment opportunities and availability of nutritious food items to the consumers. Promotion of horticultural crops at least in states like Uttrakhand should find some extra support as it most suits the conditions, marketing facilities permitting. Therefore, infrastructure facilities such as roads, transportation, storage and on site processing, need to be upgraded and supported. Only caution is that we should not overlook the problem of food security as area under and production of main cereal crop wheat is coming downwards in the sample households. That shortage will have to be met from other areas. And also efforts to increase yield in hill areas by upgrading technology need to be made. In fact, the overall yield in the sample households of 6- 7 quintals per acre in the case of maize and about 8-9 quintals per acre in the case of wheat is equal to almost pre green revolution yield of these crops in plains. This needs serious exercise on the part of agronomists to enhance yield rate. In fact, the technological intervention in the case of horticultural crops is also needed to spare land for other uses, both in hill areas as well as in plains. Most importantly in Haryana, where already a sizeable portion of land adjoining the National Highway towards Delhi has been devoted to construction of malls, shopping and housing complexes, efforts to increase productivity are required.

Impact Assessment Study of Agricultural Market Reforms in Uttrakhand and Haryana

CHAPTER - I

Introduction:

This study was planned by the Centre to find out the impact of changes in agricultural produce marketing policies at the grass root level. The central government in order to promote growth in agricultural sector wanted and encouraged the state governments to bring changes in agricultural produce marketing Acts/ policies. In addition to the higher growth target, the liberalization of policies was also necessitated under the WTO and other free trade agreements with neighbouring countries and groups of nations. The latest being with the ASEAN.

To bring in private investment for promoting growth in agricultural sector, it was necessary to allow the corporate sector to have their captive production, marketing, processing, storage and transportation and lately retail marketing chains.

Also, when the WTO agreement was signed it was envisaged that lot of opportunities will emerge in the international markets due to removal of trade barriers as well as reduction or elimination of import duties/ tariffs and quantitative restrictions by all nations, particularly by the developed nations, where the demand potential was much higher for the goods and commodities from the developing economies. This was based on the assumption that developed world will reduce tariffs on agricultural imports and cut subsidies on agricultural production and processing, which will pave the way of agricultural exports from the developing countries where labour costs were much less as compared to developed countries and overall agricultural production would be cheaper and competitive. It was pointed out[1] that once the agricultural subsidies

1 See Gulati, A , and others: Many write ups where in they emphasized that almost all Indian commodities, barring a few like edible oil seeds, were competitive.

were removed by the developed countries, agricultural production there was most likely to be most costly leaving a whole lot of export markets open for developing world. About the food security, it was argued by some that why everything should be produced locally, if when the need be, they could be imported from the international market at lesser costs.[2]

With this vision in mind the central government carried out trade and marketing reforms and came out with a model act for the marketing of agricultural produce to replace the APMC Acts and asked the state governments to modify their Acts on the lines of the Model Act. For that certain motivation was offered and also some pressure in the form of linking release of some grants to states was enforced. This act paved the way for direct purchase by the corporate sector from the farmers and contract farming.

The contract farming was permitted to help the sector build up their captive supply lines. To avoid short supply and price fluctuations and to maintain the regular flow of raw material for the processing industry, to avoid any supply shortage of finished products thereby fluctuations in prices and also to fulfill international export commitments uninterruptedly, future trading was allowed in the agricultural commodities, and for that NCDEX and MCX were brought into existence. One of the strongest arguments in favour of future trading was that farmers will benefit from the price discovery determined by future trading in commodities. And finally, trade restrictions were removed and about 1500 products were put on OGL and substantial reduction in import duties was effected, thus liberalizing the import and export of agricultural commodities.

All these developments have brought changes in India's trade structure and pattern in both exports as well as imports, and also, it has helped achieve higher overall growth trajectory, though agricultural growth has not seen any spectacular upward shift. May be due to the fact that the crucial investment in irrigation, infrastructure, marketing, transportation and storage was neither made

2 Jha, Shikha and Parikh, K : writings and lectures about food security and storage costs

and nor facilitated to the level of expectations of the corporate sector, and also other administrative barriers like unrestricted movement of agricultural produce through out the country, obligation of selling the sugar cane to the nearest firm etc., were not removed.

But how far the farmers, rural workers and other targeted social groups, woman, deprived sections of the society, for example, have benefited by these changes was never seriously assessed. Therefore, this study was envisaged to have first hand information about change in farmers' income and rural employment, if any, and change in cropping pattern due to change in the policies. In fact, with the entry of corporate sector in the agricultural activities, it was expected that certain agricultural commodities of high value such as cash crops like fruit and vegetables, flowers, plantations etc. will receive preference over others with lower margins, therefore they were likely to replace these crops in terms of area coverage, input usage and total production, affecting cropping pattern and land use. This shift was expected to enhance farmers' income and also to the pattern and nature of employment of the rural communities. Overall this should have also changed the pattern of other agricultural related activities such as development of poultry and dairy sectors.

Objectives:

In the light of the above the specific objectives of the study were as follows:

i. to find out changes in the cropping pattern. Whether commercial crops with high value have replaced other crops of lower margins,
ii. to examine changes in production and farmers' income, and,
iii. to analyze changes in the form and nature of employment in the rural sector,.

Methodology:

In the beginning because of vast difference in topography, agro-ecology and production practices two separate studies were planned for the states of Uttrakhand and Haryana. But later on, on the directions of the Academic

Advisory Committee, common crops, fruits and vegetables, in stead of cereals from Haryana and fruits and vegetables from Uttrakhand were chosen for this study.

Therefore, focus in both the states was on horticultural crops, tentative lists of private parties operating in both the states were obtained with the help of agricultural departments of the state governments. Reliance, Birla Group, Chirag and Mother Dairy were important players in both states. The Chirag was active in Uttrakhand alone. There may be many more operators. But as the Mother Dairy, a semi-cooperative body, was the main player and data available with them were well documented, we chose only that area where the Mother Dairy and along with them other players were active. In fact, our focus was not to study or analyze these institutions or their modus operandi rather on their suppliers, the farmers of the area who were selling their produce to these players. Not only that, we have to select other farmers, control group of farmers, from the same area- same village or from the nearby village/s who were mostly selling their produce in the market, in the case of Haryana Sonepat or Azadpur, Delhi and in the case of Uttrakhand in the nearby markets like Nainital, Bhimtal, Bhowali and/or Haldwani market.

The selection of respondents was based upon stratified 4 stages sample. In the first stage one district from each state, district Sonepat from Haryana and district Nainital from Uttrakhand were selected after consultation with the Mother dairy and the agricultural departments of the state governments. With the help of the district officials tehsils/ blocks were selected at the second stage. Tehsils Sonepat and Nanital were selected from Haryana and Uttrakhand respectively. At the third stage villages (both types – selling to the Mother dairy and other private buyers in the villages, and in the markets) from each tehsil were selected. In Sonepat 4 villages were those wherefrom farmers were selling either to the Mother dairy or to other groups in the villages and 3 villages were those where from farmers were selling either directly in the near by markets or in the Azadpur market Delhi. For the purpose of the study as stated above, these

were considered as control group of sample households. In Uttrakhand 4 villages were selected, two wherefrom farmers were selling to the Mother Dairy and others, from one farmers selling in the market and the one from where farmers were selling to both, mother dairy and others and in the market as well.

In district Nainital the Mother Dairy and the Chirag were buying fruits and vegetables. In district Sonepat along with Mother Dairy, Reliance and Birla Group and some others were buying vegetables for their retail stores. Fruits are not grown in this district.

After the selection of area / villages, with the help of the Mother Dairy list of local farmers who were selling to the Mother Dairy and other agencies was prepared and with information gathered from these farmers and local heads, lists of other farmers, control group, were prepared and then selection of requisite number of respondents from both the sets of farmers from both the states was made for final collection of data on the pre tested questionnaires. As the agricultural practices differed vastly in the two states, mainly due to topography, ecology and weather and climate, even there was a little difference in two sets of questionnaires canvassed for data collection in the two states. The data were collected by a private agency on contract basis as the centre's own investigators were superannuated and no replacement could take place. However, the agency did not collect data satisfactorily. Consequently we have to settle for lesser number of sample households, 69 in Haryana in place of 100 as originally planned and 45 in Uttrakhand in place of 50 planned originally.

The list of villages from both the states which were chosen for selecting sample of farmers is given below. In District Nainital, 3 villages were those where farmers sold their produce mostly to the Mother dairy or to other players and one village Malla Ramgarh was control village where farmers sold their produce to other groups or in the market and to the Mother Dairy also. But farmers selling to the Mother Dairy only were chosen from this village. Another village Simyal Raikwal was also such that farmers were selling to the mother Dairy as

well as to other players and also in the market directly. Hence this village has been listed under both the categories, as both types of farmers from this village were contacted for data collection.

The data have been put in tabular form and analyzed using the simple tools of analysis. List of selected villages and number of respondents are given below in tables 1.1 and 1.2.

Table 1.1

List of Selected Villages

State	District	Tehsil	Villages	Control villages
Uttrakhand	Nainital	Nainital/ Dhari	i Budiwana ii Sunkia iii Simyal	i Malla Ramgarh ii Simyal
Haryana	Sonepat	Sonepat	i Jhundpur ii Jakhauli iii Jajel iv Manoli	i Khewda ii Garh Mirakpur iii Palda

Table 1.2

Number of Respondents

State	Uttrakhand				Haryana						
Villages	Sunkia	Budi-wana	Simyal	Malla Ramgar	Jhundpur	Jakhauli	Jajel	Manoli	Khewda	G. Mirkpur	Palda
HHolds	14	12	11	8	8	12	14	6	9	8	12
Control	-	-	4	8	-	-	-	-	9	8	12
Others	14	12	7	-	8	12	14	6	-	-	-

Limitations:

As the data have been purposively collected from selected areas, specifically growing horticultural crops and also wherein the private marketing agencies were involved in both the states, it imposes a big limitation that the results

cannot be interpreted to represent the overall scenario of each state. Secondly due to resource constraints, the aggregate situation of food availability or supply could not be taken into account. For example, we know that there is ample scope to increase food supply from other than traditional states. Hence, if this study leads to conclude the declining position of food grains in the sample areas in order to give place to horticulture crops, that needs not to be interpreted as an alarming signal about food security. The results, therefore, are to be interpreted within these limitations.

Synopsis of the Report

The Chapter scheme of the report is as follows: Chapter one introduces the subject matter of the study, with back ground of the problem, need of the study, objectives, methodology and sample size. Chapter 2 deals with the background of the area, socio-economic characteristics of the respondents. In chapter 3 land details and cropping pattern being followed and changes taking place therein have been discussed. Chapter 4 covers marketing practices being followed in the sample areas and impact on employment, cropping pattern and farmers' income. And finally, chapter 5 gives summary and broad conclusions of the study with possible policy options.

CHAPTER – II

BACKGROUND OF THE AREA AND SOCIO-ECONOMIC PROFILE OF THE RESPONDENTS

Introduction

The study is based upon the data collected from two states – Haryana and Uttrakhand. Both these states are vastly different in topography, geography, climatic conditions, soil mass, ground water table, irrigation facilities and practices, weather, land use pattern, cropping pattern, farming practices, availability of infrastructure etc. Even the human build up, working capacity and mind set of the people towards agricultural activities differ vastly in the two states. One can say that as far as agriculture in its four aspects viz. natural endowments, human resources to depend upon, infrastructure and market access, is concerned, there is no similarity in the two states.

In Haryana, district Sonepat, the sample area, is adjoining the National Capital, Delhi which has a huge demand potential for high value crops like flowers, fruits and vegetables and dairy and poultry products. Better road and rail link provides quick delivery mechanism of the produce with relatively little loss or wastages. Whereas district Nainital, sample area in the state of Uttrakhand, does not have that location advantage and road and rail connectivity for quick disposal of perishable commodities like flowers, fruits and vegetables. On the other hand, climate, weather and moisture content in the atmosphere in the hill regions are more advantageous for these crops, which Haryana lacks. In fact, to take advantage of demand potential and market accessibility, production of high value crops seems to be forced one, i.e., demand oriented in Haryana, which in Uttrakhand should be normal, i.e., supply oriented. On the other hand, in the topography of a hill state production of crops like wheat and rice or maize or cotton can not be undertaken on that scale as it can be in plain areas like that of Haryana. But crops like fruit and vegetables, particularly during the off season, can be most successfully and profitably grown which in plains within the prevailing climatic conditions would be very costly and even difficult if not impossible.

The geographical area of Uttrakhand is 53,483 sq. km., which is 1.67 percent of the country's total area. Almost 87% area of the state is covered under hills. The literacy rate of the state is 72.78 percent (84.01 percent in males and 60.26 percent in females), which is higher than country average of 65.38 percent. There are two administrative divisions- Garhwal and Kumaun, which comprise all the13 districts. Out of thirteen districts, eleven are hill districts, where traditional hill agriculture based on rain-fed irrigation is practiced. The economy of Uttrakhand continues to be predominantly rural and agricultural. The allied activities are also an important source of income and employment. Horticulture sector comprises a low-volume but of high-value commercial crops and is of paramount importance in Uttrakhand.

Haryana on the other hand has made tremendous progress in the field of agricultural production, particularly wheat, paddy, cotton etc. and milk and milk products. In fact, it is one of the very important few states, which has developed on all the fronts, be it industry, infrastructure, education, health or social welfare. In the field of public welfare, it was the first state in the country to introduce old age pension of rupees one hundred per person per month. The country followed the example later, resulting in vast improvement in the last days of life and respect of the old people in the state and deprived one old people in other parts of the country. In Punjab which is congruent and compatible in most aspects with Haryana, life style of people changed to a larger extent by the foreign income sent by those who went abroad to almost all the countries of the world whereas in Haryana, most of the prosperity is generated by the people working in the state itself. Location advantage of the state, covering the national capital from three sides, has been a major factor in the development of the state.

In the agricultural sector, both the neighbouring states (Punjab and Haryana) provide employment to the people from Bihar, Orissa (now Odisa), Eastern Uttar Pradesh (Purvanchal) and their western neighbour Rajasthan. After the introduction of NREGS, now (Mahatma Gandhi National Rural Employment Guarantee Scheme), the agricultural labour is not immigrating to both the states to the earlier extent. The wage rate, therefore in the states is prevailing at much higher level then statutorily fixed by the government, particularly during the season of labour intensive operations like, planting and harvesting of paddy, cotton picking etc. The farmers

have to either change cropping pattern or find out other ways such as more use of machines to meet the labour shortages.

In Uttrakhand, the situation is just reverse. People migrate to plains for income and employment. We do not have much information of impact of NREGS on the migration of labour or its costs in the state. In other words, even the extent to which it is operational in the state. But considering the reports from Uttar Pradesh, the positive impact of employment guarantee scheme should not be much different in Uttrakhand also. With these two contrasting situations, it would be interesting to find out the salient features of the villages and the respondents in the two states viz. Haryana and Uttrakhand.

Background of the Selected Villages:

The salient features of the villages selected from district Sonepat, Haryana are given in table no.2.1. As stated earlier, the villages are mostly on the National Highway, adjoining the boundary of the National Capital. The soil is fertile and irrigation from the Yamuna canal is available. Moreover, the area receives good rainfall and due to flood irrigation ground water table is not that deep and also is sweet. Therefore, tube wells in ample number are also working. The area is suitable to grow wheat, paddy, sugar cane and fruit and vegetables. Sugarcane is hardly sown. Surprisingly, fruit trees are also not planted. Due to handsome profits, vegetable cultivation is undertaken by the farmers to a larger extent. The Mother Dairy has also played an important role in promoting vegetable cultivation in the area by providing seeds, imparting practices of production and marketing and finally by directly buying from the farmers, thus ensuring a certain buy up arrangement. The officials of the Mother Dairy did not confirm that they were providing seeds and imparting training for vegetable production. They only confirmed the buy up arrangement. But some of the villagers who sold to mother dairy did say about this. Any way, the Mother Dairy has established its purchase centres in the area. Where farmers in the morning gather their produce in the trays provided by the Dairy, their truck picks up the produce by noting down the quantity of each vegetable of each seller. It provides details of total weight, selling price of each vegetable and the rejected amount of vegetables due to poor quality or un-marketable quality on the day payment is made, which is after a week or so. The farmers are provided with their sale proceeds. The payment generally is made by checks. In the recent past other players like Birla Group,

Reliance and some others have also started their operations in the area. In fact, this was one of the reasons that the Mother Dairy was hesitant in providing list of their customers (sellers), fearing pouching by their rivals in the business.

TABLE – 2.1

Details of Villages (Haryana)

Villages	Jhundpur	Jakholi	Jajel	Manoli	Khewda	G.mirkpur	Palda
Nearest Market	Narela/ A.Pur	Narela/ A.Pur	Narela/ A.Pur	Narela/ A.Pur	Narela/ A.Pur	Narela/ A.Pur	Narela/ A.Pur
Distance	18km.	20km	25km	12km	10km	16km	24km
Road K	2	0	2	0	0	1	0
Road P	16	20	23	12	10	15	24
School	10th	+2	5th	8th	+2	8th	10th
Healt centre	√	√	X	√	√	√	√
Veterinary H	√	√	X	√	√	√	X
Drinki/water	pump	tap	tap	tap	tap	TW	TW
Provision	shops	shops	shops	shops	shops	shops	shops
Goods	All type	All	All	All type	All type	All type	All
Bank	3km	√	4km	5km	√	2km	2km
No. hh	1000	370	250	900	2200	270	600
General	30%	50%	50%	70%	65%	55%	30%
SC	25%	40%	25%	20%	20%	25%	25%
OBC	45%	10%	25%	10%	15%	20%	45%
Irrigation	Tw+	Tw+	Tw+	Tw+	Tw+	Tw+	Tw+
Wheat	40%	60%	65%	60%	60%	60%	60%
Paddy	40%	40%	25%	35%	40%	35%	35%
Maize	20%	0	0	0	0	0	0
Brinjal	10	10	0	20	0	0	0
Okra	20	20	20	25	25	25	25
Reddish	20	20	20	10	10	20	10
Cflower	15	20	25	15	25	20	15
Tometo	18	10	10	0	20	20	20
All vegs	100	100	100	100	100	100	100
Disposal	MD	MD	MD	MD	MAR	MAR	MAR
Tractors	40	45	70	100	300	15	125
Milk animal	700	1800	1000	1100	900	2500	600
Cows	800	1500	2500	1200	1000	1000	800
Buffalo	700	3000	800	2200	2000	1500	900
Total Area	700	4000	2200	2000	10400	1000	2000
% Irrigated	100	100	100	86	96	100	100

There are farmers, who prefer to sell in the nearby market of Sonepat, Azadpur Market of Delhi and/or even to local buyers. A good number of sellers also sell to Birla Group, Reliance and other private players, who like mother dairy collect the produce from the farmers, but unlike Mother Dairy, determine the quality of the

produce and approximate price (based on previous day's price) at the collection centre itself. Thus the risk of rejection at the market and also the uncertainty of price is eliminated at the field level. The payment is also made immediately. This has led some (a very few) farmers shifting their arrangement from Mother Dairy to others. In fact, competition has proved beneficial to farmers in the beginning at least. The reasons of selling to Mother Dairy vis-à-vis to private buyers are discussed in the next chapter.

Socially, almost all the castes are noticed in each village. The infrastructure like schools, electricity, health centres, veterinary facilities, post office, banks, marketing facilities, both for buying goods and selling commodities etc. seem to be available at a reasonable distance. A majority of the houses are built up of pukka bricks, cement and concrete. In other words, the farmers seem to be prosperous. A good number of tractors, trolleys and even cars were noticed during the visit. Some of the farmers seem to be quite rich. The number of milk animals both for domestic consumption of dairy products and for the market as well, is also an indicator. The main crops seem to be wheat and paddy. Horticultural crops, vegetables particularly, are getting importance steadily. Tractors /trolleys are quite in large number and are being used for agricultural operations.

The only surprising thing is that fruit trees/ plants are not planted or there is no tendency to grow fruits. May be historically people have not tried. Otherwise guava, pomegranate and citrus fruits can easily be grown in the area. In other parts of the state, particularly District Sirsa, which is similar in agro-climatic conditions and soil mass, these fruits are being grown on a significant area. Kinnoo, a variety of citrus fruits, for example, is now well known in the country, in fact, challenging the dominant position once occupied by Nagpuri orange.

Table 2.2 gives background of selected villages from district Nainital in Uttrakhand. The circumstances, agricultural practices and crops grown as stated earlier are different from those in Haryana. These villages lack in infrastructure like pukka roads, health centre, veterinary services, post office or at hand banking facilities, transport or storage and marketing arrangement. As entire agriculture is in the hill region, use of tractor or other mechanized equipment and irrigation facilities like those in plains is not feasible. Leave apart mechanized agricultural operations even

use of animal energy is not feasible. Most of the operations even the toughest one, ploughing for example, are carried out manually, and mostly by the women family members. Nearest market, except village Ramgarh, is about 8-10 kms away from the selected villages. In absence of pukka roads, terrain being hilly full of slumps and peaks is not easy to travel and to transport agricultural produce. Moreover main market, Haldwani being about 75 kms away, the benefits accruing to Haryana farmers of their being in the vicinity of the National Capital, are not easy to realize. Wheat and maize crops are grown but on a small area. Similarly pulses are other food crops being grown on a very small area. It is only fruits and vegetables that have been the principal crops of the area, which got a boost after the entry of Mother Dairy. In fact, the Mother Dairy has started its processing plant of horticultural produce in Ramgarh leading to buying of fruit and vegetables at a substantial scale and ensuring the demand for the horticultural produce and removing the uncertainty of post harvest wastage and losses to farmers. This has given rise to shift in cropping pattern in favour of horticultural crops at the cost food grains. It was noticed and will be explained in the next chapter that the area which was almost self sufficient in food grains now depend upon buying wheat from the market.

Socially only two groups, viz. general and Sc category people are mostly residing in the villages. The presence of other backward castes is hardly noticed. The vast difference in affluence of different social groups in Haryana villages is not visible in the hill region. Most of the people who depend upon agriculture and associated activities are almost in same category of wealth and assets possession. It is only their jobs in the plains, or in defense forces that make the major difference.

Similarly, the possession of animal stock does not differ much. However, in the scheduled caste households the number of goats was more as compared to cows in the upper caste households. Some households in the villages were of course in possession of light commercial vehicles for transformation of goods and also second hand vehicles for passengers. In fact, this was an important source of employment of the area and to some extent a symbol of prestige for both the owners as well as the drivers. Probably that is why young people prefer to be drivers or owners of such vehicles. The possible reasons as explained by our own taxi driver was that, it, transport business, fetches some extra and cash income for the family that too

almost on regular basis to meet out daily cash requirement of the household, in absence of which there is no other source of cash flow from other than agricultural sources which also can be obtained only after the harvesting and selling of the crops. Secondly, it also gives an opportunity to the young people to get rid of hard agricultural operations and at least visit the city/ town on regular basis and get acquainted with all sorts of developments. Thirdly, in some cases there is extra income in the form of cash and kind gifts from the tourists.

Table 2.2
Details of Villages (Uttrakhand)

Villages	Sunkia	Budiwana	Malla Ramgarh	Symail Raikwal
Respondents	14	12	8	10
Nearest Market	Ramgarh	Ramgarh	Ramgarh	Ramgarh
Distance	8	9	2	10
Road K	3	2	0	4
Road P	5	7	2	6
School	8th	10	12	10
Health Centre	X	X	√	2km
Veterinary H	X	X	X	X
Drinki/water	River	Spring	Tape	Spring
Provision	Shop	√	√	Shop
Goods	All	Household	All	Household
Bank	10km	10	√	X
No. hh	525	180	690	90
General%	45	93	80	100
SC%	55	0, St 2%	20	0
OBC%	X	5	X	0
Irrigation	Pipe	Rain	X	X
Wheat%	2	5	4	5
Paddy%	X	X	X	X
Maize%	2	2	2	X
Brinjal%	X	-	-	-
Okra%	X	-	-	-
Reddish	2	-	-	-
C flower%	2	-	-	-
Tometo%	X	-	-	-
All Veg%	20	15	35	20
Fruit%	All Fruits 100	100	ALL	60
Disposal	MD100	MD (70) Mar(20)	MD MAR	80%Mar 10%MD
Tractors	X	X	X	X
Milk animal	200	90	350	120
Cows	125	70	200	20
Buffalo	X	X	X	X
Total Area	7500	4000	6000	50
% Irrigated	1%	1	2	1%

As far as availability of goods and inputs was concerned, the situation was not like that in Haryana, where every thing was available in the villages itself.

In Uttrakhand, only a few shops were there and mostly they were selling household goods. For farm inputs people have to go to the nearby market or Haldwani. Similarly, but for Mother Dairy buying horticultural produce, there was no accessible outlet to sell either dairy products or other agricultural produce if one needed to sell.
One important thing was establishment of schools in each village and of much more higher level than many other parts of the country with similar number of households. Also the presence of Non-Governmental Organizations working in the area was quite large and effective too. Their activities were not only to promote local crafts, or horticultural produce, but also to look into other aspects of rural and country life, be it child development, women empowerment or environmental issues, or protection of water resources etc.
Detailed socio-economic characteristics of the respondents are given below.

Socio –Economic Profile of the Respondents:

Uttrakhand:

As stated above all the households of the selected villages from the control group are inhabited by forward castes and people belonging to scheduled castes. There was not a single household belonging to other backward castes among the control group. However, among the non control group 3 households belonging to other backward castes form the part of the sample.

No household belonging to scheduled tribes neither in the control group and nor in non-control group, was noticed in the sample villages.

Table 2.3 presents the position of the households of the control group, number of males, females and children per household among the different caste groups. Two points are striking- One, number of females is more than the male members. Reasons may be many including that of the male members leaving the hills for plains in search of employment and then rarely returning and/ or not taking along their women folk; secondly, the disease of female feticide as prevalent in urban areas and

among middle class has perhaps not yet spread in this area; thirdly, value of women labour is well recognized as most of the agricultural related activities are performed by women; and lastly, probably dowry system is not that harsh in this part of the country and female children are equally well cared for. These facts are well corroborated by some other studies. Second is the fact that the number of females per household as well as compared with the male members is more in scheduled caste families in comparison to forward castes. The number of children in sc families is relatively smaller. Even looking at the absolute numbers, per household male members in scheduled caste families is one as compared to 2 in forward castes.

Table 2.3
Identification (Control Group)

Details	F C	OBC	SC	All
No. hh	10	0	2	12
Male (No.)	20	0	2	22
Female (No.)	22	0	4	26
Children (No.)	38	0	5	43
Male/ hh	2	0	1	1.83
Female/hh	2.2	0	2.5	2.17
Children/hh	3.8	0	2	3.58
Female/ Male	1.1	0	2	1.18

In table 2.4 data pertaining to other respondents, non- control group, have been presented.

First, a small number of households belonging to other backward castes are part of the sample respondents. It is not that there are no such households, but they were not found selling fruit and vegetables to other than the Mother Dairy. If overall sample is divided, it works out 67% upper castes, 24% scheduled castes and about 9% OBCs. Secondly, members per household, male, female and children, in the OBC households are more as compared to other two social groups. Most striking is the highest female ratio, against the common belief among the OBC households and the least among the forward castes. Possible explanation can be that women in OBC households probably work more on fields as compared to upper castes. Surprisingly women in SC households are the least, their number per household is 1.88 as compared to 1.91 in the case of forward castes and 2.33 in the case of OBC households. But children per households are the lowest in upper caste households.

Table 2.4
Identification (Non-Control Group)

Details	F C	OBC	SC	All
No. hh	22	3	8	33
Male (No.)	35	5	13	53
Female (No.)	42	7	15	64
Children (No.)	48	8	19	75
Male/ hh	1.59	1.67	1.63	1.61
Female/hh	1.91	2.33	1.88	1.94
Children/hh	2.18	2.67	2.38	2.27
Female/ Male	1.2	1.4	1.15	1.21

Haryana:

As in the case of Uttrakhand, in Haryana also the control group respondents belong to forward castes and Scheduled castes, none from the other backward castes. The reason, most of the vegetables are still grown in the area by a particular caste, known for vegetable cultivation, gardening and flowery -culture. Because their entire livelihood depends upon this profession and a good number of them do not own land and thus have to lease in land, they must be very economical in all operations to earn some extra income or save on costs to pay for the land rent. Therefore, they may not be selling to other players and also, to save on time may not be going for Azadpur or Sonepat markets. Thus they may not be a part of the control group. Table 2.5 below gives us along with other details, female / male ratio and children per household in the area. In scheduled caste households the ratio is 1:1 whereas in upper castes households it falls below 1 woman for each man. Per household the number of man/ woman is above 2 in upper castes and 3 in scheduled caste households. The striking difference is in the number of children, which is 0 in the case of scheduled caste households against more than 3 in the case of upper castes. Overall, women are fewer than the number of men in the area in the control group.

Table 2.5
Identification (Control Group)

Details	F C	OBC	SC	All
No. hh	27	0	2	29
Male (No.)	63	0	6	69
Female (No.)	62	0	6	68
Children (No.)	85	0	0	85
Male/ hh	2.33	0	3	2.38
Female/hh	2.30	0	3	2.35
Children/hh	3.15	0	0	2.93
female/ Male	0.98	0	1	0.99

As far as other respondents (non-control group) are concerned, we find OBC in the sample households, but no house hold from the scheduled castes (Table 2.6). Male and female members per household are higher in forward castes. In fact, it is the number of children which is larger in OBC families as compared to others. If we look at the crucial ratio of number of females per male member, in OBC families it is 1:1 in comparison to 0.82:1 in forward castes. These ratios are close to the overall figures for the state as a whole.

Table 2.6
Identification (non-control group)

Details	F C	OBC	SC	All
No. hh	39	1	0	40
Male (No.)	112	1	0	113
Female (No.)	92	1	0	93
Children (No.)	117	7	0	124
Male/ hh	2.87	1	0	2.83
Female/hh	2.36	1	0	2.33
Children/hh	3	7	0	3.18
Female/ Male	0.82	1	0	0.82

Livelihood and source of income of the respondents:

In both the states, main profession or source of livelihood of the respondents was agriculture. This was true for all respondents, i.e., in the case of control and non-control group of respondents. However, in a few cases, in both the states and in both type of respondents male members have gone for other income sources, for example, service in state as well as central government, private sector, and their own subsidiary business of transportation, in the case of Haryana- tractor/ trolley and in Uttrakhand commercial passenger vehicles. But such households in both the states do not go beyond 2%. Female members in both the states were found working on fields, in Uttrakhand more aggressively as compared to Haryana, where number of female workers was a little less. Secondly, in Haryana, most of the harshest operations like ploughing, leveling, harvesting, threshing etc. are performed mechanically as compared to manually and that too by women mostly, in the case of Uttrakhand. In Uttrakhand almost all the female members, more than 98% and in Haryana 68% were working on fields, doing work such as picking/ plucking of vegetables, sorting them etc. However, in Haryana they were doing some extra work of looking after domestic milk animals, both cows and buffalos. In the case of

Uttrakhand, in fact, it was their responsibility to look after the animals, along with field work. At the time of harvesting or picking up of fruits, not only the women but even children were also engaged in fruit gathering. In only one case, we could see that the entire operation of fruit collection (picking from trees), bringing it to the collection centre, sorting out on the basis of colour, shape, maturity or ripeness and size, the entire work was contracted out to some persons from far North, may be from Nepal, or from border areas. Otherwise the family labour was mainly used in all the operations.

As far as income from other sources or side business was concerned, it was not a separate income except in the case of service people. The entire earning was part of the family income without any specific control of particular family members. In fact, it was the domain of female members. The entire family income was under their control, but spending was not their area. All the major spending decisions were taken either in consultation with dominant female member of the household or solely by the male members. Thus the female members appear to be only the custodian of family income.

As far as cropping pattern, land use and other agricultural practices are concerned, we discussed them in the following chapter.

CHAPTER – III

LAND DETAILS AND CROPPING PATTERN

Because agricultural conditions in the two states are totally different, we discuss them one by one, first we take up the case of Uttrakhand and later on the situation in Haryana.

Uttrakhand:

Land Details: As stated earlier, agricultural practices in Uttrakhand, particularly in the sample area, being hill region, are totally different from those observed in plains. Even the terms used for the measurement of land differ. In Haryana, smallest revenue measurement of area is Biswa followed by canal and Bigha which is equal to an acre (biswa = 20^{th} part of a canal, 8 canals = 1 bigha or acre). In Uttrakhand term Nali is used for land measurement. We have collected data pertaining to area in local parlance, i.e., in Nalies; one Nali is 20^{th} part of an acre. Most of agriculture is rain -fed. At places people have formed small ponds and during the rains, water flowing down from top of hills is collected in these ponds, both kuchcha (formed of mud but insulated with polythene sheets to save water from pouring out and pukka made of bricks/ cement etc.. The water collected thus is used, till it lasts, to irrigate fruit plants and vegetables and for animal consumption as well. It is not the plain type flood irrigation. During shortage of water even buckets are used to irrigate the thirsty plants. It appears to be more of kitchen garden type agriculture. In fact, on the land being available in small patches, leveled at the hill slopes after removing trees and bushes, only such type of agriculture is possible. Naturally, only manual operations, whether digging up of land in lieu of ploughing, removing weeds, mixing manure, leveling, sowing seeds or planting nursery, everything has to be manual and mostly performed by women and children.

For the purpose of working out total costs with depreciation and net present valuation of equipment used in farm production, no meaningful data could be collected as the cost of tank preparation is so less, particularly in the case of Kacha ponds where the family labour seems to be the major cost. Others being depreciation of spade, sickle and axe used in preparation of pond after cleaning the

area of bushes and herbs, and may be interest on the borrowed cash. Similar is the position of other implements used in farm operations. In fact, when every operation is manual and that too of micro nature, no major expenditure is needed for farm implements. But considering the economic returns and labour involvement, even that cost may not be too small for the households depending upon such type of agriculture. Another important point is that keeping under consideration the hill wet weather conditions, all the implements and other household goods have to be kept under cover or inside the house, with so small rooms and few in numbers, one in many households, built with small gates and windows, it will not be possible to make even a little large implements and keep them under cover and also to carry them up and down daily for use.

To work out the changes or find out impact of market reforms data for the last three years were collected. The details of the area of control group (farmers not selling to the Mother dairy or private players) for Uttrakhand are given below:

Table - 3.1

Details of Area in Nalies Control Group

				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Owned	517	517	517	0	0	0
Irrigated	63	63	63	0	0	0
Unirrigated	454	454	454	0	0	0
Cultivated	473	506	506	6.98	0	6.98
Owned/hh	43.08	43.08	43.08	0	0	0
Irrigated/hh	5.25	5.25	5.25	0	0	0
Unirrigated/hh	37.83	37.83	37.83	0	0	0
Cultivated/hh	39.42	39.42	39.42	0	0	0

But for the marginal increase in the cultivated area in the year 2006-07 over the preceding year which was around 7%, no change was recorded, neither in owned, irrigated area and nor in unirrigated area. Also no change was recorded in the year 2007-08. The same change, therefore, is reflected in the year 2007-08 over the year 2005-06.

In table 3.2 we present the data collected from non- control group, i.e., from the households selling to mother dairy or other players in the village itself. We do not find any change in any year in the cultivated, irrigated, unirrigated or owned area of the respondents.

One can conclude that there is no large scale leasing in/out of area in the region. May be agriculture is not that profitable for others or for outside people and the local people have small pieces which they can usually manage. For a little larger scale or medium scale operations use of animal energy at least if not mechanized energy is must, which under the circumstances is hardly possible. Hence, no large scale leasing in/out. The only use of animal energy, ponies, was noted for carrying fruits and vegetables on their back from down hill areas to the collection point of Mother Dairy or other players.

Table - 3.2

Details of Area in Nalies Non-Control Group

				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Owned	1522	1522	1522	0	0	0
Irrigated	570	570	570	0	0	0
Unirrigated	952	952	952	0	0	0
Cultivated	1402	1402	1402	0	0	0
Owned/hh	46.12	46.12	46.12	0	0	0
Irrigated/hh	17.27	17.27	17.27	0	0	0
Unirrigated/hh	28.85	28.85	28.85	0	0	0
Cultivated/hh	42.48	42.48	42.48	0	0	0

About the ownership of irrigation tanks, the households of control group did not have any pond or tank. Only about 1/3rd respondents, specifically 36.36% forward castes, 33.3% OBC and 37.5% SC households possessed puckka tanks. The cost of puckka tanks was also not much. In fact, after their houses, generally built years ago, puckka tank seems to be the major investment item. Most of the houses generally were very old, for example, in the case of one respondent where we spent good amount of time, the house was built by the owner's great, great, great grandfather, or

more than 200 years ago. The respondent himself was of about 65-70 years old. Surprisingly, no major alterations or repair was undertaken in this house.

Cropping Pattern:

Fruits: Fruit trees/plants are different from other crops like vegetables, pulses or cereals in the sense that once they are planted, they continue to give fruit after the gestation period for quite longer times depending upon the type and variety of fruit crops. Other crops, short in height and with life span of a few months are generally grown on the space between the fruit plants. Therefore, it becomes a totally different case from the point of view of economic analysis. The cultivated area if divided among different crops may not and will not tally with neither gross cropped area and nor with net sown area. Secondly, there will be problems of division of crops on the basis of seasons as fruit tree will continue during Kharif, Rabi and Zaid seasons. Thirdly, if not impossible, it will be difficult to work out separate quantity of inputs used, may be fertilizers, pesticides irrigation or expenses incurred on and number of labour days utilized. Not only that, if nutrients, say FYM, are used for improvement of soil fertility during one season, one cannot say that impact of that will not last during the next season or year when the same fruit crop will be continuing. First we discuss area under different crops for control group in table 3.3.

As stated above, the area under fruit plants is used to grow other short in height and of short span crops along with fruit trees. We had information from the sample households for the last three years. The data show that there was increase in area under fruit plants from 3.54% under apricot, the minimum to 12.5 %, the maximum, under apple in the year 2006 – 2007 over 2005-06 and overall expansion of area under all fruits was about 7.4%. However, as we were told that always there may not be expansion of area whatever may be the demand or higher prices for any or every fruit. Because one needs, availability of land, time and resources to nurse the young plants for several years before fresh plantation could be taken up. Therefore, we do not find any change in area under fruits in the year 2007-08. However, on per household basis there is slight decline in area under peach, though net addition to area under peach was made. But changes in area per household under individual fruit crops vary from - 0.32% under peach to about 12.5% under apple which may be

disturbing the overall production and supply not only for the market and consumers but also for the producers.

Table - 3.3
Area (Nalies) Under Fruit Crops (Control)

Figures in ( ) Number of Households				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Peach	103 (11)	112(12)	112(12)	8.74	0	8.74
Apricot	113/12	117(12)	117(12)	3.54	0	3.54
Plum	77(8)	83(8)	83(8)	7.79	0	7.79
Apple	56(12)	63(12)	63(12)	12.5	0	12.5
Other Fruits	2(12)	2(12)	2(12)	0	0	0
All Fruits	351	377	377	7.4	0	7.4
Peach/hh	9.36	9.33	9.33	-0.32	0	-0.32
Apricot/hh	9.42	9.75	9.75	3.5	0	3.5
Plum/hh	9.63	10.38	10.38	7.79	0	7.79
Apple/hh	4.67	5.25	5.25	12.42	0	12.42
Other Fruits/hh	0.17	0.17	0.17	0	0	0

So far as other farmers, selling to Mother Dairy, were concerned, there was no significant change in area under fruits. Only minor variation was recorded in the area under all the fruits put together. It was reduced by about 2% in the year 2006-07 over 2005-06, again added by about 1.5% in the following year. Thus over all we find about 0.7% less area in the year 2007-08 as compared to the year 2005-06. This was mainly due to variation in the area under other than listed fruits. Similarly, there is almost no change in the area per household (table 3.4).

Table - 3.4
Area (Nalies) Under Fruit Crops (Others)

Number of Households 33				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Peach	207	207	207	0	0	0
Apricot	192	192	192	0	0	0
Plum	92	92	92	0	0	0
Apple	192	192	192	0	0	0
Other Fruits	25	10	20	- 60	100	- 20
All Fruits	708	693	703	-2.12	1.44	-0.7
Peach/hh	6.3	6.3	6.3	0	0	0
Apricot/hh	5.8	5.8	5.8	0	0	0
Plum/hh	2.8	2.8	2.8	0	0	0
Apple/hh	5.8	5.8	5.8	0	0	0
Other Fruit/hh	0.8	0.3	0.6	-62.5	100	-25

Vegetables: The area under vegetables of the control sample respondents is shown in table -3.5 below. If we consider overall picture, there is positive change in area under vegetables during the three year period. The area increased by about 2.4 % during the year 2006-07 over 2005-6, but it was reduced by about the same amount of area in the very next year when it decreased by about 2.3%. Therefore, there is no change in the year 2007-08 over 2005-06. Secondly, there is huge variation in the area each year over the previous year under individual vegetables. For example, in the year 2006-07 over 2005-06, the change in area varies from 25% under cauliflower to minus 6.3% under tomato. Similarly in the following year, it varies from 3.8% under other vegetables to minus 26.7% under potato. The reason for this was the problems of demand in the market and consequent changes in market prices, which motivated or forced the farmers to shift the area from one vegetable to another in the following year. It happened due to no permanent source of procurement/ purchase by any agency public or private or assured take off from the field. Such huge variation in area will surely result in changes in production, thereby fluctuations in prices.

The situation becomes more unstable for the farmers where per household change in area under individual vegetables varies from 37.5% in the case of cauliflower to minus 25% in the case of potato.

It cannot be said authentically that future trading will handle this type of fluctuations, for which the supporters of future markets strongly argue. The only solution for this type of problems seems in the formation of strong semi-cooperative type movement such as the Mother Dairy or more entry of private players with proper regulatory framework in the sense that contracts be properly framed and settled with proper inbuilt dispute settlement mechanism.

Table - 3.5

Area (Nalies) Under Vegetable Crops (Control)

Figures In ( ) Number of Households				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Potato	14(9)	15(10)	11(9)	7.1	-26.7	-21.4
Cauliflower	8(10)	10(10)	8(7)	25	-25	0
Cabbage	60(12)	62(12)	64(12)	3.3	3.2	6.7
Peas	11(9)	12(10)	10(9)	9.1	-16.7	-9.1
Tomato	32(12)	30(12)	25(12)	-6.3	-16.7	-21.9
Others	128(12)	130(12)	135(12)	1.6	3.8	5.5
All Vegetables	253	259	253	2.37	-2.31	0
Potato/hh	1.6	1.5	1.2	- 6.3	-20	-25
Cauliflower/hh	0.8	1	1.1	25	10	37.5
Cabbage/hh	5	5.2	5.3	4	1.9	6
Peas/hh	1.2	1.2	1.1	0	-8.3	-8.3
Tomato/hh	2.7	2.5	2.1	-7.4	-16	-22.2
Others/hh	10.7	10.8	11.3	9.3	4.6	5.6

The area under vegetables of the farmers selling to the Mother Dairy is given in table 3.6 below.

Area under all the vegetables together has been steadily increasing from 1.7% in the 2006-07 over 2005-06 to 0.66% in the year 2007-08 over the previous year and by 2.4% over the year 2005-06. In fact, barring cabbage and peas which the Mother dairy buys regularly and on a significant scale, area under rest of the vegetables have been increasing. Only under these two vegetables there is slight decline or no increase. Does it mean already people have used maximum area or their prices were not remunerative or there was more rejection? The answer should be that as other players have also started buying these vegetables from the area, there was extra production to meet the demand and prices fell, which ultimately led to decline in the area under these vegetables. Secondly, the change in area was not that much as observed in the control group, neither on the basis of overall area and nor per household. This should be good indicator for the stability of production and supply.

Table - 3.6
Area (Nalies) Under Vegetable Crops (Others)

Number of Households 33				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Potato	335	345	351	2.99	1.74	4.78
Cauliflower	144	151	153	4.86	1.32	6.25
Cabbage	437	432	432	-1.14	0.00	-1.14
Peas	13	15	14	15.38	-6.67	7.69
Tomato	56	59	59	5.36	0.00	5.36
Others	57	58	58	1.75	0.00	1.75
All Vegetables	1042	1060	1067	1.73	0.66	2.4
Potato/hh	10.2	10.5	10.7	2.99	1.74	4.78
Cauliflower/hh	4.4	4.6	4.6	4.86	1.32	6.25
Cabbage/hh	13.2	13.1	13.1	-1.14	0.00	-1.14
Peas/hh	0.4	0.5	0.4	15.38	-6.67	7.69
Tomato/hh	2	1.8	1.8	5.36	0.00	5.36
Others/hh	1.7	1.8	1.8	1.75	0.00	1.75

Area under other than fruit and vegetable crops is not much. In fact, other crops are a few. During the Rabi season mostly wheat and one or two pulse crops are grown, and during kharif, it is maize and one or two pulse crops are sown and not much area is covered. Table 3.7 below shows the details. Out of total cultivated area of around 500 nalies, only 5 nalies are under wheat, which is around 1%. Similarly, under maize also area is not much, but maize is now grown for sweet corn and baby corn and is mostly bought by the Mother Dairy and other players. If we look at per household area under wheat, it is again not much only around 2 nalies per household, which means only 1/10th part of an acre. The crop grown may not be even sufficient for household consumption.

Table - 3.7

Area (Nalies) Under Other Crops (Control)

Figures in ( ) Number of Households				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Wheat	5 (2)	4(2)	4(2)	-20	0	-20
Maize	8(3)	8(3)	9(4)	0	12.5	12.5
Other Crops	2(1)	1(1)	2(2)	-50	100	0
All Crops	15	13	15	-13.33	15.38	0
Wheat(hh)	2.5	2	2	-20	0	-20
Maize(hh)	2.67	2.67	2.25	0	-15.73	-15.73
Other Crops(hh)	2	1	1	-50	0	-50

Table 3.8 shows area under these crops of the households selling fruit and vegetables to mother Dairy. The area per household in this group of households is still lower than control group households. Secondly, there is continuous decline in area under these crops during the period under consideration. It is only maize area of which has shown some positive change, and that is also probably due to corn being bought by the fruit and vegetables buyers, the Mother dairy in this case. The fastest decline in area is recorded under other than identified crops, for example pulses. Area under wheat per household has gone down tremendously during the three years by more than 10%, 17% and by more than 25 and a half percent, this may cause problems of food security if the trend continues. But Uttrakhand is not a region known for making any contribution to the national food security, particularly cereals, which has so far been a domain of Punjab, Haryana and other states like Uttar Pradesh. The case of Haryana is discussed in the following section.

Table - 3.8

Area (Nalies) Under Other Crops (Others)

Figures in ( ) Number of Households				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Wheat	39(29)	35(29)	29(29)	-10.26	-17.14	-25.64
Maize	102(33)	103(33)	109(33)	0.98	5.83	6.86
Other Crops	32(33)	25(33)	21(33)	-21.88	-16.00	-34.38
All Crops	173	163	159	-5.78	-2.45	-8.09
Wheat(hh)	1.34	1.21	1.00	-10.26	-17.14	-25.64
Maize(hh)	3.09	3.12	3.30	0.98	5.83	6.86
Other Crops(hh)	0.97	0.76	0.64	-21.88	-16.00	-34.38

Haryana:

Land Details: The land details of the control group Households in Haryana are shown in table 3.9 below. The area is fully irrigated as shown in table 2.1. Most of the area gets irrigation from tube wells and pump sets. Canal irrigation is available to a limited area. If we compare source wise irrigation largest area is irrigated with pump sets followed by tube wells and then with canal, the smallest. Per household area is much more in Haryana as compared to that in Uttrakhand and there is no comparison as far as irrigation is concerned, because in Uttrakhand we do not find any thing like irrigation as being applied in plains. Secondly, per household irrigated area is much more in forward caste households than that in SC households.

Table - 3.9
Irrigation Details (Area in Acres Control Group)

Details	Forward Castes	OBC	SC	All
No. Households	27	0	2	29
Canal	9	0	0	9
Tube well	80	0	0	80
Pump Sets	219	0	12	231
Canal area /hh	0.33	0.00	0.00	0.31
Tube well area/ hh	2.96	0.00	0.00	2.76
Pump sets area /hh	8.11	0.00	6.00	7.97

If we compare the irrigation data of the control sample with that of other respondents, (table 3.10) there is a little difference as far as canal irrigation is concerned. There is no area irrigated with canal water in these households. Secondly, per household area under tube wells is about twice of that as was noted under control group households. But as far as irrigation with pump sets is concerned, the largest source of irrigation in both sets of data, per household area is strikingly similar with a marginal variation of about 1.5% in all sections of the sample groups and even less than three quarters of 1% in the case of forward castes.

Table - 3.10
Irrigation Details (Area in Acres other than Control Group)

Details	Forward Castes	OBC	SC	All
No. Households	39	1	0	40
Canal	0	0	0	0
Tube well	211	0	0	211
Pump Sets	318.5	5	0	323.5
Canal area/hh	0.00	0.00	0.00	0.00
Tube well area/ hh	5.41	0.00	0.00	5.28
Pump sets area /hh	8.17	5.00	0.00	8.09

Further, if we compare percentage of irrigated area to the total cultivated area during the three year period it is same in both the sample groups, control group as well as non-control group (tables 3.11 and 3.12 below). In other words, 100% cultivated area from the sample area is irrigated. Secondly, the cultivated area in both the sample groups is more than the owned area during the three years, which means leasing in and out, takes place in the area and that is substantial one. In this case more land has been leased in as compared with the leased out, if it was there. In the control groups it is more than 11% in the years 2005-06 and 2006-07 and almost 18% in the 2007-08, whereas in the non-control group it is almost 28% in the first year, i.e., during the year 2005-06 and about 27% in the later two years. As stated earlier, the

sample households are those cultivating vegetables and they mostly lease in land. Lastly, the area owned and cultivated is much more as compared to that in Uttrakhand in both the control and non-control groups and also in the aggregate as well as per household. As far as irrigation is concerned, there is almost no comparison in both the states.

Table - 3.11

Details of Area in Acres Control Group

No. of Households 29				% Change		
Area	2005-6	2006-7	2007-8	06-7/ 5-6	07-08/6-7	07-08/5-6
Owned	265	265	265	0	0	0
Irrigated	295	295	312	0	5.76	5.76
Unirrigated	0	0	0	0	0	0
Cultivated	295	295	312	0	5.76	5.76
Owned/hh	9.14	9.14	9.14	0	0	0
Irrigated/hh	10.17	10.17	10.76	0	5.76	5.76
Unirrigated/hh	0.00	0.00	0.00	0	0	0
Cultivated/hh	10.17	10.17	10.76	0	5.76	5.76

Table - 3.12

Details of Area (Others) Acre

No of Households 40				% Change		
Area	2005-6	2006-7	2007-8	06-7/ 5-6	07-08/6-7	07-08/5-6
Owned	317	317	317	0	0	0
Irrigated	405	401.5	401.5	-0.86	0	-0.86
Unirrigated	0	0	0	0	0	0
Cultivated	405	401.5	401.5	-0.86	0	-0.86
Owned/hh	7.93	7.93	7.93	0	0	0
Irrigated/hh	10.13	10.04	10.04	-0.86	0	-0.86
Unirrigated/hh	0.00	0.00	0.00	0	0	0
Cultivated/hh	10.13	10.04	10.04	-0.86	0	-0.86

As far as area under different crops is concerned, as stated earlier, it should be totally different from that in Uttrakhand because of obvious reasons, which we are discussing below.

Cropping Pattern:

For the purpose of this study, we have separated area under vegetables and other crops in Haryana. In Uttrakhand, this situation did not arise as there was no area marked for vegetables and other crops vis-à-vis fruit crops, because of intermixing

of these crops. In plains, because crops like paddy, wheat, mustard etc. are not that tall and moreover, not at a distance as are fruit trees, no small size crops, may be vegetables or any other like fodder can be grown in the same area simultaneously. Therefore, separate area has to be used for the cultivation of these crops and we tabulated accordingly.

We have presented area under a few vegetables of the control group sample households in table 3.13 and for other than control group in table 3.14. Area under other crops like mustard and wheat is shown in separate tables 3.15 for control group and 3.16 for other than control group households.

An important distinction needs to be made with regard to mustard crop. Though it is an edible oil crop, but its green leaves and shoots are used for vegetable purpose also. In Haryana, particularly, in the sample area, which is near the National Highway and lot of vehicles pass though out the time, i.e., day in and out. For the purpose of refreshment and rest of the truck drivers and other passengers going to and fro Delhi, a number of road side *Dhabas* have come up along the Highway. Where *sarson ka sag* is served and relished by the passengers. The farmers nearby therefore, grow mustard through out the year, even without season, and benefit by supplying to these *Dhabas.* In fact, mustard is weather sensitive crop, but for the purpose of vegetables, one does not need the crop to grow fully and ripen. And for the purpose of vegetables it can be grown in any weather. Secondly, we know Haryana is one of the few states where rapeseed mustard is grown and a substantial area is covered under the crop during the Rabi season for the purpose of oilseeds. As the data were collected for the Rabi season to which the mustard crop belongs, we have used the area under mustard for the edible oil crop and shown in the relevant table and not under vegetables. Also, some of the vegetables, due to technological breakthrough have crossed the seasonal barriers, and can be successfully grown more than once a year.

Tables below show the actual number of vegetables growers and per household area. Therefore, it is more relevant as it covers only the actual growers of particular vegetables. It is only area under radish which has declined in the third year. Area under cauliflower and okra has increased, under cauliflower in the second year and

under okra during the consequent years and substantially. However, area under other vegetables which constitute pumpkin, cucumber, gourds etc. has increased handsomely about 14% in the second year and more than one/ third during the third year. If we consider all the vegetables together, there is positive change in the area under vegetables and subsequently during the three year period under consideration. However, per household area under vegetables based on the number of actual growers has increased but slightly less than the aggregate area. But over all the enhancement in the area in the year 2007-08 over 2005-06 by about 12% is not small.

Table - 3.13
Area (Acres) Under Vegetable Crops (Control)

Number of Households in ( )				% Change		
Area	2005-6	2006-7	2007-8	06-7/5-6	07-08/6-	07-08/5-6
Radish	20.5(18)	20.5(18)	19.3(19)	0	-5.85	-5.85
Cauliflower	11.5(15)	13.5(16)	13.5(16)	17.39	0.00	17.39
Okra	22.3(26)	25.5(29)	25.5(29)	14.35	0.00	14.35
Tomato	30.5(29)	32.5(29)	35(29)	6.56	7.69	14.75
Others	22(29)	25(29)	34(29)	13.64	36.00	54.55
All Vegetables	106.8(29)	117(29)	127.3(29)	9.55	8.80	19.19
Radish/hh	1.14	1.14	1.02	0.00	-10.81	-10.81
Cauliflower/hh	0.77	0.84	0.84	10.05	0.00	10.05
Okra/hh	0.86	0.88	0.88	2.52	0.00	2.52
Tomato/hh	1.05	1.12	1.21	6.56	7.69	14.75
Others/hh	0.76	0.86	1.17	13.64	36.00	54.55
All Vegetables	4.57	4.84	5.12	5.93	5.64	11.91

The area under vegetables of those households selling vegetables to the Mother Dairy is shown in table 3.14 below. Surprisingly, area under some important vegetables like Okra has gone down in these households. May be because the Mother dairy has many sources (places) to procure such vegetables, they might have offered less prices or not equal to those prevailing in the market, or may be there was substantial rejection in the market or due to some other problems, the area might have gone down, which of course we shall be discussing in the next chapter. Other vegetable with negative growth in area is tomato. However, there is significant increase in the area under cabbage. Area under cabbage is increasing (as Mother Dairy Officials suggested) due to increased demand in cities and town for Chinese food. We cannot rule out the possibility of area being shifted from okra and tomato to cabbage in these households. Also there is tremendous increase in area

under cauliflower, which is more than 36% in the year 2006-07 and more than 31% in the following year. Other vegetables as stated above also find substantial increase in area there under. If the area is shifted from one vegetable to another, it may not have that much serious implication. But if the area is shifted from crops such as cereals or pulses, it may have some implications. This will be discussed in the following section.

Table - 3.14

Area (Acres) Under Vegetable Crops (Others)

Number of Households 40				% Change		
Area	2005-6	2006-7	2007-8	6-07/5-6	7-08/6-7	7-08/5-6
Radish	56(25)	62(32)	61(27)	10.71	-1.61	8.93
Cauliflower	9(20)	13.5(22)	14.5(18)	50.00	7.41	61.11
Cabbage	18(30)	19.5(30)	22(32)	8.33	12.82	22.22
Okra	57.5(34)	63(29)	56(33)	9.57	-11.11	-2.61
Tomato	38.5(32)	37.5(29)	32(35)	-2.60	-14.67	-16.88
Others	49.5(40)	51.5(40)	59.5(40)	4.04	15.53	20.20
All Vegetables	228.5(40)	247(40)	245(40)	8.10	-0.81	7.22
Radish/hh	2.24	1.94	2.26	-13.50	16.61	0.86
Cauliflower/hh	0.45	0.61	0.81	36.36	31.28	79.01
Cabbage/hh	0.60	0.65	0.69	8.33	5.77	14.58
Okra/hh	1.69	2.17	1.70	28.46	-21.89	0.34
Tomato/hh	1.20	1.29	0.91	7.48	-29.30	-24.01
Others/hh	1.24	1.29	1.49	4.04	15.53	20.20

Figures in ( ) households growing particular vegetable

Other Crops: Along with vegetables as stated earlier, only two other major crops are grown – mustard and the other is wheat. In fact, if we consider rapeseed mustard as grown for vegetable purpose, which most likely is to be, because this region is not known for growing rape seed mustard, which is mostly grown in district Hissar and Sirsa. The other main crop then is wheat and it should not be surprising as the area, rather the entire belt from Ambala to Sonepat, rather further down South adjoining Alipur Block of Delhi also, is known for wheat paddy crop rotation area – during Rabi it is wheat and during Kharif it is paddy. However, off late the adjoining area near the National Highway is being diverted for construction (malls, housing complexes, etc.) particularly near to Delhi. But the area under wheat has declined by about 5 and half percent in the year 2006-07 over 2005-06 and over all in the third year by about 2%

(table 3.15). Its implications and reasons would be discussed in the following chapter.

Table - 3.15

Area (Acres) Under Rabi Crops (Control)

Number of Households in 29				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Wheat	186.2	176	182.7	-5.48	3.81	-1.88
Mustard	2	2	2	0.00	0.00	0.00
Total	188.2	178	184.7	-5.42	3.76	-1.86
Wheat(hh)	6.42	6.07	6.30	-5.48	3.81	-1.88
Mustard(hh)	0.07	0.07	0.07	0.00	0.00	0.00
Total (hh)	6.49	6.14	6.37	-5.42	3.76	-1.86

Coming to the other group of households (table 3.16) below, we find substantial decline in area under wheat by about 11% during the two years period and under mustard by about 17%. It therefore, appears that area under vegetables has increased at the cost of wheat and area under rapeseed mustard, if we treat it as a vegetable crop, might have given place to other vegetables. Logical conclusion should be that the farmers might have shifted the area which from the point of view of economic reasons. In other words, the vegetable crops should be more remunerative as compared to wheat or other crops. Moreover, since the Johl Committee report on crop rotation, there has been lot of emphasis for shifting the crop rotation from wheat – paddy to other cash crops requiring less water like vegetables, pulses and edible oil crops to maintain soil health and enhance farmers' income. But in this case, it will be more due to income reasons and less due to soil health or water conservation, as we do not find any change in the application of chemical fertilizers, irrigation pattern or use of pesticides by the farmers. In fact, application of pesticides goes beyond the permissible limits in the case of vegetable production as well.[3] The farmers have rightly shifted the area from paddy- a hugely water consuming crop to less water consuming crops like vegetables, which will be

1 For details see, Production and marketing of vegetables in Delhi, 1999, Origin of vegetables in Azadpur Market, Delhi, 2000 by the author, where it was reported that farmers were applying pesticides on Okra every alternative day even before harvesting and marketing, without caring that pesticides take at least 7 days to dissolve.

congenial for the health of the soil also. Already the adjoining area, in districts Karnal, Kurukshetra, Kaithal and Ambala (not exactly the sample area) is facing soil salinity problems. The major negative impact of this shift in cropping pattern will be on the production of wheat and paddy two major cereals, if it (production thereof) is reduced below the minimum critical level at the national level. The impact will be discussed in the following chapters.

Table - 3.16
Area (Acres) Under Rabi Crops (Others)

Number of Households in 40				% Change		
Area	2005-6	2006-7	2007-8	06-07/ 5-6	07-08/6-7	07-08/5-6
Wheat	164.5	145.5	146.5	-11.55	0.69	-10.94
Mustard	12	9	10	-25.00	11.11	-16.67
Total	176.5	154.5	156.5	-12.46	1.29	-11.33
Wheat(hh)	4.11	3.64	3.66	-11.55	0.69	-10.94
Maize(hh)	0.30	0.23	0.25	-25.00	11.11	-16.67
Total (hh)	4.41	3.86	3.91	-12.46	1.29	-11.33

Detailed discussion about the impact on cropping pattern, farmers' income and employment will be taken up in the next chapter.

CHAPTER – IV

IMPACT ANALYSIS

We have briefly discussed cropping pattern in the previous chapter. Because our main focus is on changes in marketing policies i.e., market reforms and impact thereof on cropping pattern, production and employment, without analyzing production process discussion on marketing alone will not be sufficient to meet the objectives of the study. We, therefore, discuss the production part along with marketing and related issues in this section of the report. As in the previous chapters, we first take up the case of agricultural production in Uttrakhand, and later production details in Haryana are discussed.

Uttrakhand:

In Uttrakhand, particularly in the sample area as discussed earlier, the main crops are fruit and vegetables. In fact, as the study was specifically intended to focus on fruit and vegetables, the sample area was purposely selected to focus on fruit and vegetables. Other crops are grown on miniscule area. Historically, this was not the case. A few years back, i.e., in the beginning of the century, other crops viz. cereals, edible oils and pulses, to the extent to meet local needs, household needs specifically, were grown locally. This situation changed quickly once the arrangements to buy horticultural crops through the Mother Dairy first and private players later on were put in place and the returns from cash crops to producers were sufficient to buy other food items from the market and problems of marketing of horticulture crops were lessened to a larger extent.

If we take overall distribution of area under various crops, ignoring the total area under cultivation not tallying with cropped area due to intermixing of crops and fruit trees' continuation for years, we observe that in the control group of sample households it varies from 351 Nalies[4] (17.55 acres) in 2005-06 to 377 Nalies (18.85 acres) in later years. Area under vegetables in the same group varies between 253 and 259 nalies (12.65 to 12.95 acres) and finally, area under wheat and maize the other two crops is about 4-5 nalies (0.2 to 0.25 acres) and under maize 8-9 nalies (0.4 to 0.45 acres). Total gross cropped area and its distribution is given in table 4.1.

[4] One nali as mentioned earlier equals 20th part of an acre.

The most part of the area, between 57% and 59%, goes for fruit crops, increasing marginally from 56.9% to 58.6% during the three year period. To be specific, aggregate area under fruit crops increased by about 7.4 % between 2005-06 and 2007-08 (table 3.3). Between 39 and 41% area is used to grow vegetables. Surprisingly it has a declining trend from 41% in 2005-06 to a little more than 39% in the 2007-08. The area under the only major cereal crop, wheat, is less than 1%, showing a downward trend from 0.81% to 0.62% in the period under consideration. The other crop, Maize, partly cereal and partly used as a vegetable in the form of sweet corn and baby corn is grown on less than 1.5% of area, varying between 1.2% to 1.4% with no visible trend.

Table - 4.1

Gross Cropped Area and % Distribution (Control Group)

Details	2005-06		2006-07		2007-08	
Crops	Area	%	Area	%	Area	%
Fruits	351	56.89	377	58.18	377	58.63
Vegetables	253	41.00	259	39.97	253	39.35
Wheat	5	0.81	4	0.62	4	0.62
Maize	8	1.30	8	1.23	9	1.40
Total	617	100.00	648	100.00	643	100.00

Area under all fruits increased marginally by about 1.33% during the three year period, whereas production of all fruits put together increased by about 8.8% during the same period, which shows that there is an increase in overall productivity of fruits (table 4.2 below). However, there is vast variation in production of different fruits. For example, during the period under consideration, production of apple dropped by more than 14% in comparison to increase in the production of plum by more than 44%. And production of other fruits increased by about 40% during the same three year period. Because number of households were same in all the categories of fruit, per household change in fruit production does not vary from that of aggregate production.

Table - 4.2

Production of Fruits (Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	07-08(6-7)	07-08(5-6)
Peach	193	204	208	5.83	2.20	8.16
Apricot	197	194	205	-1.22	5.42	4.13
Plum	105	144	151	37.12	5.20	44.25
Apple	122	108	105	-11.75	-2.92	-14.33
Other Fruits	5	8	7	60.00	-12.50	40.00
All Fruits	621	657	676	5.85	2.79	8.80
Peach/hh	17.5	17.0	17.4	-2.99	2.20	-0.86
Apricot/hh	16.4	16.2	17.1	-1.22	5.42	4.13
Plum/hh	13.1	17.9	18.9	37.12	5.20	44.25
Apple/hh	10.2	9.0	8.7	-11.75	-2.92	-14.33
Other Fruits/hh	0.4	0.7	0.6	60.00	-12.50	40.00
All Fruits	51.8	54.8	56.3	5.85	2.79	8.80

Per unit production of fruits is shown in table 4.3. Increase in production per unit of area, Nali in this case, is at a little variation from the aggregate production as well as from per household production. For example, average production (per Nali as well as per household) of peach has declined by about 1% (table 4.3 and 4.2) whereas in absolute quantity it has not declined. Decline per nali in the production of apple is much more about 31% as compared to a little more than 14% in the case of per household output or aggregate output. Production of all the fruits put together per nali has increased only by 1.33% as compared to aggregate increase of about 9%. In fact, average production has changed due to change in the number of denominator, i.e., number of households and number of area units. There is more increase in production as compared to change in area also. That increase in aggregate output is not only the result of area expansion but also due to increase in yield and may be due to interaction factor of both area and yield.

Table - 4.3

Production of Fruits Per Unit of Area (Control GP)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-7(5-6)	07-8(6-7)	07-8(5-6)
Peach	193	204	208	5.83	2.20	8.16
Apricot	197	194	205	-1.22	5.42	4.13
Plum	105	144	151	37.12	5.20	44.25
Apple	122	108	105	-11.75	-2.92	-14.33
Other Fruits	5	8	7	60.00	-12.50	40.00
All Fruits	621	657	676	5.85	2.79	8.80
Peach/ Nali	1.87	1.82	1.86	-2.79	1.96	-0.90
Apricot/ "	1.74	1.66	1.75	-4.89	5.67	0.50
Plum/ "	1.36	1.73	1.82	27.23	4.86	25.05
Apple/ "	2.18	1.71	1.67	-21.31	-2.78	-30.71
Other Fruits/ "	2.50	4.00	3.50	60.00	-12.50	28.57
All Fruits/ "	1.77	1.74	1.79	-1.50	2.89	1.33

In comparison to control group sample households, area under fruits in the non-control group households is less and under vegetables more (table 4.4). Area under fruits varies from less than 37% to about 37 and a half percent of total gross cropped area and under vegetables it increases from 55.1% to about 56%, whereas in control group area under vegetables was not more than 40% and under fruits not less than 56% of gross cropped area. One possible reason as we were told during the field visits and also which appears to be logical was that as vegetables are more susceptible to weather and relatively more perishable in nature than the fruits under consideration, hence, can not be kept for more time in the shelves, and also put to longer journey without running the risk of wastage and spoiling their quality.[5] The farmers who do not have buying contracts or other such arrangements as they depend mostly upon local markets to sell their produce are more prone to risk of price and demand of vegetables in comparison to those who have buying contracts with the Mother dairy or other such organizations. Because in such cases the risk shifts to the buying party who already have some sort of quality transport and storage facility to lessen the burden of such risk. In fact, the mother dairy even does not sell immediately on arrival in the cities like Delhi. It generally carries these fruits

[5] Quality of vegetables was specified in terms of freshness, shape, size, visible blemish marks, and flavour

and vegetables to their warehouses/ depots, Mangolepuri in the case of Delhi, and from there slowly and steadily deliver at their retail outlets.[6] Similarly area under corn, because it is also grown more for the purpose of a vegetable and less as a cereal crop, in these households, is more in comparison to that in the control households. Area under wheat is not much different, varying between 1.5% and 2% as compared to less than 1% in the case control group sample. Area under maize, which was less than 1.5% in the case of control group, is considerably more in these households, which is more than 5% of the total gross cropped area (table 4.4).

Table - 4.4

Gross Cropped Area and % Distribution (Non-Control Group)

Details	2005-06		2006-07		2007-08	
Crops	Area	%	Area	%	Area	%
Fruits	708	37.44	693	36.65	703	36.84
Vegetables	1042	55.10	1060	56.05	1067	55.92
Wheat	39	2.06	35	1.85	29	1.52
Maize	102	5.39	103	5.45	109	5.71
Total	1891	100.00	1891	100.00	1908	100.00

Coming to the production of fruits by the non-control group households, we find over all increase in the production of peach, plum and apricot. There is slight decline in the production of apple and other fruits which were not specified. In fact, these other unspecified fruits are mainly responsible for the overall decline. There is no trend in the production of these fruits. In the year 2006-07 there is huge increase in their production about 119%, but in the very next year as compared to the base year there is decline of more than 25%. Because number of sample respondents producing each fruit were almost identical or all the respondents were producing these fruits, so there is not much difference in per household production of fruits (table 4.5).

[6] During our earlier study, (Bhupal, 89), we were introduced to their computerized storage system at Mangolepuri. To make space for fresh arrivals in the store the oldest lot on the basis of computer software analysis was to be distributed first to their retail outlets. That was the period when computers were being introduced in the country.

Table - 4.5

Production of Fruits (Non-Control) (Per Household)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-7(5-6)	07-8(6-7)	07-8(5-6)
Peach	567	546	588	-3.65	7.58	3.65
Apricot	712	718	728	0.81	1.34	2.16
Plum	258	252	269	-2.14	6.57	4.29
Apple	1306	1215	1229	-6.91	1.11	-5.88
Other Fruits	75	26	56	-65.87	118.75	-25.33
All Fruits	2918	2758	2869	-5.49	4.04	-1.67
Peach/hh	17.19	16.56	17.81	-3.65	7.58	3.65
Apricot/hh	22.26	22.44	22.74	0.81	1.34	2.16
Plum/hh	7.81	7.64	8.14	-2.14	6.57	4.29
Apple/hh	39.56	36.83	37.24	-6.91	1.11	-5.88
Other Fruits/hh	2.27	0.78	1.70	-65.87	118.75	-25.33
All Fruits/hh	88.42	83.56	86.94	-5.49	4.04	-1.67

If we look at the per unit area of production of fruits, we find no difference. The production of apple and other fruits thereby of all fruits decreased. Even there is per unit area decline in the production of apple, and other fruits. It means there was some problem with yield also (table 4.6). May be, there was some weather related hardships or other agronomical problems.

Table - 4.6

Production of Fruits (Non-Control) Per Unit of Area

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-0(5-6)	07-8(6-7)	07-8(5-6)
Peach	567	546	588	-3.65	7.58	3.65
Apricot	712	718	728	0.81	1.34	2.16
Plum	258	252	269	-2.14	6.57	4.29
Apple	1306	1215	1229	-6.91	1.11	-5.88
Other Fruits	75	26	56	-65.87	118.75	-25.33
All Fruits	2918	2758	2869	-5.49	4.04	-1.67
Peach/ Nali	2.74	2.64	2.84	-3.65	7.58	3.65
Apricot/ "	3.71	3.74	3.79	0.81	1.34	2.16
Plum/ "	2.80	2.74	2.92	-2.14	6.57	4.29
Apple/ "	6.80	6.33	6.40	-6.91	1.11	-5.88
Other Fruits/ "	3.00	2.56	2.80	-14.67	9.37	-6.67
All Fruits/ "	4.12	3.98	4.08	-3.44	2.56	-0.97

The non-control group respondents were those who were selling a major portion of their produce, if not the entire produce, to the Mother Dairy. One reason for selling to

the Mother Dairy we were told was there was no problem of demand and price risk. It was the responsibility of the dairy to make arrangement for transportation, storage and disposal of the produce at their distribution centres and at their own risk. As the control group farmers were not in a position to quickly transport, store and dispose of more perishable commodities like fresh vegetables, they preferred to grow fruits, though they might not be fetching that much remuneration as the vegetables could. Therefore, we find the control group farmers sowing vegetables on lesser area and fruits on larger. And that is just in contrast to the non-control group farmers.

Data regarding vegetable production is shown in Table - 4.7. Though we find a positive trend in the production of vegetables like cauliflower, cabbage and peas, but aggregate production in comparison to fruits is much less. The production of potatoes even shows a negative trend. As number of producers of each vegetable remains same, there is no change in per household production of vegetables

Table - 4.7

Production of Vegetables (Control) Per hh

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	7-08(6-7)	07-8(5-6)
Potato	40	42	25	5.00	-40.48	-37.50
Cauliflower	17	29	21	70.59	-27.59	23.53
Cabbage	92	92	104	0.00	13.04	13.04
Peas	8	8	8	0.00	0.00	0.00
Tomato	48	48	44	0.00	-8.33	-8.33
Others	49	43	53	-12.24	23.26	8.16
All Vegetables	288	295	321	2.43	8.81	11.46
Potato/hh	4.4	4.2	2.8	-5.50	-33.86	-37.50
Cauliflower/hh	1.7	2.9	3.1	70.59	3.45	76.47
Cabbage/hh	7.7	7.7	8.6	0.00	13.04	13.04
Peas/hh	0.9	0.8	0.9	-10.00	11.11	0.00
Tomato/hh	4.0	4.0	3.7	0.00	-8.33	-8.33
Others/hh	4.1	3.6	4.4	-12.24	23.26	8.16
All Veg/hh	4.5	4.5	5.3	-0.67	17.73	16.94

If we look at the data in terms of per unit area, we find that except potato, there is positive variation in production of vegetables, cauliflower, cabbage and peas and those unspecified others (table 4.8). In other words, along with area expansion, there

is increase in yield of these vegetables. The benefit cost ratio of some selected vegetables was found to the tune of 1.87 in case of tomato followed by potato (1.79), and ginger (1.68) under field conditions. Nonetheless, highest b/c was recorded in case of capsicum (2.20) under protected cultivation.[7]

Table - 4.8

Production of Vegetables (Control) Per Nali

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	7-08(6-7)	07-8(5-6)
Potato	40	42	25	5.00	-40.48	-37.50
Cauliflower	17	29	21	70.59	-27.59	23.53
Cabbage	92	92	104	0.00	13.04	13.04
Peas	8	8	8	0.00	0.00	0.00
Tomato	48	48	44	0.00	-8.33	-8.33
Others	49	43	53	-12.24	23.26	8.16
All Vegetables	288	295	321	2.43	8.81	11.46
Potato/Nali	2.86	2.80	2.27	-2.00	-18.83	-20.45
Cauliflower/ "	2.13	2.90	2.63	36.47	-9.48	23.53
Cabbage/ "	1.53	1.48	1.63	-3.23	9.51	5.98
Peas/ "	0.73	0.67	0.80	-8.33	20.00	10.00
Tomato/ "	1.50	1.60	1.76	6.67	10.00	17.33
Others/ "	0.38	0.33	0.39	-13.59	18.69	2.55
All Veg/ "	1.14	1.14	1.27	0.06	11.39	11.46

In contrast we find a positive trend in the production of vegetables in the case of non-control group of farmers, who sell their produce to the Mother Dairy. The only exception is a slight decline in one year in the production of tomato. But overall there is positive change. Even on the basis of per unit area of land, there is positive variation in the production of vegetables in this group of sample households, and that too is increasing, 1.37 % in 06-07 over 5-6, 3.78% in 07-08 over 6-7 and 5.2% in 07-08 over 05-06 (table 4.9).

[7] Dixit, A.K. & Pandey, B.M., 'Horticulture Technology Mission (MM-I) project 'Status of Horticulture and Market Opportunities in the State of Uttarakhand', Paper presented in the Annual conf. of ISAM at Ludhiana, Feb. 2009

Table - 4.9
Production of Vegetables (Non-Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	07-8(6-7)	07-8(5-6)
Potato	1049	1076	1165	2.66	8.26	11.14
Cauliflower	307	352	379	14.71	7.85	23.71
Cabbage	1184	1171	1188	-1.14	1.48	0.31
Peas	17	20	21	15.38	3.16	19.03
Tomato	167	187	185	12.07	-0.95	11.01
Others	132	139	138	5.26	-0.83	4.39
All vegetables	2856	2945	3077	3.12	4.47	7.73
Potato/Nali	3.13	3.12	3.32	-0.03	6.41	6.07
Cauliflower/ "	2.13	2.33	2.48	9.39	6.44	16.43
Cabbage/ "	2.71	2.71	2.75	0.00	1.48	1.48
Peas/ "	1.33	1.33	1.47	0.00	10.53	10.53
Tomato/ "	2.98	3.17	3.14	6.38	-0.95	5.37
Others/ "	2.32	2.4	2.38	3.45	-0.83	2.59
All Veget/ "	2.74	2.78	2.88	1.37	3.78	5.20

Other Crops: As we have discussed above, production of and area under other crops is not much. The only other two crops in the sample households were wheat in the rabi season and maize in the kharif. And both occupied very small part of the total gross cropped area. Though, there seems to be positive trend in the production of wheat and maize in the control sample in the first two years of consideration, i.e., in the year 2006-7 over 2005-06, and in 2007-08 over 6-7(table 4.10). But first, there is negative change in the case of wheat in the year 2007-08 over 2005-06 by about 10%; second despite there being positive trend in per nali output, i.e., yield per unit of land in the case of both the crops wheat and maize, overall yield of 6- 7 quintal per acre in the case of maize and about 8-9 quintals per acre in the case of wheat is equal to almost pre green revolution yield of these crops in plains. This needs serious exercise on the part of agronomists to enhance yield rate.

Table - 4.10
Production of Other Crops (Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	07-08(6-7)	07-08(5-6)
Whaet	2	1.5	1.8	-25	20	-10.00
Pernali	0.4	0.38	0.45	-6.25	20	12.50
Maize						
Maize	2.6	2.6	3.20	0	22.88	22.88
Pernali	0.33	0.33	0.36	0	9.23	9.23

The case of non control group of respondents is not much different. Rather, there is decline in production of maize in all the years of consideration and the case of wheat remains as was in the case of control group of farmers (Table 4.11). Secondly the rate of decline is still higher in this case. As far as yield rate is concerned, the decline is sharper in the case of maize, down by about 26%. This leads to two quick conclusions – one, the deceleration in production of cereals, particularly wheat may not be a healthy sign of food security of the area. Though the area is not known for providing anything substantial to the general pool of the nation, but we were told by the respondents that up to 1990-1991, the residents did not need to buy wheat from the market. It was locally available in the needed quantity, but now almost 25 – 26% requirement is met by buying from the nearby Haldwani market, where it comes from outside state, mostly Uttar Pradesh. This needs to be verified from the market arrival data. Second, serious efforts on the part of the scientific community are needed to enhance the yield improvement of the commodities. This becomes more crucial at the time when the land needs to be used for production of more horticultural produce in order to meet the demand from outside state, and also to enhance farmers' income which through horticultural produce can be easily done in comparison to cereals production. The position will become further clear when we look into the data from Haryana, a state known for its contribution of wheat and paddy to the national pool, which is discussed below.

Table - 4.11

Production of Other Crops (Non-Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-07(5-6)	07-08(6-7)	07-08(5-6)
Wheat	15.21	12.25	13.99	-19.46	14.22	-8.00
Pernali	0.39	0.35	0.48	-10.26	37.86	23.72
Maize						
Maize	36.21	32.75	28.72	-9.54	-12.31	-20.68
Pernali	0.36	0.32	0.26	-10.42	-17.14	-25.77

Harayana:

In the sample households in Haryana, unlike in Uttrakhand, there were more crops grown, fodder for example in both the seasons, rather even during Zaid season in addition to Kharif and Rabi. The reason is obvious, no rural household in any part of northern India, being largely dependent on vegetarian food, sources permitting, can do without animal husbandry, specifically without milch animals. Secondly, there are no more common pastures left to graze the animals. This is more so in the case of Haryana where forest cover is just 4% of the area and that too is strip forest. Every household dependent upon agriculture and rearing animals, therefore has to necessarily grow fodder. In Uttrakhand, particularly in the hill areas, animals can be grazed either upon the common uncultivated hill slops or wild grass can be fetched from these areas. Hence, there is limited need to grow fodder.

Due to our resources limitations and need of the study, we are not discussing the entire cropping pattern in the state of Haryana. We are mainly focusing on the few commercial crops like vegetables and principal cereal crops considered for the study; fruits are not grown in the area. Details of area under fruit and vegetable crops, cereals and edible oils in both the groups in Haryana have been discussed in chapter III, (tables 3.13, 3.14, 3.15 and 3.16). Hence, in the following paragraphs, details of production in both the groups are discussed. Details of production of vegetables of the control group of sample households are given below in table 4.12.

About the production and yield of vegetables, a few points can be made. One, overall vegetables production is on the increase and the increase of more than 17% is substantial one. Two, barring radish, aggregate production of all the vegetables has increased during the three year period. Three, yield per acre has declined only in the case of okra and tomato, means there should have been more area coverage under these vegetables. Four, there is tremendous growth in the unspecified 'other' vegetables which include, palak, cabbage, mustard leaves and shoots, gourds and the like. Five, devotion of more area for vegetables means reduction of area under other crops, which need to be identified and their criticality to be found out.

Table - 4.12

Production of Vegetable (Control)

Figures in quintals				% Change (Over)		
	2005-6	2006-7	2007-8	06-07(5-6)	07-08/6-7	07-08/5-6
Radish	1236.77	1258.09	1232.11	1.72	-2.06	-0.38
Cauliflower	657.11	789.75	800.55	20.19	1.37	21.83
Okra	1282.92	1394.60	1430.55	8.70	2.58	11.51
Tomato	2993.58	2850.25	3078.95	-4.79	8.02	2.85
Others	1441.00	1715.00	2383.40	19.01	38.97	65.40
All Vegs	7611.38	8007.69	8925.56	5.21	11.46	17.27
Radish/Acre	60.33	61.37	63.84	1.72	4.02	5.82
Cauliflower/Acre	57.14	58.5	59.3	2.38	1.37	3.78
Okra/Acre	57.53	54.69	56.1	-4.94	2.58	-2.49
Tomato/Acre	98.15	87.7	87.97	-10.65	0.31	-10.37
Others/Acre	65.5	68.6	70.1	4.73	2.19	7.02

However, for complete picture of the situation, other part of the sample households has to be examined, details of which are give in table 4.13 below.

The 'other' or non-control sample households are those who have some sort of selling arrangement mostly with the Mother Dairy or with other such organizations, and control group are those who make their own arrangement of selling vegetables either in the local market, viz. Sonepat or take to Azadpur Delhi. They also sell to the local consumers. This has some serious implication in case the quantity of vegetable/s is more than what they can absorb, consume or sell. The excess amount either is wasted or has to be sold at discount. Though marginal, we have seen decline in the production of radish in the case of control group farmers, whereas in the non-control group there is handsome increase in the production of this vegetable, which is around 27%. Another example is the case of tomato, most delicate vegetable or salad, which if not sold on an urgent basis is likely to lose its quality – defined on the basis of freshness, colour, shape, size, ripeness, lack of blemish, flavour etc. The production of tomato increased marginally in the control group, whereas in the non-control group the increase is about of 32%. Similarly increase in the case of cauliflower is about 59%, the highest. Overall growth of vegetables production is around 33% in this group of households as compared to only 17% in

the case of control group. Most importantly, per acre production or yield of vegetables has gone up though marginal in the case of radish to substantial in the case of okra. In the control group per acre production of okra fell by about by 2 and a half percent. Only exception is the production of tomato, which declined in this group of households as well. But in this case decline is marginal, 2 and half % in comparison to substantial decline of about 10% in the control group.

One can therefore, safely conclude that assurance of vegetables purchase has led the farmers to grow more vegetables in comparison to those who lack that arrangement. Secondly, this pre arrangement of buying has promoted the yield or per acre production of vegetables, thus helped to save land use to some extent.

Table - 4.13
Production of Vegetable (Non-Control)

Figures in quintals				% Change (Over)		
	2005-6	2006-7	2007-8	06-7(5-6)	07-08(6-7)	07-08(5-6)
Radish	5302	6000	6722	13.17	12.04	26.80
Cauliflower	565	850	900	50.47	5.87	59.30
Okra	4365	4870	5848	11.58	20.08	33.98
Tomato	2737	3111	3604	13.67	15.84	31.68
Others	1408	1575	2098	11.87	33.21	49.01
All Vegetables	14377	16406	19172	14.11	16.86	33.35
Radish/Acre	60.59	60	61.39	-0.97	2.32	1.32
Cauliflower/Acre	51.36	53.13	56.25	3.45	5.87	9.52
Okra/Acre	49.6	52.65	55.17	6.15	4.79	11.23
Tomato/Acre	60.15	58.15	58.6	-3.33	0.77	-2.58
Others/Acre	108.3	101.61	110.42	-6.18	8.67	1.96

We have seen that growth in vegetable production has been mainly due to area expansion and to some extent due to yield enhancement also. Naturally, the more area coverage under vegetables might have led to reduction of area under some other crops. For that we look at table 4.14 below. As stated above we have taken two important other than vegetable crops – wheat and mustard for consideration. Other crops than horticulture and above mentioned cereals do not occupy much area. There is no change in the production of mustard, and production of wheat actually declined during the period. Not only aggregate production of wheat has gone down but also per acre production or yield too. However, the decrease in yield is

marginal less than a quarter of one percent, but aggregate decrease of more than 2% shows that most of the decrease happened due to decrease in area under the crop. In other words, the farmers of control group have also shifted area from wheat. No change in the area under mustard may be due not to the crop being used as an oil seed crop. But one cannot rule out the possibility of mustard being used and sold as vegetable. This was reported also during our personal visits during verification of data that they grow mustard and sell to *Dhabas* on the National Highway passing nearby.

Table - 4.14
Production Rabi Crops (Control)

Number of Households 29				% Change (Over)		
Quintals	2005-6	2006-7	2007-8	06-7/(5-6)	07-8(6-7)	07-8(5-6)
Wheat	3879	3670	3797	-5.39	3.46	-2.12
Mustard	14	14	14	0.00	0.00	0.00
Wheat/Acre	20.83	20.85	20.78	0.10	-0.34	-0.24
Mustard/Acre	7	7	7	0.00	0.00	0.00

Table 4.15
Production Rabi Crops (Others)

Number of Households 40				% Change (Over)		
Area	2005-6	2006-7	2007-8	06-7/(5-6)	07-8(6-7)	07-8(5-6)
Wheat	3440	3077	3119	-10.53	1.35	-9.32
Mustard	348	219	313	-37.08	42.94	-10.06
Sweet Corn	210	205	215	-2.38	4.88	2.38
Wheat/Acre	20.9	21.2	21.3	1.15	0.66	1.82
Mustard/Acre	29	24.3	31.3	-16.10	28.65	7.93
S Corn /Acre	21	20.5	21.5	-2.38	4.88	2.38

Before arguing conclusively one would like to go through the data of non-control group households as well, which are given in Table - 4.15. There is about 9% decrease in the production of wheat and 10% in mustard. This has happened despite the per acre increase in the output of both the crops, wheat by 2% and mustard by about 8%. In other words, entire reduction in output occurred due only to reduction in area under both the crops. Decrease in yield can happen due to some other non-controllable reasons also, but reduction in area can take place due only to some

deliberate action. From the point of view of soil health, farmers' income from other competing crops, irrigation water availability/conservation etc., this should be a healthy and conscious action on the part of the farmers. But food security may be at risk. Another crop is sweet corn. Though maize is a kharif crop, but due to technological progress, many crops are grown under unfavourable conditions as well and sweet corn is one among many. There is expansion of production by more than 2% of sweet corn (table 4.15)

In addition to environmental issues, the most effective parameter of farmers' decision making is remuneration from the output, feasibility of the crop, healthy market demand, transportation and storage facilities etc. To consider all these aspects we look into marketing arrangements of the produce by control and non-control group of farmers.

Marketing:

In Uttrakhand, in addition to the problems related with production, the terrain causes problems of storage and transportation as well, thereby in the marketing of the produce. As we have seen, the fields or small patches of leveled slopes are not at the same plinth. If one is 10' above, the other one is 15' down, and reaching from one to the other is not straight. Carrying produce from one field to the other or to the household or collection point, which may be another 20' – 50' way apart, up or down, is not that easy and straightforward. Still people manage it by putting unparallel amount of physical labour. Leave apart carrying the produce, even movement from one field to the other is not that simple. The author has experienced that during schedule testing in village Ismayl Raikwal. We have seen that not all the farmers sell their produce to the same buyers or through the same channels. The control group households sell in the markets, and in the most preferred markets, Bhowali and Haldwani, due may be to the distance and size of the markets. Secondly not all the produce is sold in the market. Table 4.16 below shows that about 95% to 97% of production of fruits is sold in these markets, which varies from the lowest 62.5% in the case of other fruits in the year 2006-07 to 98.6% of peach in the year 2007-08. Also, the quantity of fruits sold shows a positive change during the three year period, except the case of apples. But if we look at the percentage of fruits sold, we notice declining percentage of sale in the case of plum, apple and other fruits in the 2006-

07 over 2005-06. Overall we find that there is positive trend in the sale of fruits during the years as well as in the percentage of the marketed quantity. The absolute quantity of fruits sold increased by 10.6% in the year 2007-08 over 2005-06 in comparison to about 1.6% increase in the percentage of production sold in the market.

We enquired about the unsold produce, which was partly domestically consumed and distributed among the relatives and friends and/or a small part of that was thrown away as a waste.

Table - 4.16
Fruits Sold in the Markets (Control)

Figures In Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	06-7(5-6)	07-8(6-7)	7-08(5-6)
Peach	186	201	205	8.06	1.99	10.22
Apricot	190	189	202	-0.53	6.88	6.32
Plum	100	135	145	35.00	7.41	45.00
Apple	115	100	100	-13.04	0.00	-13.04
Other Fruits	4	5	6	25.00	20.00	50.00
All Fruits	595	630	658	5.88	4.44	10.59
% of Production Sold in the Market (Bhowali, Haldwani)						
Peach	96.37	98.53	98.56	2.24	0.03	2.27
Apricot	96.45	97.42	98.54	1.01	1.14	2.17
Plum	95.24	93.75	96.03	-1.56	2.43	0.83
Apple	94.26	92.59	95.24	-1.77	2.86	1.04
Other Fruits	80.00	62.50	85.71	-21.88	37.14	7.14
All Fruits	95.81	95.89	97.34	0.08	1.51	1.59

So far as sale of vegetables is concerned, we know that vegetables are grown intermixing with fruit trees. Therefore, it is natural that farmers also sell vegetables along with fruits, if vegetables are picked along with fruits. Naturally farmers while taking fruits for particular destination for sale will also prefer to sell vegetables at that place or to that buyer, provided unlike Delhi, he or she is not a dealer in one type of commodity. In Delhi, there are separate wholesalers, even retailers of fruits and vegetables. Hence, vegetables are also sold at the markets of Bhowali and Haldwani along with fruits. A handsome quantity (marketed surplus) of vegetables is sold which varies between 97.65% and 98%. Some of the vegetables, tomato, cabbage and the 'others' are sold 100%. It does not mean that the farmers do not consume.

What happens, if a farmer grows more than one vegetable, only a small portion of one vegetable is retained for home consumption while the rest is sold. Thus overall most of the production is sold. It will be entire produce in the case of not retained for home consumption. Secondly, the proportion of home consumption of a particular vegetable depends upon the production of other vegetables and also upon the time of the season. For example, we were told, when the season passes, preference for particular vegetable being consumed throughout the season reduces and may be the entire lot is sold in comparison to the beginning of the season when a portion is retained for home consumption. The lowest portion sold is of the peas. However, we find percentage change comparatively more during the three year period. For example, in the case of cauliflower, if the percentage of marketing increased by 75% in the year 2006-07, it went down in the following year by about 29%. That is the case with all the vegetables considered in aggregate. The marketing portion changed positively by about 2 and a half percent in the first year, went down by about 3% in the next year. Thus we find overall negative change of half a percent.

Overall we find a huge marketing percentage (marketed surplus) of both fruits and vegetables in the households selling in the market (tables 4.16 and 4.17).

Table - 4.17

Vegetables Sold in the Markets (Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	6-07(5-6)	7-08(6-7)	7-08(5-6)
Potato	38	38	22	0.00	-42.11	-42.11
Cauliflower	16	28	20	75.00	-28.57	25.00
Cabbage	92	92	104	0.00	13.04	13.04
Peas	7	7	7	0.00	0.00	0.00
Tomato	49	48	44	0.00	-8.33	-8.33
Other	48	43	52	-10.42	20.93	8.33
All	250	256	249	2.40	-2.73	-0.40
% of Production Sold Bhowali, Haldwani						
Potato	95.00	90.48	88.00	-4.76	-2.74	-7.37
Cauliflower	94.12	96.55	95.24	2.59	-1.36	1.19
Cabbage	100.00	100.00	100.00	0.00	0.00	0.00
Peas	87.50	87.50	87.50	0.00	0.00	0.00
Tomato	100.00	100.00	100.00	0.00	0.00	0.00
Other	97.96	100.00	98.11	2.08	-1.89	0.16
All	98.03	97.71	97.65	0.37	-10.61	-10.28

In comparison to control group households who sold in the market, if we look at the data about the non- control group households who sold to the Mother dairy, we find that they do not sell their entire produce to the Mother dairy, rather a small portion of the aggregate production of fruits, less than 50%, rather between 42% and 43%, is sold to the Mother Dairy. Production of horticultural crops, both fruits and vegetables is not such that one can consume a large portion or store like cereals for deferred consumption. Hence, they might have sold the remaining portion either to other buyers like the Reliance retail, the Chirag or in the market. The information was made available that they sell to both the Chirag, an NGO, as well as in the market. The fact is that first the fruit and vegetables are supplied to the Mother Dairy and if some cart load is left either with the each seller or jointly with others, then market is preferred The Chirag has its own suppliers, which are given preference,. They buy from these sellers only if the required quantity is not available with their regular suppliers.

It has some implications, both positive as well negative. Positive in the sense, that farmers do not suffer wastages or incur losses, if the Mother Dairy does not buy the entire quantity. Negative in the sense that the other players do not offer competitive prices if they do not have enough load to carry to the market or they have their requirement already met from their regular suppliers.

Also, there was information that the fruits if not disposed on the same day after sorting are left for the other day, however, this was not possible with the vegetables. The percentage bought by the Dairy also varies with regard to fruits. For example, if the plums are bought to the extent of 67% apples are bought only to the extent of 33% - 35%. Moreover, there is declining trend in the purchase of absolute quantity apples over the years. When checked with the Dairy, we were told that generally the apples by the Dairy are bought from J &K and Himachal Pradesh. Moreover, the quantity bought by them depends upon the demand.

Table - 4.18

Fruits Sold to Mother Dairy (Non-Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	6-07(5-6)	7-08(6-7)	7-08(5-6)
Peach	83	88	97	5.92	9.87	16.37
Apricot	95	94	98	-1.85	5.04	3.09
Plum	63	93	102	48.61	9.03	62.02
Apple	42	37	37	-12.37	-0.95	-13.21
Other Fruits	0	0	0	0	0	0
All Fruits	261	279	290	7.00	3.69	10.95
% Of Production Sold To Mother Dairy						
Peach	43.23	43.32	46.68	0.21	7.76	7.98
Apricot	48.45	48.29	48	-0.33	-0.60	-0.93
Plum	59.69	64.68	67.25	8.36	3.97	12.67
Apple	34.48	34.13	34.77	-1.02	1.88	0.84
Other Fruits	0	0	0	0	0	0
All Fruits	42.06	42.54	42.87	1.14	0.78	1.93

As far as selling of vegetables to the Mother Dairy by the non-control group of households is concerned, there is not much difference between the sale of fruits and sale of vegetables, the percentage of vegetable sales is lower than that of fruits. In the case of vegetables the maximum sale is of peas and that is near 50%. The lowest sale is of the other vegetables, which include a number of hill vegetables like cucumber, capsicum etc. which probably the Dairy prefers less in quantity. The reason of smaller purchases of vegetables like tomato is that the diary has its arrangements for these vegetables in other parts of the country as well. For example, Haryana, Punjab, Himachal Pradesh etc. if we take all the vegetables in aggregate, the percentage of production sold to the Dairy is around 35 to 36%. The trend of purchases by the Dairy of vegetables cauliflower, tomato and other vegetables also is on the decline. Also, it is due to the reason that the sample households are not the sellers to the Mother dairy alone. There are other buyers as well. The sale proceeds to the other players are not discussed.

Table - 4.19

Vegetables Sold to Mother Dairy (Non-Control)

Figures in Quintals				% Change (Over)		
Details	2005-6	2006-7	2007-8	6-07(5-6)	7-08(6-7)	7-08(5-6)
Potato	386	398	411	2.99	3.26	6.35
Cauliflower	91	110	106	21.42	-3.67	16.97
Cabbage	503	500	548	-0.59	9.61	8.97
Peas	8	10	11	19.05	9.31	30.13
Tomato	40	50	41	23.59	-18.26	1.02
Other	5	5	5	-3.33	3.57	0.12
All	1019	1060	1108	3.95	4.57	8.70
% of Production Sold to Mother Dairy						
Potato	36.82	36.97	35.26	0.41	-4.63	-4.24
Cauliflower	29.51	31.25	27.96	5.90	-10.53	-5.25
Cabbage	42.45	42.67	46.1	0.52	8.04	8.60
Peas	48.63	49.21	51.23	1.19	4.10	5.35
Tomato	24.19	26.7	22.06	10.38	-17.38	-8.81
Other	3.78	3.47	3.62	-8.20	4.32	-4.23
All	35.69	35.98	36.01	0.81	0.08	0.90

In sum, it can be said, that with the stepping in by the Mother dairy, some positive changes in the form of farmers' shifting from cereals crops to cash crops has taken place, production and yield of fruits and vegetables have increased, marketable surplus (97 to 98%) of fruits and vegetables has gone up due to the intervention of marketing agencies. But the Mother dairy purchases a very small part of the production. Therefore, from the remote areas like Uttrkhand, for the enhancement of farmers' income, maintaining soil health, fulfilling the needs of large scale buyers as well as consumers such as in metro cities some corrective steps in the form of strengthening Mother Dairy, encouraging other private players, improving infrastructure etc. are needed To maintain competition for the sake of efficiency, entry of some other organizations, may be directly by the govt. in the form of procurement, if no body else is entering, will also be helpful.

Haryana:

In the case of control group households of Haryana, marketed surplus of vegetables vary between 99.93% in the case of cauliflower, the highest, to 87.69 the lowest in the case of tomato. Secondly, the % variation in the sale of vegetables shows positive change except two cases of decline in the marketed surplus, one in the case of radish in the year 2007-08 over 2006-07 and two in the case of sale of tomato in the year 2006-07 over 2005-06. the highest increase in the marketed surplus has taken place in the case of 'other' vegetables, which increased by about 68% followed by cauliflower by about 33.33% during the same period. Interesting thing is that in the case of other non-specified vegetables in Uttrakhand, the percentage variation was either negative or not significant be it the case of control group or non- control group. But here in Haryana, we find a huge increase 20% the lowest to as high as 68% in the third year. It can happen due to the closeness of the production to the main and largest vegetable market of the country, Azadpur. Mostly because, other vegetables include every other vegetable from palak, coriander, mint leaf, all types of gourds, pumpkin, cucumber etc. In fact, in the Azadpur market about 55 vegetables are received daily from all over the country depending upon the season and availability. Therefore, all these vegetables find good market and affordable transportation and our sample area due to it being in the vicinity of the market suits such type of perishable and leafy vegetables the most. From far away places like Uttrakhand such vegetables cannot be brought directly for sale by the producers and the other buyers, be it the Mother dairy or others, why should bother when they have the option of buying from nearby production centres.

If we look at the marketed surplus data and % variation during the three year period, there is slight change in the absolute quantity. For example, marketed surplus of all vegetables considered in aggregate shows a negative change in comparison to positive change in the absolute quantity marketed. This happens due to change not only in production or quantity marketed but due to change in the percentage of produce marketed in relation to production (table 4.20).

Table - 4.20

Vegetables Sold in the Market (Control)

Figures in quintals				% Change (Over)		
Area	2005-6	2006-7	2007-8	06-07(5-6)	07-08/6-7	07-08/5-6
Radish	1185	1223	1146	3.21	-6.30	-3.29
Cauliflower	600	745	800	24.17	7.38	33.33
Okra	1260	1320	1370	4.76	3.79	8.73
Tomato	2750	2662	2700	-3.20	1.43	-1.82
Others	1420	1710	2380	20.42	39.18	67.61
All Vegs	7215	7660	8396	6.17	9.60	16.36
% of Production Marketed						
Radish	95.81	97.21	93.01	1.46	-4.32	-2.93
Cauliflower	91.31	94.33	99.93	3.31	5.93	9.44
Okra	98.21	94.65	95.80	-3.63	8.57	4.63
Tomato	91.86	93.40	87.69	1.67	-6.11	-4.54
Others	98.54	99.71	99.86	1.18	0.15	1.33
All Vegs	94.79	95.66	94.10	0.91	-1.63	-0.72

Some vegetables sold by other non-control group farmers to the Mother Dairy (table 4.21), tomato for example, confirm the above statement regarding fresh and leafy vegetables being procured by the Dairy from nearby areas. There is negative trend in the sale of radish, but we notice huge increase in the sale of vegetables like cauliflower okra, tomato, and 'other' vegetables to the Dairy. In fact, we noted during our earlier studies[8] that most of the leafy vegetables like palak, coriander and other perishable vegetables like gourds are mostly procured by all type of buyers, private individual traders, cooperatives like Mother Dairy etc. (no big corporate entity was operating at that time in the production and marketing of agricultural produce) from the nearby areas to the extent possible due mainly to maintain their quality and save on costs of transportation etc. Tomato if available in the adjoining areas is also preferred. Not only that, there is increase of 13%, 24% and about 40% overall of all

[8] Bhupal, D.S., Origin of Vegetables at Azadpur Market in Delhi, 1999; and Origin of Vegetables at Varnasi Markets, 2000

the vegetables, during the period under consideration. But % variation in the marketed surplus changes slightly in this case as well.

Table 4.21

Vegetables Sold to Mother Dairy (Non-Control)

Figures in quintals				% Change (Over)		
Area	2005-6	2006-7	2007-8	06-7(5-6)	7-08/6-7	7-08/5-6
Radish	4872	5330	4699	9.40	-11.84	-3.55
Cauliflower	543	830	865	52.85	4.22	59.30
Okra	3922	4465	5670	13.84	26.99	44.57
Tomato	1260	1394	3550	10.63	154.66	181.75
Others	1390	1520	2015	9.35	32.57	44.96
All Vegetables	11987	13539	16799	12.95	24.08	40.14
% of production marketed						
Radish	91.89	88.83	69.90	-3.33	-21.31	-23.93
Cauliflower	96.11	97.65	96.11	1.60	-1.57	0.01
Okra	89.85	91.68	96.96	2.04	5.75	7.91
Tomato	46.04	44.81	98.50	-2.67	119.83	113.97
Others	98.72	96.51	96.04	-2.24	-0.48	-2.71
All Vegetables	83.38	82.52	87.62	-1.02	6.18	5.09

As far as marketing of other crops is considered, there is negative trend of about 5% in the sale of wheat in the year 2006-07 over 2005-06 and positive change of less than 2% in the sale, which does not make much difference to the three year period wherein net variation is in the negative. We do not find any change in the sale of mustard. From the almost negligible sale of the mustard seeds, it appears that the crop is grown for the vegetable and not for seeds (table 4.22)

Table 4.22

Marketed Rabi Crops (Control)

Number of Households 29				% Change (Over)		
Quintals	2005-6	2006-7	2007-8	6-07/(5-6)	7-08(6-7)	7-08(5-6)
Wheat	3520	3345	3400	-4.97	1.64	-3.41
Mustard	0.5	0	0.5	0	0	0.00
% Marketed						
Wheat	90.75	91.14	89.54	0.44	-1.76	-1.32
Mustard	3.57	0.00	3.57	0	0	0.00

But considering the sale by other farmers, selling vegetables to the Mother Dairy, it is noted that there is significant decrease in the sale of wheat and mustard seed (table 4.23). If this is the trend in other areas, not falling under the sample, then there appears to be a significant shift in the cropping pattern and also in the production of commodities. Reduction in the marketed surplus of an important cereal like wheat may cause concern to the food security. Area under maize, of course during the off season has been devoted for growing sweet corn not a cereal. That finds confirmation from the data (table 4.23) as well.

Table 4.23

Marketed Rabi Crops (Control)

Number of Households 29				% Change (Over)		
Quintals	2005-6	2006-7	2007-8	6-07/(5-6)	7-08(6-7)	7-08(5-6)
Wheat	3150	2645	2590	-16.03	-2.08	-17.78
Mustard	75	34	68	-54.67	100.00	-9.33
Sweet corn	200	200	210	0.00	5.00	5.00
% Marketed						
Wheat	91.57	85.96	83.04	-6.13	-3.40	-9.32
Mustard	21.55	15.53	21.73	-27.96	39.94	0.81
Sweet corn	95.24	97.56	97.67	2.44	0.12	2.56

In sum, we find a positive change in the area, production and marketed surplus of vegetables going up. The Mother Dairy and other players have made their contribution by buying the produce and selling it in other markets, where probably the producers would not have tried at their own. It is not that with intervention of these players, farmers only selling to them have stepped up production or benefited, even those who do not sell to them also have benefited by indirect demand evolved in absence of the sellers to the Mother Dairy and others.

Employment: Though employment per se was not a focal point of the study, some questions were added to get some qualitative information about the pattern of employment in the area. The entire production process, starting from bed preparation for cultivation to harvesting of fruit and vegetables crops, sorting, marketing etc. is labour intensive and requires more labour power per unit of area as

well as per unit of output in comparison to cereals, pulses, edible oil crops. It requires the entire family to work in fields to complete the operations and that too in time. But we were interested to find out in absence of male members of the hill families and no out side labour availability how the labour requirement was met, how much the extra labour absorption generated extra income for the family, and how that extra income benefited the earning members, mostly female workers, in the family?

The answers from both the states were quite interesting, for example, all the respondents were of the opinion that more labour days were needed in the cultivation of fruits and vegetables, in the case of fruits for picking, sorting and transporting from field to the collection point and in the case of vegetables even during nursing the crops till fruitation along with picking, sorting and transportation. In comparison to that labour requirement for the production of wheat, maize and a few pulses was much less. Secondly, about 98% respondents were of the opinion that mostly the extra labour was provided by the household females. The remaining 2% hired extra labour from the northern part of state, even people from Nepal to meet the requirement. It was more so during the time of harvesting the crops, picking, sorting and carrying from field to the selling points. There was no change in labour requirement for other agricultural related activities, such as rearing of animals and craft works. Even the services such as marketing, transportation etc. did not change much.

As far as income from the change in cropping pattern from cereals to horticultural crops was concerned, most of the respondents, about 91% were of the opinion that it has increased. The income from the traditional cropping pattern was not much to spare. The output was just enough to meet the household consumption requirement. But after going for horticultural crops, the income irrespective of marketing channel followed, whether through the mother diary, NGOs, or direct sale in the market has increased. The extra income, in almost all the cases was brought to the house by the male members and handed over to the female members. But use of that income was not the sole authority of the female members. It was the domain of male members. Mostly the income was spent in consultation with dominant female member of the house.

In sum, about the entry of the Mother Dairy in the marketing of fruits and vegetables, one can conclude that it has a positive effect on the farmers' income and employment through the change in the cropping pattern in both the states Haryana and Uttrakhnad. In Uttrakhand, the contribution of the direct purchase from the farmers seems more as they do not have any other alternative. A very few of them have the opportunity and sources to sell their produce in the nearby markets. Local markets, be it Ramgarh, Bhimtal, Dhari, Bhowali and even Nainital are too small to absorb the entire marketable surplus and almost insufficient to make any dent on the cropping pattern to a reasonable extent and the other nearby market, Haldwani, not so nearby in fact, was 75 kms. away and daily transportation of perishable crops to such a long distance in absence of specialized mode of transport was not the domain of the individual producers. Moreover, bringing produce daily to such a distance of 75 kms. in hill areas, even if somebody could do it, was not that easy and economically prudent.

With the intervention of Mother Dairy and others, few points from the data emerge, first, there is increase in area under horticultural crops, particularly under vegetables, in both the states and production of vegetables has increased. The increase in production has taken place both due to area expansion as well as due to increase in yield. Second, the marketed surplus has increased in the case of both types of producers/ sellers, mainly because the Mother Dairy and other players has increased the demand from their suppliers leaving marketing space to be filled by others. Third, there is increase in on field employment for the producers of vegetables and thereby in income also as the horticultural crops fetch better returns. Fourth, there is decrease in area under cereals in both type of respondents in both the states and production has gone down. Moreover, the production has gone down despite the fact that the production per unit of area has gone up, it means the decline in area under cereals is nullifying the increase in yield too. The demand for cereals in the case of Urrakhand respondents is being met by buying from the market. Therefore, the issue of food security of these areas will have to be addressed if the production of horticulture crops is to be stepped up. In Uttrakhand, we have seen the yield rate of wheat is equal to almost pre green revolution yield rate, which needs to be addressed by technological improvements. If this happens, the local demand for wheat can be met to a larger extent. Because there is decrease in availability of

wheat to the extent of 25 to 26%, and yield rate from 7-8 quintals per acre in hill areas can be easily increased beyond that requirement.

In the case of addressing the food security issues, the role of mother dairy in improving farmers' conditions in remote areas of Uttrakhand through enhancement of horticulture production needs to be strengthened further. It would be more so in the case of entry of other private players. Even some of the conscious farmers were aware of the gap in lower prices being offered by the Mother Diary in comparison to the prevailing market prices at their sale points, Delhi in this case, but they were also aware what would happen in their absence and secondly, if they are out new private players would be more profit minded. We are also aware of the vast difference in prices the consumers pay in Delhi and farmers in Uttrkahand receive. For example, we bought apple at Rs.15/- a kg., plums Rs. 5/-a kg., pears Rs. 2/- a kg., the highest price we paid for each item in the sample area, whereas the same quality fruits were selling in Delhi retail market, Dabri retail fruit and vegetable market, at Rs. 60/-, Rs. 40/- and Rs. 12/- a kg. respectively at that time. Whatever be the transport costs, overhead charges, wastages, and other marketing charges and margins, the 4, 8 and 6 times difference respectively of price cannot be justified. This does not show that the entire price difference is pocketed by the Mother dairy. One should compare with wholesale prices prevailing in the market. In that case the difference is reduced by almost 50%. In fact, we have seen during our earlier studies that it is the retailer in Delhi who pockets between 34% to 54% consumers' price depending upon the locality, time and type of fruit and vegetables.[9]

The main point therefore, is that the entry of mother dairy has made positive impact, which has led to shift in cropping pattern, enhancement of local employment and farmers' income. Competition with private players will further improve farmers' accessibility to other markets and consumers, resulting in enhancement of their income further. Hence, even if the govt, has to provide some sort of budgetary support to the cooperative, i.e., The Mother Dairy, be it in the form of subsidized seeds, fertilizers, transport, retail outlets, power, storage etc. there exists a case for its role along with the entry of private players in the marketing of fruit and vegetables for the overall benefit of the consumers and farmers. Be it fruits and vegetables in

[9] Bhupal,D.S: 'Marketing of cauliflower, okra and palak in Delhi, 1999

Uttrakhand and vegetables in Haryana there is strong case for increased intervention of private players including Mother Dairy. The only cause of caution is that area under cereals, wheat particularly, is coming down in both the states. That should be cause of concern for food security.

But there are limitations of this study as well. The data have been purposively colleted from fruit and vegetable growing areas, also from those villages (areas) where there was intervention of Mother Dairy and private players, therefore the data should not necessarily be representing the entire state. Moreover, production of food grains has to be broad based, i.e., other areas have to be developed for that.

The important point is that we have seen, the yield of wheat in Uttrkhand is at the level of pre green revolution yield in the plains. Therefore, there is a strong case through technological intervention for improvement of yield of wheat in Uttrakhand, which will spare land for other uses. Overall infrastructure in Uttrakhand, be it roads, bridges, markets, storage, transportation and most importantly on site processing of horticulture produce need to be upgraded on regular basis.

CHAPTER- V

SUMMARY AND BROAD CONCLUSIONS

Summary:

Introduction: The study was planned by the centre in the wake of some important policy measures taken by the Govt. in the field of agricultural marketing, such as changes in the APMC Acts, permission to contract farming, liberalization of trade in agricultural commodities and permission to start futures trade in agricultural commodities. These changes were necessitated under the signing of international trade agreements like WTO and other Free Trade Area pacts. More than that as the policy was to enhance investment in agriculture, private investment in particular, it was necessary that the corporate sector be allowed their captive production, marketing, storage, processing and transportation facilities. All this was envisaged on the assumption that with free trade lot of opportunities will emerge for Indian agriculture, and farmers will be able to share the benefits only if they are linked with international agriculture and associated with trade and industry.

It was basically to study the impact of these changes on the cropping pattern, production, employment and farmers' income, that this study was planned. On the directions of the Academic Advisory Committee of the Centre, common crops (fruits and vegetables) from the two states Haryana and Uttrakhnad were to be studied. Therefore, we selected fruits and vegetables from Uttrakhand and vegetables from Haryana. Chapter 1 of the study gives us the brief description, background of the problem, objectives of the study, methodology, limitations of the study and chapter plan of the report. The data for the study were collected by a private agency as the centre's own investigators were superannuated and replacement could not take place. The data were not satisfactorily collected. Hence, we have to work with a small number of schedules, 69 from Haryana instead of 100 and 45 from Uttrakhand in place of 50 as planned at the beginning of the project.

Background of Area and Households: In chapter 2, we discuss the background of the area, particularly that of the selected villages from the two states. It was necessary to have a detailed note on the two vastly different areas under the study coverage. On the one side, Haryana, an agriculturally advanced state, rich in soil

fertility, farmers' awareness to production technology, irrigation facilities, marketing infrastructure, viz. vast coverage under the regulated market yards with nearly adequate facilities, good road network, storage, procurement arrangement by the central agencies etc, and most importantly its location advantage of being in the vicinity of the National Capital, which always provides boost to certain agricultural activities and commodities. On the other side, Uttrakhand, a far flung state with almost no matching infrastructure to boost agriculture production such as production technology, marketing infrastructure, roads, storage, procurement etc. and on that hill region where size of fields would necessarily be like that of kitchen gardens. It has certain plus points also such as major source of production of some fruits due to its climate which no where else can be produced and suitability of its weather to certain vegetables during off season in the rest of the country. Hence, this background needs to be kept in mind and we have discussed it in chapter 2. Also, with the change in climate, topography, farmers' socio-economic conditions also change vastly, particularly differ from those observed in Haryana. Even the social background, viz. caste composition, land holding pattern, possession of assets, livelihood and source of income of different social groups in the two states differ vastly, more strikingly in Haryana as compared to that in Uttrakhand.

Land Details: We have devoted chapter 3 to describe the land details and cropping pattern in the two states. Further division in the sample households has been made on account of the basic objective of the study, that is, farmers selling directly in the market/s, nearby or far away and the farmers selling their produce through either the Mother Dairy or through other players like Chirag in Uttrakhand and Birla and Reliance groups in Haryana. The divergence in land details in the two states emerges clearly, for example, in Uttrakhand, because of obvious reasons we did not observe any leasing in or leasing out of land whereas in Haryana, in both categories of farmers we find cultivated area more than owned area. In other words, extra land is leased in by the households growing vegetables in Haryana. The reasons were obvious – one, growing vegetables was more beneficial than cereal crops. Two, most of the cultivation of vegetables is done by small and marginal farmers, who generally not finding other work in the village, go for vegetables cultivation and for that have to lease in land. This practice was noted in and around Delhi also. In Uttrakhand, because modern technology, viz. use of tractors, desired level of

irrigation, use of chemical fertilizers and pesticides can hardly be applied. Most of the operations are to be carried out manually just like in kitchen gardens. Therefore, the question of leasing in and leasing out of land does not arise. Secondly, as the male members from the area come down to plains for want of work, most of the agricultural operations in the villages are carried out by female members who can do only on the owned land. Thirdly, almost every one in the area does his/her own farming, therefore, leasing in and leasing out is almost ruled out.

Most of the area under both types of sample households is rain-fed. Irrigation takes place only with the natural rain water collected in small ponds by a few households. In Haryana, the entire area is irrigated, and for that every measure, be it canal, tube well and pump sets, is used. Even the leased in area which has increased during the three year period by about 6% is irrigated fully.

Cropping Pattern: We find some interesting results With regard to the cropping pattern is concerned. First of all, there is difference in cropping pattern between plain areas and hill areas. In the hills fruit trees are grown on almost every part of area and vegetables and other crops are planted by intermixing. Therefore, change in area under fruit trees may be only due to replacement of trees or addition of new area, which however was not the case. Secondly, under the control group of sample households, there is an increase in area under fruit crops by about 7% in the three year period as compared to decline in area under fruit crops of the non-control sample households. In contrast area under vegetables of control sample households has remained unchanged whereas that of non-control group households has increased by 2.5%. In Uttrakhand otherwise also there is little scope for expansion in area.

But most important point is about decline in area under cereal crops, particularly, wheat, which declined by about 20% in control group households and by about 26% in other households. It has serious implication on food security of the area. It was noted that about a decade back, when there was no private agencies to buy horticultural crops from the area people were growing wheat now purchase wheat and even edible oils to meet their household consumption needs. Almost their total food grain demand could be met locally and now about 25% of wheat is purchased from the markets like Haldwani.

However, under both categories of sample households, area under maize has increased by about 12.5% in control group households and by about 7% in non-control group sample households. This increase in area under maize could have neutralized the shortfall in area under wheat thereby availability of cereals, had area under maize been used to produce corn. But it is being used to produce sweet corn and baby corn for supplying to Delhi and other vegetable markets. It might be useful to enhance farmers' income but surely put a question mark on food security of the region. It is therefore, needed that some measure will be needed to enhance production of cereals from other areas, may be UP, Bihar or any other part to meet the growing demand of food grains in the country. It will be more important in the light that our traditional wheat growing areas and major contributors to the national pool, Punjab and Haryana are under severe pressure to increase further production of wheat and paddy.

As far as cropping pattern in Haryana is concerned a few observations were noted. First, in the sample region most of the area is devoted to vegetables and other crops. Unlike Uttrakhand, there is no area under fruits. Though fruits in Haryana, particularly in some hill region are grown in Panchkula and Ambala districts and citrus fruits, Kinoo particularly is grown largely in Sirsa district. Such fruits could easily be grown because weather, soil and irrigation facilities all suit for the production of fruit crops. But probably, people are not habitual and they have not yet adopted fruit crops in the area, mostly wheat, paddy, vegetables, mustard and maize are grown. But, for the last few years, we were told area under wheat is shifting towards vegetables. Our sample data also confirm that about 19% area of control group households has increased under vegetable during the last three years, and same for the non-control group increased by about 7% whereas area under wheat of the control group households decreased by about 2% and that for the non-control group by about 11%, which is a huge area. if the pattern continues, it may be a serious cause for food security, particularly food grains. We have seen that in Uttrakhand also. There are reports about area under food grains, particularly under coarse cereals in Rajasthan shifting towards cash crops like Jathropa. As far as area under maize in Haryana is concerned, that has gone down by about 17% in non-control group households. There was no area under maize in the control sample households.

Impact Analysis: During the three year period, 2005-06 to 2007-08, for which data were collected, it is observed that in the control group of households area under fruits varies between 57% and 58%, the highest, which shows increasing trend and at second place in area coverage are vegetables with 41% to 39%, going down during the period, then comes maize with around 1% area during the three years and finally it is wheat which gets less than 1% area. Area under maize has gone up from 1.3% to 1.4% whereas under wheat it has gone down from 0.81% to 0.62%.

Two important conclusions can be drawn from the trend. One, that as the farmers from this group of households sell generally in the market on their own, sometimes in the nearby markets like Bhimtal, Nainital, Bhowali and mostly in Haldwani, which is about 75- 80 kms away from the sample villages, carrying fresh and perishable produce like vegetables daily to such a distance may not be economical in comparison to fruits, which can be considered as semi-perishable, particularly in comparison with vegetables, that is why the area under fruits is on the rising trend and that under vegetables declining. Secondly, area under cereals like wheat is also on the descending path that may be due to the fact, that as fruits and vegetables from the area are now moving down to plains in larger quantity due to the entry of some NGOs like Chirag, private players like Birla and Reliance groups and mother dairy, returns from their cultivation may be becoming remunerative in comparison to crops like wheat, oil seeds etc.

In comparison, area under the same crops during the three years period in the non-control group is almost in contrast. For example area under fruits is about 37-38% and under vegetables about 55 -56%. Also, in this group we find the trends of area just reversing, in the case of fruits on decline, may be marginally, from 37.44% to 36.84% and under vegetables increasing from 55.1% to 56%. Possibly, because vegetables are being taken away by the agencies to their retail points, thus creating enough market space for these perishable commodities. As far as area under wheat is concerned, there is not much difference in both types of sample groups. It is on the decline. But under maize mostly being cultivated for the purpose of sweet corn and baby corn, is on the increase.

The area position in Haryana is also not different from that in Uttrakhand. Area under vegetables is found increasing by more than 19% in the control group and by more

than 7% in the non- control group during the period. In comparison to that area under wheat declined by about 2% in the control group and by 11% in the non-control group. Area under crops is most important factor which can affect their availability, but technology and production practices are equally important in the determination of level of output.

Production: Therefore, we have to look into the overall changes in production along with area. The production of fruits in the control group households increased by about 9% during the period, whereas that in the non-control group households marginally by less than 2%. However, production of vegetables in both the sample groups increased by about 11 and a half % in the control group and by about 8% in the non-control group, thus leading to overall increase in production of about 20%. However, our concern remains the production of food grains, area under which has been declining. Production of wheat fell by about 18% in both sample groups. As far as production of maize in control group households is concerned, it increased by about 23% but fell by about 21% in non-control group sample households. Thus overall there may not be major change in the production of maize. But certainly there is shortfall in the production of wheat.

As far as production in Haryana is concerned, efforts being made by the policy makers for the diversification of cropping pattern in favour of high value crops like fruits and vegetables seem to bearing fruits. Area and production of vegetables in both sample groups have increased, and production increased significantly by more than 17% in control group and by more than 33% in the non-control group. Thus aggregate production increases by about 51% in the three years period. This not only leads to increased in farmers' income and create more employment, but also provides nutritious food to city consumers where the produce is sold. But there is shortfall in the production of wheat by about 2% in control group and by about 9% in the non-control group. That needs to be addressed.

In sum, as far as impact on cropping pattern and production is concerned, the trends are visible, there is increase in area and production of fruits and vegetables, the increase in production is more than the increase in area. This shows increase in productivity as well which should be beneficial to the farmers of the area and consumers in the far off areas. There is increase in production of vegetables in the case of those farmers who do not sell to the Dairy as well. Because buying by the

dairy has created a space for them too and for crops like leafy and perishable vegetables too. On field employment in the case of horticultural crops, particularly vegetables has also increased. This extra requirement of labour is met by the women labour mostly in the case of Uttrakhand, who are already overburdened. Growing of horticultural crops is beneficial in comparison to growing of cereals or pulses or edible oil crops. That is why there is shift in area. The marketed surplus of fruit and \vegetables is going up due to intervention of Mother Dairy and other players in the sample area. Not only the marketed surplus of sellers to these players has gone up but that is true also in the case of other group of sample households, who are left with more market space in absence of sellers to the Mother Dairy and other players. But shortfall in area and production of wheat is noted. In fact production has gone down despite the increase in productivity or yield of wheat in Haryana. That is basically due to sharp fall in area. It may pose a challenge for food grains availability, at least in the hilly areas, where the residents have to buy up to 25% of their wheat requirement from the markets like Haldwani. The overall situation on the food security front may not be that alarming as it appears to be, because the samples in both the states have been drawn from specific areas growing fruits and vegetables crops and also wherefrom the private players in the marketing of fruit and vegetables were involved. Secondly, overall shortfall of 25-26% of wheat in Uttrakhand can be easily met by up gradation of technological intervention. The yield rate of wheat in Uttrkhand is almost at level of yield rate of wheat in pre green revolution period in the plains. By a little efforts of technology improvement the yield rate can be upped beyond the required rate of 25 to 26%. Growing cash crops if there is marketing facilities – procurement, storage, transportation, processing, packaging etc. will be advantageous to the growers. The cross section data available suggest that too.

Income: The very fact, that area under cereal crops is being shifted towards fruit and vegetables, which are more prone to weather, price fluctuations, and moreover are not as much crucial as food grains, is not for nothing. There cannot be any other reason for that except major difference in returns both due to difference in production (quantity) and margins (difference in costs and prices) in both the states. The generation of extra income, in comparison to traditional crops to the producers of high value crops is supported by the benefit cost ratio also.

Employment: Employment opportunities do increase in the case of shifting towards horticultural crops. But unfortunately, most of the agriculture related work in the hill areas is done by female members who are already overburdened. In states like Haryana, where cropping pattern is shifting in favour of cash crops, specifically in the sample area, extra labour absorption is useful to only those families who have family labour, but not enough land to work on. The labour cost in Haryana is already almost highest in the country. It helps to immigrant labour to earn some extra income. Overall, irrespective of the fact, that which labour benefits, the extra employment in vegetable cultivation is generated. And mostly female members find that work.

Suggested action: In the light of above discussion it can be concluded that the with the intervention of Mother Dairy and other players in the production, marketing, transportation storage and processing of fruit and vegetables, change in cropping pattern as suggested by many serious studies and policy makers is taking place which should be helpful to enhance farmers' income, employment opportunities and availability of nutritious food items to the consumers. Promotion of horticultural crops at least in states like Uttrakhand should find some extra support as it most suits the conditions, marketing facilities permitting. Therefore, infrastructure facilities such as roads, transportation, storage and, if possible, on site processing need to be upgraded and supported. Only caution is that we should not overlook the problem of food security as area under and production of main cereal crop wheat is coming downwards in the sample households. That shortage will have to be met from other areas. And also efforts to increase yield in hill areas by upgrading technology need to be made. In fact, the overall yield in the sample households of 6- 7 quintal per acre in the case of maize and about 8-9 quintals per acre in the case of wheat is equal to almost pre green revolution yield of these crops in plains. This needs serious exercise on the part of agronomists to enhance yield rate. In fact, the technological intervention in the case of horticultural crops is also needed to spare land for other uses, both in hill areas as well as in plains. Most importantly in Haryana, where already a sizeable portion of land adjoining the National Highway towards Delhi has been devoted construction of malls, shopping and housing complexes.

Comments and Action taken

The reviewer has gone through the report very carefully and has made very valuable suggestions – about the average marketing costs and margins of the producers by selling the produce under the control and non control conditions and secondly if there was any difference in prices how it could be narrowed down.

But unfortunately, the data on these crucial points were not satisfactorily collected by the agency and when we insisted for the same they preferred not to claim the prescribed remaining fee. Hence, the report has to be finalized without these details.

The typographical errors, pointed out, occurred because the draft report was directly typed by me, and I am not well versed with this art. However, the mistakes have now been corrected.