CHAPTER VI

CASE STUDY

6.1 Introduction

The state of Haryana which was carved out from Punjab on 1st November 1966 has made an appreciable development in every area e.g. economic, social, and agricultural over the years. Agriculture is the main activity of the people of the state. The vast plain area, alluvium fertile soil, good availability of water, and hardworking people are some of the factors that have supported to enhance the development of agriculture in the state. In reference to agriculture the state has made some remarkable progress in production and productivity in recent past. This progress was envisaged by use of modern inputs which has altered our cropping pattern from coarse grain crops to water intensive crops. For example since the time of green revolution the coverage of area under two major water intensive crops viz. rice and wheat has increased phenomenally with the passage of time. In some areas it has became a monoculture of rice and wheat. This monoculture of rice and wheat drive out some crops nearly out of cultivation from the traditional system of cultivation. Due to per hectare increase in production and productivity the per capita income of the people also increase. In the initial years the use of HYVs with better availability of water has accelerated our production but this was not go long lasting. The harm effects of both these HYVs and water intensive crops were realized by farmers in the form of water depletion and water logging. In some areas the progress made by green revolution was outstanding e.g. north, north-west, east and central Haryana. Where as in some part of the state its achievement were limited to scale e.g. south-west and south and south-east. The author makes out an attempt to distinguish one region from other region and find out the causes that are responsible for land degradation in the state. The author selected four villages which are situated in different agro-climatic zone of Haryana that represent their region for the need of case study. The location of the surveyed villages in the state is shown by map in this chapter (see map). These villages are located in different agro-climatic zone of the state. The surveying of
the villages presents an example of the region as a whole. In other words these villages actually demonstrate the picture of agriculture development that the state has made during whole of green-revolution period by itself. Out of these four villages two represents the development of canal irrigation and two represents tube wells irrigation in the state. The four villages are also example of exploitation of natural resources e.g. water and soil through canal and tube wells irrigation. The present chapter on case study also supported the already mentioned fact in this research. The author tried to explore the facts that are responsible for unsustainable use of our natural resources. The author also made an attempt to know the actual idea of farmers about the problem of water depletion and water rise etc. For this purpose the author has prepare a well defined questionnaire based on objectives of the study. The questionnaire covers is aspect of the study. The author asked the suggestion from farmers to overcome this twin problem of water logging and water depletion and also set policy guidelines which are further based on these suggestions.

6.2 Nangal Sirohi

6.2.1 Location:

The village is situated in the extreme south-western part of the state. It is almost 9 km away from Mahendergarh city towards Narnaul. The village of Nangal Sirohi was founded and owned primarily by Yaduvansi people (Ahirs) of Khosyan Gotra. The Aravali hills area spread over the space in this south and south-western part of the state. In Aravali hills the mining of different type of stone is the main activity. Some sand dunes may be seen in this area of the state. Due to nearness of Rajasthan state the village enjoys almost semi-arid climatic condition. The average temperature in this part of the state are comparatively high and the region is further subjected to low and meager amount of rainfall. This low level of rainfall further rendered it to dry vegetation. The average size of vegetation is small. The leaves are minimum on trees and they are conical in shape. The roots of trees are penetrated deep in the soil to seek moisture. At the time of monsoon a increase in natural greenery can be seen.
6.2.2 Demography:

This village belongs to Gurgaon division and lies in Mahendergarh district. The total population of the village is 5393 persons and total population density is 960 persons/km² (census 2001). The village is inhabited by different caste e.g. Jaat, Pandat or Barahmnas, Chamar, etc. but majority among them are Yadav (Ahirs) people. There are still about 500 families of Yadavas in the village followed by 100 families of Baniyas, 80 families of Brahmns, 20 families of Kumhars (potters), 10 families of weavers and 35 families of Masonl and Carpenters etc. Mahendergarh is the nearest city of this village. The village is very well connected with Narnaul in the south and mahendergarh in the north by a mettaled road. The train facility is also available in adjoining areas. There are three primary and middle school in the village. There is also one Senior Secondary School in the village. Children from nearby villages come here to learn. The medical facility is available in village dispensary. The district and Tehsil headquarters are administrative center of the village.

6.2.3 Economy:

The village is known for its soldiers and businessmen. This village has been home to some of the very successful people. Founder of major Indian industrial house Modi group of industries was related to this place. The Main source of livelihood of people in the village is agriculture. Yadav are big farmers. The traditional crops of this region are some coarse grain crops e.g. Bajra, Gram, Moong and Jowar but the green revolution also affected the region at the same time. In the post green revolution period the cropping pattern has changed and it favours some water intensive crops e.g. wheat, rice and cotton. The change in cropping pattern has became the farmers prosperous over time but it is also true that it has critically affected the natural resources in the region particularly water table. To gain from these water intensive crops the farmers has used water beyond sustained limit. On the other hand side the paucity of rainfall and dearth of other water resources made agriculture uneconomic activity over the years. The other economic activities are selling of milk, and other local products.
6.2.4 Problem of water table decline and water table change:

The change in water table is rapid and hazardous as discussed in previous chapter compared to other part of state as witnessed by farmers from a long period of personal observation and experience. In the surrounding of this village water table have declined to a critical level of 40 meter in recent past. It is found during the survey that the main reason of decline in water table is the tube well irrigation. It was found that the development of tube wells irrigation has taken place of traditional wells irrigation and it has emerged a cheap source of irrigation in recent past. It is easy to install a tube well in the farm and almost each farmer has their own tube well. The expansion of wheat cultivation in the surrounding areas of this village has accelerated the pace of increase of tube wells irrigation. Till recent past wheat-cotton and gram was the main cropping pattern but now this depletion of underground water table led to a change in cropping pattern. It was experienced that almost one-fourth area in the surveyed area of the village has been reported a change in cropping pattern. According to surveyed households the wheat-cotton cropping pattern was accomplished by gram crop in the region in the early years of green revolution that time water table was not so deep as now. But over the years according to farmers’ two contradictory forces has acted as major check on this development of agriculture. One was the development and spread of tube wells irrigation and the next is low quantity of rainfall. According to the farmers before the onset of green revolution the main source of irrigation was wells irrigation in this semi-arid part of the state. But the extend of green revolution in later years has reached in this part of the state also which developed a modern system of irrigation e.g. tube wells. The expansion of tube wells irrigation in the region has led to a deep critical level of water table in area which further obliged the farmers to change their cropping pattern from water intensive crops to the low water crops. The wheat-cotton and gram cropping pattern now replaced by in favour of wheat, mustard, bajra and guwar crops. Big farmers have their own one to two or sometime three tube wells (in case when the farms are situated in different places within the same village) whereas small farmers have only one tube wells. It is interesting to note that more than 90 percent farmers are aware of the problem of water depletion but after all they have not taken any serious step to mitigate the problem. When asked the
farmers about the reason of this decline, 47 percent among them said that the main reason of this decline is low rainfall and 50% said that tube well irrigation is the main reason, 3 percent have no idea. How the problem of water depletion is critical one in this village can be estimated from the given table. From the observation it has emerge that after the green revolution rice and wheat also covered the sizeable area in this part of the state. The increase in area under these water intensive crops obliged the farmers to develop source of irrigation in the form of tube wells. All farmers who use tube wells irrigation are responsible for this decline of water table in recent past in this village. But the contribution of big farmer is more because they have more tube wells as study reflects. It is interested to note that almost half of the farmers blame low rainfall as reason of decline in water table.

6.3 Mirzapur

6.3.1 Location:

This village is situated in the northern part of the state. It lies in Thanesar tahsil in Kurukshetra district of Haryana. It belongs to Ambala division. It is 5 km away from district headquarters and 2 km from Thanesar city. Climatic condition is pleasant here than other part of the state. The region also receive good amount of rainfall as compared to other areas. Although Semi-arid to humid climatic condition prevails here but availability of good water resources cut their harm effect. There is level plain and fertile alluvium soil in the village. The type of vegetation is different here from earlier one. The size of vegetation is slightly longer than semi-arid type. The conical shape of the leaf changed to some larger leaf in size. The vast plain area provides an ideal site for agricultural activities. The farming activities are done whole the year round.

6.3.2 Demography:

The village is small in size. The total area of this village is 521 hectare. The total population of this village is 4375 people. Almost all houses in village are cemented. The type of houses in the village is rectangular in shape. Although village is small in size but it gives shelter to almost all cast people. The majority in the village is Rod people. They are under OBC category. The other important casts in the village are Chamar, Gujar and Punjabi. There are two primary/middle class and one senior secondary school in the
village. According the village Sarpanch, most of the villagers are literate. It is situated in the vicinity of the Kurukshetra so there is easy available of higher education facility.

6.3.3 Economy:

The main source of economic activity is agriculture. Both men and women work in the farm. People are engaged almost whole of the year round in the farm. There are big as well as small farmers in the village. Farmers grow two types of crops viz. rabi crops and kharif crops. Wheat is the main rabi crop whereas rice is the main kharif crop. Other than two crops, farmers grow some horticulture crops also. The other sources of livelihood are animal husbandry, milk product and poultry. The per capita income of the villagers is very good. The village is situated in one of heart of green revolution areas. The farmers of this region have benefited economic prosperity much earlier than rest part of the state due to early spurt of green revolution in the region. The productivity of agriculture in this village as well as in the surrounding areas is good. Rice and wheat are the main cropping pattern in this part of the state. The agriculture in the village is highly mechanized here to early start of green revolution in this area. Some farmers in the village has big farm house which is sign of increased prosperity in the state.

6.3.4 Problem of water table decline and water table change:

The onset of green revolution has led to a change in the agriculture scenario in the region. The rice-wheat monoculture has led to remarkable change in production and productivity in the region. The expansion of area under these two water intensive crops has over utilized ground water resources beyond sustainable limit in the post green revolution period. The canal irrigation was supplemented by tube wells irrigation in tail enders areas and in those areas where canal irrigation was not available. It is experienced by farmers in the village that the development of tube wells irrigation has led to a shrinking of water table in the village. It is found during survey that water table declined to 20 meter in recent past. The water table was near the surface before some years ago but now it is 20 to 30 meter below the surface. The problem is mainly encountered by tube well irrigation in rice-wheat cultivated areas. According to some farmers the activity of farming is becoming uneconomic. It is reported by farmers that the cultivation of rice is the main
cause of this decline. The problem was not as serious when wheat-gram and cotton were grown but it became a serious one only when the farmers started to grow rice-wheat sequence. Farmers are now thinking to change the cropping pattern. They are thinking to ban the paddy cultivation. Some farmers started to grow horticulture crops in sequence of rice-wheat cultivation. It is calculated that 42 percent of the surveyed household experienced the change in cropping pattern since the time of green revolution in favour of rice-wheat cultivation. It was experienced that almost half the surveyed villagers think that tube wells irrigation are the main reason for decline in water table in the village. Whereas according to 40 percent farmers its main cause is cultivation of water intensive crops e.g. rice, wheat etc. While on the other hand 13 percent treat rainfall as major contributory factor in decline of water table. It was also found that farmers have made Bandh in their farms to check rain water. It is good to see and to listen that 87 percent households are aware about the problem of water table decline. The villagers are now thinking to award a fine in case to cultivate rice crop. They are organizing Panchayat to deal the problem. It is praiseworthy that almost 87 percent of farmers are aware about the problem.

6.4 Raipur

6.4.1 Location:

This village is situated in the western part of the state. It lies in Hisar district. This is 10 km away from Hisar city. This village is very well connected to Hisar city by metalled road. This is modest size village having total area is 1471 hectare. There is semi-arid type of climatic condition in the village. The village is almost level plain and characterized by fertile alluvium soil. Most of the rainfall receives at the time of monsoon. Rabi and kharif are two main crops in the village. Wheat and rice are two main crops of rabi and kharif season respectively. Other than this some horticulture crops are also grown. The main source of irrigation is canal. The agricultural activities are done whole the year round. Farmers get the work in different type of agricultural activity whole the year round and earn the income.
6.4.2 Demography:

The total population of the village is 5318 person. There is good facility of dispensary in village. There is one primary/middle and secondary school in the village. There are different castes systems in the village but majority among them are Jat, Brahmans, Thakur’s, Saini and Schedule caste. The general morphology of this village is compact. The streets cut each other at right angle. People are engaged in agriculture related activity throughout the year. Other than agriculture some people are also engaged in service sector.

6.4.3 Economy:

The main source of income of the villagers is agriculture. People also sold milk & milk products e.g. Butter, cheese etc. Rabi and kharif are the two cropping season. In rabi season, wheat is the main crop whereas in kharif it is paddy crop. Some big farmers have their own farm houses where along with residence one part is kept reserve for animals. The big farmers have their own tractors where as small farmers take the same on rent to cultivate the farm. The landless farmers found work in the farm of big landlords throughout the year. Some people also go in the city to seek work, where they act as daily wage worker. Purchasing & Selling of animals is also other important activity.

6.4.4 Problem of water logging/salinity and water table change:

It is amazing to know that the changes in water table in this village are unique. This village was severely affected by the problem of water logging and salinity before two to five years ago. However, at present a significant part of the village is also victim under the same. Note withstanding, farmers have used unwise and excess of water by tube well and canal irrigation over the years. The more availability of water in recent past in this region of the state leads to development of wet patches in this village. But in recent times, supply of water in canal has come down. Farmers are obliged to use more underground water through tube wells irrigation to supplement the canal irrigation in paddy cultivation areas as result they are also facing secondary problem e.g. water depletion, mostly in those farms which are situated away from the canal. The development of tube wells irrigation has got a boost in recent past and it is interesting to
know that changes in water table have been phenomenal in the village. The upper surface water aquifers are shrinking rapidly. In recently one to two year, the water table has been showing negative balance. The water table that was upper the surface or near to the surface in recently some years ago now has gone down to 3 to 4 meter. There is almost 2 to 3 meter decline in water table has been recorded in recent two years in this village. The problem is realized by farmers but they are not able to take steps. It is interested to know that half of the farmers of the surveyed household consider dearth of rainfall as contributory factor in decline of water table. Whereas 20 percent among them consider tube well irrigation as the main reason and rest of them have no idea. Actually they are in two dilemmas viz. water logging (near to canal) and water depletion (away from canal) hand to hand. Here it is important to note that awareness level of the farmers of this village is almost 80 percent. In the water logged areas patches of white salt can be seen with open eye. Farmers are applying zipsum in the farm to eliminate the problem of salinity. The above problem of water logging/salinity also led to change in cropping pattern. Almost one third villagers of the surveyed households have been observed a change in cropping pattern. It is realized by most of the farmers that the cultivation of paddy is no longer economic one so they are seeking right alternate. For instance earlier the village was dominated by paddy cultivation but now they started to grow less water intensive crops e.g. cotton and horticulture. It is here important to mention that small farmers are more interested to grow horticulture crops. Horticulture crops take less time to ripe, less risky and are more economic and eco-friendly. It is also found during survey that some are more interested in supply of Deshi khad to mitigate the problem of water logging and salinity. So it can be estimated from the table 6.2 that the agriculture scenario in the region is changing over with the passage of time. The severe impact of rise/decline of water table can be seen under the same.

6.5 Sahllavas

6.5.1 Location:

This village is located in the southern part of the state. It belongs to Rohtak division. It is situated in Jhajjar district. It is acquired a status of sub-tahsil. The total area
of this village is 1471 hectare. This is 25 km. far away from Jhajjar city. Actually the village is vast plain characterized by alluvium soil. The general climatic condition is dominated by semi-arid type. This village is very well connected by road link to nearby important big cities. The average annual rainfall is low in the village which cannot meet the requirement of farmers at the time of irrigation. There is semi-arid type of vegetation found in the region comprising mainly short or conical type leafs.

6.5.2 Demography:

The general morphology of this village is compact size. Houses are made at rectangle. They are very close to each other. Generally one storey houses are made but there are examples of two storey houses in the village. The total population of this village at present is more than 5000 persons. People of almost every caste lives there but in majority are Yadav, Baniya, Pandit, Chamar, Thakur, Balmiki etc. There is also Khap system in the village which takes social and political decision at the time of emergency. Jakhar is one of the dominant Khap in this village. There are two primaries and one secondary school in the village. Student from nearby villages come here for education. Most of the population in the village is literate.

6.5.3 Economy:

The economy of this village is in good condition. People are engaged in agricultural related activity whole of the year. Other than agricultural people also rear animals and poultry. Some people also go in Jharli power plant to work there. There is some household industry e.g. flour mills, candle industry in the village. The per capita income of the villagers is good. People also sold animal products e.g. Cheese & Butter. Rabi & kharif are the two important cropping season in the village.

6.5.4 Problem of water logging/salinity and water table change:

The general water table has risen in recent past in this village. The villagers of this village pray to God for no rain. Actually the twin problem of water logging and salinity are severe one in this village. In some farms there is water on the surface (The Hindu, 15 oct, 2012; also see photo). According to the farmers there was no problem of water logging and salinity in this village before the onset of paddy cultivation but over the years
the cultivation of paddy transformed the area into wet desert. The problem of water logging and salinity changed the 43 percent cropping pattern in the surveyed household. Earlier farmers grow paddy cultivation but now they have started to grow bajra & guwar crops. It is calculated by the author during survey that 39 percent of the total area of the surveyed household is affected by the problem of salinity. It is significant to note that the patches of salt can be seen on dry land in the region. During day time heating the upper surface water evaporate leaving a white patch of salt on the soil. It is significant to note that the problem of salinity has became acute one in the post green revolution period in this part of the state, especially in canal irrigated areas. The problem of salinity is very serious in adjoining canal command areas. According to majority of the farmers the problem of seepage and paddy cultivation rendered it more serious in the region. It is interesting to know that majority of the farmers have no idea to remove or eradicate this problem. Some have applied Zipsum in the soil to remove this problem whereas rest have applied Deshi Khad( farm yard manure) to eradicate the problem.

The general water table in village is half & one metre below the surface. The seepage from canal is one of the main reason to enhance the problem of water logging. It is here important to note that more than 80 percent households are aware about the problem of water logging and salinity. Table 6.1 and 6.2 show the status of water logging/salinity, its reason, and awareness levels of the surveyed households in the village. It is also important to mention that it is the very first village in Haryana which has totally banned on the cultivation of rice. In recent years Pachayats are organized to stop or for ban on paddy cultivation. It is announced that khap panchayat will impose a sum of 5000 Rs if anyone found to cultivate paddy crops (The Hindu Oct 15: 2012). It is noteworthy that the activity of farming is no longer economic one. It is becoming uneconomic one over the years because some farmers started to sell their land. Farmers are selling to those parts of their farm which is affected by the problem of water logging and salinity. The problem is so actuate and critical in this village that several newspaper covered the story on their page (see e.g. The Hindu Oct 15: 2012 p. 15). People in this village and nearby villages abandoned the cultivation of paddy now they started to grow less water intensive crops e.g. bajra & guwar. It is severe ecological hazard in this matter
if the problem of water depletion and water logging will not check on time this will convert a sizeable portion of our most productive agricultural land out of cultivation.

<table>
<thead>
<tr>
<th>Villages</th>
<th>Decline in meter</th>
<th>Rise in meter</th>
<th>Change in cropping pattern due to depletion/rise of water table expressed as percentage to total surveyed household of the villages</th>
<th>Land affected by water logging/salinity expressed as percentage to surveyed household of the villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>*</td>
<td>1 to 2</td>
<td>43%</td>
<td>39%</td>
</tr>
<tr>
<td>R2</td>
<td>3</td>
<td>*</td>
<td>31%</td>
<td>71%</td>
</tr>
<tr>
<td>M3</td>
<td>20</td>
<td>*</td>
<td>42%</td>
<td>*</td>
</tr>
<tr>
<td>N4</td>
<td>40</td>
<td>*</td>
<td>22%</td>
<td>*</td>
</tr>
</tbody>
</table>

Notes: * Means negligible

(1) S1 means Sahllavas

(2) R2 means Raipur

(3) M3 means Mirzapur

(4) N4 means Nangal Sirohi

Source: Compiled by researcher and based on surveyed villages of the state.
<table>
<thead>
<tr>
<th>Villages</th>
<th>Probable reason of decline</th>
<th>Probable reason of rise</th>
<th>Earlier grown crops</th>
<th>Now grown crops</th>
<th>Awareness</th>
<th>Steps taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sahllavas</td>
<td>Low rainfall</td>
<td>20</td>
<td>80</td>
<td>Paddy</td>
<td>86</td>
<td>Ban on paddy cultivation, sold water logging land</td>
</tr>
<tr>
<td></td>
<td>Tube well irrigation</td>
<td></td>
<td></td>
<td>Guwar, bajra</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water intensive crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raipur</td>
<td>53</td>
<td>20</td>
<td>27</td>
<td>Paddy</td>
<td>80</td>
<td>Supply zipsum in farm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cotton horticulture</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mirzapur</td>
<td>13</td>
<td>47</td>
<td>40</td>
<td>Gram, cotton wheat</td>
<td>87</td>
<td>Make bandh &amp; boring to collect rain water, organize panchayat, thinking to stop paddy cultivation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rice wheat, horticulture</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nangal Sirohi</td>
<td>47</td>
<td>50</td>
<td>3</td>
<td>Wheat cotton gram</td>
<td>90</td>
<td>No step taken</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wheat mustard bajra, guwar</td>
<td></td>
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</tbody>
</table>

Source: Compiled by researcher and based on surveyed villages of the state
Conclusion

The whole of the chapter present deep in depth knowledge of the twin problem of water logging/salinity and water depletion. Both problems go hand to hand in the state. But the problem of water depletion is more actuate & severe one as compared to water logging. Most of the districts in the state are facing the problem of water table depletion. It is found during the survey that almost 3 in the four surveyed villages are facing the problem of water depletion. In case of village Raipur (Hisar) the example is latest one. The problem is critical in south-western part of Haryana where the water table has gone to more than 40 meter below the surface. Farmers are banning on the cultivation of rice crops. This region is transformed into dark zone. It is interesting to know that farmers are seeking to alternate of rice crop in almost all rice cultivating areas because the crop has no longer remained a economic crop from ecological point of view because it has negative affected surveyed villages.
References

