

CHAPTER IV

AGRICULTURE AND IRRIGATION

INTRODUCTION

Hisar is predominantly an agricultural district. In the past, the life in the district was marked by the recurring droughts, famines and scarcity conditions due to lack of irrigation facilities and scanty and erratic rainfall. The advent of canal irrigation brought big chunks of barren and parched lands under cultivation. A pragmatic approach adopted by way of planning the agricultural production programmes on rational basis was prepared and it started paying quick dividends during the last two decades. The location of Haryana Agricultural University, a high seat of learning and research in agriculture and allied sciences, age old traditions of virile peasantry and long established live-stock farm brought most spectacular transformation in agricultural economy of the district. The district now boasts of providing highest share to the state production of cotton, oil-seeds and gram and is known all over the country for its quality live-stock.

IRRIGATION

The district is situated in the arid region of very inadequate rainfall. The sub-soil water is deep and unfit for irrigation in most parts of the district. The irrigation was provided to the district by the Western Yamuna Canal and Rangoi Inundation Channel but it provided irrigation to 16.1 per cent of the total cropped area in 1950-51. Hardly 45 per cent of the villages received irrigation. Some were served by inundation channel in the summer season only while the supply of water in other cases was inadequate. The irrigated area formed only 29.2, 13.4 and 13.2 per cent of the total area in the Hansi, Fatehabad and Hisar tahsils respectively.¹ After the commencement of irrigation from Bhakra Nangal Project, the irrigation in the district registered a sizeable increase. The irrigated area increased from 16.1 per cent of total cropped area in 1950-51 to 27.0 per cent in 1955-56, 40 per cent in 1963-64, 43 per cent in 1966-67, 58.4 per cent in 1973-74 and 66 per cent in 1977-78. The well irrigation was introduced in some parts of the district where sub-soil water was fit for irrigation after sufficient availability of power from Bhakra Nangal Project. In 1977-78, the net irrigated area in the district was 357 thousand hectares—330 by canals and 27 by tubewells and wells.

1. *Effects of Bhakra Dam Irrigation on the Economy of Barani Villages in the Hisar District, 1964-65*, (Economic and Statistical Organisation, Government of Haryana), p. 1.

Wells and Tubewells

In the beginning of the present century, the area under well irrigation was insignificant because the depth of water was 100 ft. or more below the level of the ground and sub-soil water was unfit for irrigation in most parts of the district. The wells were primarily meant for drinking purposes and were generally located near the village sites or around the village ponds and sometimes supplied irrigation to rabi crops on the land attached to them. A few wells were located in the neighbourhood of canals or the Ghagghar. These wells were invariably worked with *lao* (rope) and *charsa* (leather bucket).

In 1951, only 1.7 per cent of the total irrigated area in the district was under well irrigation. With the availability of sufficient power from Bhakra Nangal Project, the ground water was also tapped through tubewells for irrigation. In 1977-78, 27 thousand hectares amounting to 7.6 per cent of total irrigated area, was under well irrigation.

Canals

Canal irrigation in the district is mainly provided by two canal systems—the Western Yamuna (Jumna) canal, the oldest in the state, and the Bhakra canal.

Western Yamuna (Jumna) canal was dug originally during the reign of Firuz Shah in A.D. 1355. It was designed to force water from the Yamuna into Chautang river, once a tributary of the Ghagghar, which flowed down to Hansi. It then passed on to the newly built town of Hisar. Firuz Shah's canal seems to have choked and silted up by the 16th century. Akbar ordered the renewal of the canal so that it might supply water all through the year up to Hansi and Hisar. The canal was named Shakhuni. The Shakhuni might well have been a perennial canal, to judge from the two masonry bridges over it, one at Karnal and the other at Safidon. In A.D. 1639, Shah Jahan got the canal improved, using the alignment of Shakhuni for a large section of this canal which was renamed as Shah-nahar.¹ He carried it on to Delhi. The Shah-nahar gradually silted up.

The canal was reopened in 1826-27 and it entered the Hansi tahsil from Jind side and irrigated some villages of Hansi and Hisar tahsils. Till 1893, it did not provide proper and extensive irrigation in the Hisar district. In some villages, there was much waste of water

1. Abha Singh, Irrigating Haryana—*The Pre-Modern History of the Western Yamuna Canal* (A paper presented at 43rd session of Indian History Congress, Kurukshetra, 1982).

and in parts the irrigation was so extensive that the level of the sub-soil water was raised considerably, the soil damaged and the health of the people injured. Thus while some villages suffered from over irrigation, the people in adjacent villages could not get any water owing to slight difference in levels. This state of affairs led to the construction of the Sirsa branch in 1895 and the Petwar distributary in 1899. Tosham distributary was constructed in 1939. It was remodelled and re-named as Sunder Sub-branch in 1941. These branches of the Western Yamuna (Jumna) canal had rotational closures but with the augmentation of supplies from the Bhakra canal and Augmentation canal,¹ these were made perennial.

Hansi Branch.—The Hansi branch of the Western Yamuna (Jumna) canal enters the district from Jind side near RD 23,600 at village Rajthal and throws off four distributaries, i.e. Masudpur distributary, Narnaund minor, Hisar major distributary and Petwar distributary which provide irrigation in the district. The total area in the district irrigated by the system in 1977-78 was 75,604 hectares.

Sunder Sub-branch .—A channel of the Western Yamuna (Jumna) canal named Tosham distributary was constructed in 1939 for providing irrigation to Hansi and Bhiwani tahsils. The channel was remodelled in 1941 and named as Sunder Sub-branch and its tail portion as Sunder distributary. It takes off from Butana branch of Western Yamuna (Jumna) canal at RD 83,000. With the augmentation of supplies from Bhakra canal and Augmentation canal, the system was made perennial. The Jui Lift canal constructed in 1971 takes off in the district from Sunder Sub-branch at RD 1,21,350. The total area irrigated in the district by the channels of Sunder Sub-branch during 1977-78 was 22,307 hectares.

Sirsa Branch .—The Sirsa branch was constructed in 1895. It entered the district in Tohana tahsil and passed across Fatehabad and ended just outside Sirsa tahsil (Sirsa district). From here a minor carried on irrigation to a point close to Sirsa town. It was not perennial and had rotational closures. In 1954, the Narwana branch of the Bhakra Main Line canal was linked with Sirsa branch near village Budhera (Kurukshetra district) and in 1972, another feeder channel namely Barwala Link canal was constructed to pour water from Bhakra Main

1. A carrier channel known as Augmentation canal takes off from the Western Yamuna (Jumna) canal at its RD 68,036 near Yamunanagar (Ambala district) and falls back in it at RD 1,25,512 near Munak (Karnal district). Tubewells have been installed along the canal to augment water-supply and to solve the problem of water-logging in the area.

Line Canal into Sirsa branch. The Sirsa branch system was re-oriented with its shifting from Western Yamuna (Jumna) canal to Bhakra canal. The Sirsa branch which came to be known as Hansawala distributary after RD 3,88,500 was abandoned beyond village Hansawala (Tohana tahsil) and its tail end areas were put on the channels of the Bhakra canal. Barwala branch and Pabra distributary off take from the Sirsa branch and provide irrigation in the district.

The Barwala branch, constructed in 1957, off takes at RD 3,42,000 of Sirsa branch and enters the district near village Makhand (Jind district) at RD 51,000. The system was fed from Bhakra canal supplied through Narwana branch. The supplies were augmented in 1972 with the construction of Barwala Link canal from Bhakra Main Line canal and tailing into Sirsa branch. Surbra distributary (RD 25,000-R), Sandlana distributary (RD 25,000-L), Sotha distributary (RD 51,000-L) Nara distributary (RD 51,000-L) Banbhori distributary (RD 51,000-R), Pinhari distributary (RD 75,000-L), Badhawar distributary (RD 75,000-R), Data minor (RD 75,000-L), Gurana distributary (RD 99,000-L), Kharak distributary (RD 99,000-R), Kharkhari distributary (RD 1,20,440-L) Ghirai distributary (RD 1,20,440-L) and Khanpur minor (RD 1,20,440-R) off take from Barwala branch.

The Barwala branch at RD 1,39,600 bifurcates into Rana distributary and Balsmand sub-branch. The Balsmand sub-branch further bifurcates at its RD 69,840 into Balsmand distributary and Dewa distributary. The Barwala branch along with its distributaries and numerous minors has proved a great boon for the Hisar district.

The Pabra sub-branch is an old distributary of the Sirsa branch and takes off at RD 3,88,500-L and enters the district at village Latani RD 17,000. The Pabra sub-branch along with Sarsod distributary (off take RD 36,680-L of Pabra sub-branch) and various minors irrigate various parts of the district.

The Sirsa branch system which is now entirely a Bhakra canal system, irrigated 1,61,226 hectares of land in the district in 1977-78.

Bhakra Main Line Canal.—The Bhakra Main Line canal enters the district near village Balyala at RD 5,29,400 (Tohana tahsil) and its various channels providing irrigation to the district were constructed between 1954 and 1966. The Tohana distributary at RD 5,31,853-R, Bhakra Main branch, Fatehabad distributary, Pirthla distributary, Fetehabad branch and Samani distributary at RD 5,38,630-T take off from the Bhakra Main Line canal. The Bhakra Main branch takes off at

RD 5,38,630 tail of the Bhakra Main Line canal and passes through the northern portion of the district and crosses over to Punjab to enter again in the Sirsa district. The Ratia branch (RD 26,337-L), Dharsul distributary (RD 36,200-L), Kudni distributary (RD 36,200-R), Ghaswa distributary (RD 36,200-L), Ghagghar distributary (RD 45,000-R), Badalgarh distributary (RD 67,500-R), Rattangarh distributary (RD 67,500-L) take off from Bhakra Main branch. The Ratia branch further throws off Birdhana distributary, Ratta Khera distributary, Khundan distributary and Sukhchain distributary. Fatehabad branch off takes at RD 5,38,630 tail of Bhakra Main Line canal and throws off Gorakhpur distributary (RD 71,468-L), Dehman distributary (RD 1,10,468-L), Khjuri distributary (RD 1,10,468-R) and Kishangarh sub-branch (RD 1,60,400-L). The Kishangarh sub-branch at its tail feeds a link channel meant for Rajasthan. The Kishangarh sub-branch with its Khara Kheri distributary, Kherampur distributary, Mirpur distributary, Jakhod distributary, Seeswal distributary, Kohli distributary, Haroli distributary, Khara Barwala distributary and Moda Khera minor provide irrigation to various parts of the district. The Bhakra Main Line canal system provided irrigation to 1,69,010 hectares in 1977-78 in the district.

Rangoi Inundation Canal .—It appears to have been originally dug at the beginning of the 19th century, if not earlier, to carry water from the Ghagghar into the Joiya. The channel gradually fell into disrepair. In 1899-1900, the Rangoi canal was strengthened and regraded down to its entry into the Joiya and below that the Joiya itself was canalized. A masonry stop dam was placed at the head of the Rangoi and it supplied water to 28 villages of the Fatehabad tahsil. The supply was, however, restricted during the rainy season. Gradually the bed of the Ghagghar became deeper and there was no overflow from it into the Rangoi. The canal has been repaired a number of times as a famine relief measure. This channel is not being used for irrigation purpose.

Modernisation of existing channels .—The area in different reaches of channels have been water-logged due to seepage of water and there is an alarming rise in the water table. As the water resources in Haryana have almost been fully developed, the state government has been engaged in lining of canals to save the seepage losses for further expansion of agriculture in the state. The scheme of modernization of channels has been taken up in the state as a part of integrated irrigation project. The government has undertaken schemes of lining of different channels falling in the district. Burak sub-minor, Khara Kheri distributary, Moda Khera minor and Daha sub-minor have been lined during 1977-78.

Sprinkler Irrigation

There are certain areas in the district which are uncommanded by the flow irrigation and many of them consist of shifting sand dunes. The farmers adopted lift irrigation for such fields. Sprinkler irrigation was introduced to some of these fields on experimental basis during 1977-78 when 5 sprinkler sets irrigated about an area of 200 hectares.

The comparative figures of irrigated area under different crops during 1977-78 in the state and the district is given in the following table :—

(Thousand hectares)

Crop	Hisar District	State	Percentage of the District Irrigated Area to the Total State Irrigated Area
1. Rice	13	347	3.9
2. Jowar	4	32	12.5
3. Bajra	21	57	37.0
4. Wheat	139	1,208	11.3
5. Barley	4	54	7.4
6. Maize	2	18	11.1
7. Gram	102	253	40.0
8. Other Pulses	2	15	13.3
9. Sugarcane	12	172	7.0
10. Other food including condiments and spices	6	57	10.5
11. Cotton	125	261	48.0
12. Other non-food crops	92	301	30.6
Total ;	522	2,776	18.0

AGRICULTURE

Agriculture occupies the foremost place in the economy of the district. In 1950-51, the net sown area was 74 per cent of the total area. The double cropped area was hardly 6 per cent of the net sown area. The irrigation increased immensely thereafter and in 1977-78, the net sown area was 85 per cent of the total area and about 50 per cent of the net sown area (274 thousand hectares) was double cropped. The land use pattern in 1977-78 was as follows :—

Nature of Land Use	Area (Thousand hectares)	Percentage of Total Area
Forests	7	1.10
Land put to non-agricultural uses or barren and uncultivable	54	8.50
Fallows	30	4.80
Net sown area	541	85.60

The net sown area per cultivator (cultivators and agricultural labourers) was 2.4 hectares in the district in comparison to 2.1 hectares for the state. The agricultural economy of the district is distinctly different for the irrigated and the unirrigated areas. A large irrigated area, which formed 66 per cent of cropped area was under high yielding crops. Its agricultural development is comparable to the best obtained in any part of the country. In unirrigated tracts which were still one-third of the cropped area, the cropping pattern was dominated by low value crops and per hectare yields were also low.¹ With changed cropping pattern which has been possible due to ensured water supply, the district has become the cotton belt of Haryana accounting for about 47 per cent of the total cotton produce of the state. Hisar has already achieved self-sufficiency in foodgrains and has been exporting cotton, cereals, oilseeds and gram to other parts of the country.

Soils

The soils of the district change gradually from light sand to a firm loam and can broadly be classified into three divisions; a fairly

1. *Techno-Economic Survey of Haryana*, National Council of Applied Economic Research, New Delhi, 1970, pp. 33-34.

heavy or hardish loam (*rausli*), light sandy soil (*bhur*) and a very heavy clay (*sotar*). The *rausli* type of soils are in Hansi tahsil and parts of Hisar and Fatehabad tahsils. These are fairly good for production provided adequate rainfall or irrigation is received. The *bhur* soils predominate the district and cover the western and south-western parts of the district and in Fatehabad and Hisar tahsils. These soils are light, highly permeable and have little waterholding capacity. The *sotar* soils stretch from east to west in Tohana and Fatehabad tahsils. These soils are impossible to cultivate until well saturated by summer floods.

The soils of the district have two main problem, wind erosion and water-logging.

Crops

The intensity of cropping shows a marked upward trend since 1954-55 when Bhakra Canal irrigation was introduced in the district. Prior to this, the intensity of cropping was as low as 71 per cent which improved to 115 per cent in 1964-65 and 143 per cent in 1977-78. The cropping pattern has also greatly changed. The barley, *bajra*, gram and fodder crops covered a major area but with the advent of irrigation, the percentage area under barley and *bajra* has greatly decreased and that under rice, wheat, cotton sugarcane and oilseeds have increased. The major crops of the district are *jowar*, *bajra*, cotten, sugarcane, rice and pulses in kharif and wheat, gram and oilseeds in rabi. Cotton, oilseeds, gram and *bajra* are the principal crops of the district. In 1977-78, the Hisar district produced 634.9 thousand tonnes of foodgrains (including 309 thousand tonnes of wheat, 172 thousand tonnes of gram and 113 thousand tonnes of *bajra*, 29.3 thousand tonnes of oilseeds (mostly rape and mustard), 65 thousand tonnes of sugarcane (*gur*) and 220 thousand bales (170 kg. each) of cotton. The cotton production of the district was 47.52 per cent of the total state production and the cotton covered 46.99 per cent of the cotton area in the state.

The food crops hold a paramount position in the cropping pattern. These crops accounted for 63.8 per cent of the total cropped area of the district. The largest area under a single crop was under gram (26.3 per cent in 1977-78) which was 34 per cent in 1950-51 and 42.1 per cent in 1964-65. The area under gram decreased because it is grown on the land where the irrigation is not available or is inadequate. Next to gram, wheat, *bajra*, rice which covered 17.1, 17.1 and 1.5 per cent of the total cropped area respectively were other important food-grain crops. The non-foodgrain crops covered 36.2 per cent of the

cropped area. The oilseeds accounted for 6.6 per cent, sugarcane 1.5 per cent and cotton 15.4 per cent of the total area.

Cropping Pattern

Low yields of crops in the district has been the basic cause of severity of food problem during the last century. Available agricultural statistics for 1881-82 indicate that average yield of rice, wheat, cotton and oilseeds was 693 kgs., 456 kgs., 58 kgs. and 252 kgs. per hectare respectively. These figures are indicative of the under utilisation of production potential of soil. The yield increased gradually over the years with the availability of water from newly constructed distributaries of Western Yamuna canal towards the close of 19th century. The yield per hectare of many crops increased markedly in the period 1951—1965 due to advent of irrigation through Bhakra canal system. The increase was more than 200 per cent in the case of sugarcane and barley and more than 150 per cent in the case of *bajra* and maize. The development of hybrid seeds, greater use of chemical fertilizers, plant protection and other scientific methods of farming have increased the yield manifold. The increase in the agricultural production was spectacular when high yielding varieties programme was taken up in a big way year after year and maximum land came under high yielding varieties of crops. During 1977-78, 34 thousand hectares of *bajra*, 7 thousand hectares of paddy, 126 thousand hectares of wheat and one thousand hectares of maize were brought under high yielding variety of crops in the district. The average yields of major crops in the district in 1977-78 was as under :—

Yield Per Hectare (in kilograms)

Rice	Wheat	Cotton <i>Desi</i>	Gram	Oilseeds (Rape and Mustard)	Jowar	<i>Bajra</i>	Barley	Maize
2,204	2,221	265	804	527	447	816	1,055	950

The total area under principal crops and their production as compared with those of the state may be seen in the Table given below :

Crop	Area under Crops '000' Hectares	Production '000' Tonnes	Percentage to Cropped Area of the State	Percentage to State Production
1. Gram	214.2	172	18.62	17.82
2. Wheat	139.3	309	10.22	10.86
3. Cotton	125.3	220	46.99	47.52
4. Rape and Mustard	54.0	290	30.51	33.33
5. Bajra	139.4	113	15.69	39.79
6. Jawar	5.2	2	2.87	9.53
7. Maize	2.0	2	2.08	2.15
8. Barley	3.9	4	4.12	3.15
9. Sugarcane	12.0	65	6.12	7.25
10. Rice	13.5	31	3.64	3.21

The most important crop of the district is cotton. In 1977-78, it ranked first in the state in terms of area (125.3 thousand hectares) and production (220 thousand tonnes). The share of the district to cotton area and production of the state was 46.99 per cent and 47.52 per cent respectively and the district was termed as the cotton belt of the state.

The second major crop of the district is oilseeds which is grown as rabi crop. Rape and mustard are major constituents of oilseeds. The total area under oilseeds in 1977-78 was 54.4 thousand hectares and its production was 29.3 thousand tonnes. Rape and mustard occupied the first place in the state both in areas and production with 54 thousand hectares and 29 thousand tonnes respectively and accounted for 30.51 per cent of the total state area under rape and mustard and 33.33 per cent of the total state production during 1977-78.

The gram is another major crop of the district. In 1977-78, it was grown in 274 thousand hectares and its production was 172 thousand tonnes. It covered 18.62 per cent of the total gram area of the state and its contribution to the state production was 17.82 per cent. The district was second, next to the Bhiwani district, in respect of gram area and production.

AGRICULTURE AND IRRIGATION

The principal cereal crop of the district is *bajra* and predominates in kharif. In 1977-78, it covered 139.4 thousand hectares (15.69 per cent of the total *bajra* area of the state) and its production was 113 thousand tonnes (39.75 per cent of the total state production). Though the *bajra* area was second largest, next to the Bhiwani district, yet its production was highest in the state.

Fruit Crops and Gardens

Fruit gardening was more a hobby than a commercial enterprise in the past and some old orchards still exist where all types of fruit trees were planted irrespective of adaptability and agro-climatic conditions. It was only with the inception of garden colony scheme that fruit cultivation became a commercial enterprise. Such colonies were set up at Hansi and Uklana.

The farmers are now very keen to plant fruit trees. The soil and climate are suited for the cultivation of *ber*, citrus fruits, guava, grapes, pomegranate and mango. These fruits are mostly grown in orchards. In 1977-78, the area under fruit crops was 47.5 hectares out of which mango crop was under 7.25 hectares, *ber* 17.25 hectares, citrus fruits 9.0 hectares, pomegranate 1.25 hectares, peach 0.50 hectare, guava 8.25 hectares and grapes and papaya 2 hectares each.

Other Crops

There has been a decrease in the area under permanent pastures and grazing land over the period since such lands have been brought under cultivation and the availability of green fodder for the livestock became acute. The steps were taken to increase the area under forage crops to make white revolution a success. New varieties of forage crops like *chari*, Sudan grass, *guar*, oats, berseem and lucerne were introduced to make fodder available round the year. The fodder crops covered 8 per cent of total cropped area of the district in 1977-78.

With increased facilities of irrigation, there is a shift towards vegetable crops also. In 1977-78, vegetable crops covered 2,650 hectares, chillies and potatoes, the principal vegetable crops of the district, constituted about half of the total vegetable area of the district.

Agricultural Implements and Machinery

The traditional implements commonly used by cultivators are plough (*hal* or *munna*), seed drill (*por*, *orna* or *nali*), spade (*kassi*), axe (*kuhari*), chopper (*gandasa* or *gandasi*), two-pronged pitchfork (*jheli*), three-pronged pitchfork (*tangli*), hoe (*Kasala* or *khurpa*), sickle (*dranti*), flat board for harrowing (*suhaga*) and rake with 6 or 8 teeth (*dandeli*).

These indigenous implements have undergone little change except minor improvements in seed drill, plough and harrows. The farmers are rapidly taking to the use of tractors and other agricultural machinery. In 1978, the mechanised implements were as follows :—

Items	Number
Tractors	3,535
Sugarcane crushers	
(a) Worked by power	259
(b) Worked by bullocks	2,909
Oil expellers (<i>ghanis</i>)	143
Pumping sets (oil engines)	6,199
Pumping sets (Electric tubewells)	9,011

The Haryana Agro Industries Corporation and the Haryana Land Reclamation and Development Corporation are extending help to farmers for mechanised farming.

Fertilizers

The general deficiency of soils in nitrogen and phosphate is made up by use of chemical fertilizers. The consumption is increasing at a rapid pace which may be seen from fertilizer consumption during 1975-76 to 1977-78.

Year	Consumption (Tonnes)			
	Nitrogen	Phosphate	Potash	Total
1975-76	9,018	688	142	9,848
1976-77	16,283	1,722	484	18,489
1977-78	19,489	3,576	1,145	24,210

Organic manure is equally important for improving soil fertility. The organic manure is obtained from urban compost and rural compost. The urban compost is prepared by local bodies by consuming urban waste and night soil. The local bodies of Hisar, Hansi, Fatehabad,

Tohana, Jakhal Mandi and Uklana Mandi are preparing urban compost and selling to farmers. The best source of rural compost is cattle dung or farm yard manure. The district has been notified under the East Punjab Conservation of Manure Act, 1949. Steps have also been taken for scientific preparation of compost in villages. The compost prepared and utilized during 1975-76 to 1977-78 is given below :

Year	Compost Prepared (Tonnes)	Compost Utilized (Tonnes)
1975-76	72,000	44,000
1976-77	88,850	77,770
1977-78	30,879	21,300

Green manuring is another useful soil improving practice. The government is stressing the adoption of the practice in the district because of sandy soils. Green manuring is recommended with sunn-hemp or *guar* but the latter leguminous crop is generally used. Of late, *dhaincha* has been introduced for green manuring. The extent of area under green manuring crops during 1975-76 to 1977-78 was as under :—

Year	Area under Green Manuring (Hectares)
1975-76	754
1976-77	1,680
1977-78	1,250

The above figures show that the cultivators are realising the usefulness of green manuring. Incentives by way of remission of water rates and subsidy are given to increase green manuring.]

Crop Protection

The crops are exposed to the ravages of pests, diseases and weeds. Downy mildew and ergot on *bajra*; *jassids* and boll worms on cotton; root weevil, annalids, blast and *sawank* weed in rice and red hariry

caterpillar (*Autra*) in kharif crops are some of the major pests, diseases and weeds. Wilt in gram; termites, rusts, smut, *Phalaris minor* and *Avena fatua* in wheat; sawfly larve, painted bug and aphid in oilseeds are major pests, diseases and weeds in rabi crops. A package of practices for the control of various diseases and pests is being enforced in the district. These practices include spraying with various pesticides/weedicides, roguing of diseased plants, sowing of disease—resistant varieties, soil treatment and other cultural operations.

The stored grains are damaged by *dhora*, *khapra* and *susri*. These pests are controlled by fumigating the grains in the bins and stores with various fumigants.

Pesticides are supplied to the farmers through Agriculture Department, cooperatives and allied agencies. The facilities are provided for plant protection equipments on nominal hire charges. Subsidy to the maximum limit of Rs. 250 per piece is also provided to the farmers for the purchase of plant protection equipments. To save cotton crop, large scale aerial spray is being conducted in compact area of cotton. A World Bank project namely, "Integrated Cotton Development Project" was started in the district in seventies in few selected blocks (later introduced in whole of the district) with the main object of increasing yield of cotton per unit area.

Locust control needs special mention in this district. The locust cycles have been very frequent in the adjoining desert area of Rajasthan. So the precautionary measures have been adopted against the locust attack. The last attack of the locust in the district occurred during 1978 but there was no loss to the crops.

Agricultural Cooperatives

By and large, the credit requirement of the peasants led to the formation of agricultural cooperatives. In 1978, there were 339 agricultural credit societies with a total membership of 1,18,765.

The cooperative farming helps the agriculturists to pool their scanty resources for intensive farming. The government provides loans and incentives to these societies. In 1977-78, there were 65 farming cooperative societies with a total membership of 985.

STATE ASSISTANCE TO AGRICULTURE

The following table gives an idea about the financial assistance provided to the farmers under various acts before Independence :—

Year	Land Improvement Loans			Loans to Agriculturists		
	Hisar Tahsil	Hansi Tahsil	Fatehabad Tahsil	Hisar Tahsil	Hansi Tahsil	Fateha- bad Tahsil
Average 1901-02 to 1905-06	1,605	623	1,485	26,505	23,037	35,963
Average 1916-17 to 1920-21	920	N.A.	2,890	42,093	17,500	10,937
1930-31	5,350	700	17,860	2,375	1,900	..

The policy of advancing loans to farmers was liberalised after Independence. The loan advanced during 1975-76 to 1977-78 are given below :

Year	Loan Advanced (Rupees in thousand)
1975-76	91.4
1976-77	132.1
1977-78	157.6

The government has adopted various measures to develop agriculture. The work is looked after in the district by a Deputy Director who is responsible to the Director of Agriculture, Haryana, Chandigarh.

ANIMAL HUSBANDRY

The Hisar district is renowned for its Haryana breed of cattle and Murrah breed of buffaloes and holds unique position in India. According to 1977 livestock census, the livestock population of the district was 8.12 lakh which accounted for 11.9 per cent of the livestock population of the state. The livestock density works out to 128 animals per square kilometre. Buffaloes had significantly larger population and accounted for 40 per cent of the total livestock population in the district. The population of sheep was largest in the state and these were 18 per cent of the total sheep population of Haryana. On the poultry side, there are 60 birds per thousand person in the district as against 122 in the state.¹ In sum, the position of the

1. *Statistical Abstract of Haryana, 1978-79*, pp. 153-54.

village on an average is that it has 567 cattle and 671 buffaloes besides other livestock and poultry. The details of 1977 livestock census may be seen in Table given below :

(In Hundreds)

Category	Haryana	Hisar	Percentage of District Population to State Population
Cattle	24,418	2,756	12.8
Buffaloes	29,401	3,258	11.1
Horses and Ponies	264	10	3.7
Donkeys	773	76	9.8
Mules	107	4	3.7
Sheep	5,415	1,032	19.2
Goats	5,196	636	12.2
Camels	1,305	187	14.3
Pigs	2,025	154	7.6
Others	144	13	9.0
Total :	69,048	8,126	11.7
Poultry	14,155	783	5.5

Milch Animals

In 1977, there were 231 thousand milch animals consisting of 69 thousand cows and 162 thousand buffaloes in the district. There were 53 milch cows and 125 milch buffaloes per thousand persons in the district as compared to 59 cows and 125 buffaloes in the state. The agro-climatic conditions are conducive to livestock population and a good majority of buffaloes and cattle are of superior breeds. A sample study shows that 85 per cent of female and 80 per cent of male among the adult cows were of Haryana breed, while 92 per cent of female and 71 per cent of the male among adult buffaloes belonged to Murrah breed. The rest of the population was of mixed or non-descript breed.¹

1. *Study of Economics of Raising Cattle and Buffaloes*, Hissar District, Haryana, (1963-66), Institute of Agricultural Research Statistics, New Delhi.

Cattle Breeding

Initially, the government followed a policy of selective breeding through key village cattle development scheme for enhancing milk production and producing quality draught bullocks. During the First Five-Year Plan, 6 key village centres were established at different places in the district. The upgradation of non-descript stock by selective breeding was a long process and the productivity could increase marginally. It was, therefore, felt that the breeding programme should be stepped up through cross breeding and other development programmes. In the early seventies, the low milk yielders were taken up for upgrading through cross breeding by artificial insemination with Jersey and Holstein Freision bulls known for their high milch characteristics. The cross breeding facilities were later spread all over the district. Artificial insemination in buffaloes have also been intensified with the progeny tested bulls of Murrah breed. To provide breeding facilities promptly, veterinary-cum-breeding centres were opened in different parts. In 1977-78, there were 58 cattle breeding centres in the district. The cross breeding facilities are also provided through mobile veterinary units. The entire breedable population of 2.38 lakh (0.71 lakh cows and 1.68 lakh buffaloes) has been covered under scientific breeding based on the technology of artificial insemination. The result of the programme was that 9 thousand female crossbred cow calves and 10 thousand female buffalo calves were born by 1977-78. The success of the programme can be well gauged from the fact that daily milk production went up from 525 thousand litres in 1971-72 to 675 thousand litres in 1977-78.

The premier institutions for cattle breeding located at Hisar are discussed below :

Government Livestock Farm, Hisar.—It is the biggest livestock farm in Asia and the second largest in the world. It was first started in 1809 as a camel stud to house and train camels for military purposes. The farm was taken over by the government in 1912 and since then it has been managed by the Animal Husbandry Department. The farm initially covered land measuring about 17,400 hectares. Originally, horses, camels and bullocks were bred. The breeding of horses was given up in 1847 and that of camels in 1857. The object of the farm thereafter remained to breed bullocks and mules of superior quality for military purposes and to provide high class bulls and donkey stallions for breeders.

The farm now breeds pedigree bulls for supply in and outside the state. In 1973, the Indo-Australian Cattle Breeding Farm was also located here.

In 1977-78, the farm was spread over 4,212 hectares and maintained 2,428 livestock.

Progeny Testing Farm, Hisar.—The farm was established in Government Livestock Farm, Hisar in 1960 under a centrally sponsored scheme for improving the milk yield of Haryana breed of cows and Murrah breed of buffaloes. The farm was taken over by the state government in 1966. The farm undertakes research and extension. For extension, 30 thousand breedable stock in the adjoining villages have been covered and 3 regional centres and 15 sub-centres have been set up in these villages.

The farm aims at improving the quality of village cattle with the ultimate object of increasing milk production through better breed and artificial insemination. In 1977-78, the herd strength of the farm was 850.

Indo-Australian Cattle Breeding Farm, Hisar—The farm was established in Government Livestock Farm, Hisar in 1973-74 in collaboration with the Government of Australia to meet the heavy demand for exotic Jersey and Holstien Friesian bulls for cross breeding of indigenous cattle. Initially, the Government of Australia gave a stock of 150 Jersey and 150 Holstien Friesian cows/heifers and 20 bulls to initiate the breeding operations. The studs of exotic breeds are now produced at this farm under local climatic conditions. A frozen semen bank has also been set up for optimum utilisation of semen. In 1977-78, the herd strength of the farm was 625.

Gaushalas

There are eight *gaushalas* located at Hisar, Barwala, Hansi (2), Agroha, Ratia, Data and Uklana. These *gaushalas* have been opened under religious sentiments to house unproductive cattle and are run mostly on charity and donations. The *gaushalas* running at Hisar, Barwala, Hansi and Agroha have been developed under *gaushala* development programme and they have become financially viable units. Besides financial assistance, the government is providing technical guidance and assistance to these *gaushalas* to enable these institutions to function as breeding and milk producing centres.

Horse Breeding

A few private stud farms have been established in and around Tohana. To promote these private stud farms and provide them selective breeding facilities, a government horse breeding station was opened at Tohana in 1972. A prized horse 'Pandragon' was initially purchased

for extending breeding facilities in the area. The breeding facilities are also provided to the horse breeders in the state. Of late, a few private stud farms have purchased horse for breeding.

Sheep and Wool Development

Sheep rearing is traditionally followed by weaker sections of the society and it has good economic potentiality in the district. The common Hisar dale sheep, though comparatively better than the other breeds in the state, is a low-yielder. The wool is also coarse and the annual yield is hardly 1.5 kilogram per sheep.

To increase the wool production, quality sheep rearing was taken up and improved breeding was undertaken with crossing of Hisar dale with exotic Merino and Corriedale. There is a sheep breeding farm at Hisar and five sheep and wool extension centres, one each at Khedar, Kaimri, Bhoodya Khera, Kukarawali and Sandol. A wool grading-cum-marketing centre was also set up at Hisar in 1969-70. The centre purchases wool from breeders and after sorting and grading, sells it to actual users. The centre purchased wool worth Rs. 21.19 lakh in 1977-78. There were 1.03 lakh sheep in the district as per 1977 live-stock census and the total production of wool in 1977-78 was 1,875 quintals.

For increasing production and to supplement the income of small/marginal farmers and landless labourers, a special programme of sheep rearing was taken up in 1975-76. The assistance in the form of subsidy towards capital investment for setting up sheep rearing unit is given. Up to 1977-78, 1,641 sheep units have been established in the district.

Poultry Development

Poultry breeding is still in its infancy in the district and it is only concentrated in and around the towns. According to 1977 live-stock census, there were 0.78 lakh poultry birds in the district and the total egg production was 69 lakh accounting for annual per capita egg availability of 5 as compared to 13 in the state in 1977-78. A turkey farm was set up at Hisar under the Haryana Agricultural University in 1972 with a nucleus stock of 200 birds. In 1977-78, the farm had 1,000 birds and was the only modern turkey farm in India.

Pig Breeding

Like poultry, pig breeding is also adopted by the weaker sections in the district. The pig breeding in the district is promoted through the pig breeding farm, Hisar. The farm introduced exotic strain with

white Yorkshire pig. The exotic breed is supplied to breeders at subsidised rates. One piggery extension centre is also functioning at Hisar.

Slaughter Houses

In 1977-78, there were four recognised slaughter houses, one each at Hisar, Hansi, Fatehabad and Tohana and 17,299 animals including 6,156 sheep, 9,838 goats and 1,305 pigs, were slaughtered during the year.

Animal Diseases and their Control

During last century, the common animal diseases prevalent in the district were *sitla* or cow pox, foot-and-mouth disease (*munh-khur*, *goli ki sat* (anthrax fever) and *galghuta*. The people adopted various indigenous methods to cure these diseases. For *sitla*, the sick animal was put in a closed stable and protected from the cold and was sometimes given balls of pounded *bhang*. For foot-and-mouth disease, the animal was administered a pound of molasses and the mouth of the animal was tied for some hours so as to keep it shut. *Goli ki sat* was considered to be a fatal disease and there was no remedy for that. For *galghuta*, the neck of the sick animal was scorched by applying burning grass or the holy man was called to exorcise the disease by making mesmeristic passes (*jharna*) over the affected part. These common indigenous treatments are still followed but people have become conscious to have veterinary assistance from veterinary hospitals and dispensaries functioning in various parts of the district.

The first veterinary hospital was opened at Hisar in 1900. Later veterinary hospitals were opened at Hansi (1906), Barwala (1926), Narvaud (1928), Ratia (1930) and Tohana (1940).

In 1977-78, there were 18 veterinary hospitals, 13 dispensaries and 39 other veterinary institutions located in various parts of the district. A mobile veterinary clinic was also functioning in the district. The Haryana Veterinary Vaccine Institute was also functioning in Hisar. It was originally set up at Dagshai (Himachal Pradesh) and was shifted to Hisar in 1950. It produces various sera and vaccines for curative and prophylactic vaccination. It also looks after the standardisation of vaccines. On an average 1.2 lakh animals were treated annually by these veterinary institutions during 1975-76 to 1977-78 and about 3 lakh animals were vaccinated every year against contagious diseases. The common diseases of livestock in the district are haemorrhagic septicaemia, rinderpest, foot and mouth disease, surra, black quarter and fowlpox. For effective veterinary aid, the veterinary facilities are being expanded gradually. The livestock wealth is thus well-protected against

fatal diseases and the incidence among the livestock mortality has decreased substantially. In 1977-78, there were 88 cattle which died due to contagious diseases. The College of Veterinary and Animal Sciences of the Haryana Agricultural University provides indoor cattle treatment, having facilities of operations and other latest techniques. The veterinary institutions functioning in 1977-78 may be seen in Table VI of the Appendix.

Dairy Farming

Dairying in the district has been an allied occupation to agriculture. Milk is derived mostly from cows and buffaloes. According to 1977 livestock census there were 1.04 lakh buffaloes and 0.44 lakh cows in milk and total daily milk production during 1977-78 was estimated at 6,750 quintals as compared to 3,000 quintals in 1966.

A small dairy unit with an installed capacity of 4,000 litres of milk a day was established at Hisar in 1967-68. This unit was closed down in 1969. The unit has been revived for supply of milk to Hisar town and production of some dairy products.

A milk collection and chilling centre has been established at Bhuna (Fatehabad tahsil) with an installed capacity of handling 5,000 litre of milk per day. Another temporary milk chilling centre has been set up at Hisar on the premises of the dairy.

Milk required for feeding the milk plants of the Dairy Development Cooperative Federation is collected from the district through milk cooperative societies. The government has initiated scheme for promotion of milk production through incentives like loans at subsidised rate of interest, subsidies to milk cooperative societies. A scheme of mini dairy units involving unemployed youths, ex-servicemen, small farmers and scheduled castes has been launched. Incentives are given for the establishment of such dairy units. In 1977-78, there were 70 milk cooperative societies with a total membership of 4,295 members. On an average 93 quintals of milk was procured daily through these societies.

FISHERIES

The district with low rainfall, sandy and high temperature has unfavourable climate conditions for fisheries propagation. Though river Ghagghar is the only natural water resource where fish is available, yet the fish can be grown in canals, ponds and other reservoirs. Fishing rights in rivers and canals are controlled by the state government. The Fisheries Development Officer under the control of Director of Fisheries, Chandigarh promotes fish culture

in the district. The fish culture is also propagated in village ponds which are under the control of respective panchayats. In 1977-78, there were 16 ponds with a total area of 14.7 hectares under fish culture in the district. The Fisheries Department has improved number of ponds and supplied fish seed at concessional rates.

There is a fish seed farm at Tohana over an area of 6 hectares where quality fish seed is produced. The average annual fish production in the district is 101.5 quintals. The important varieties of food fish available in the district are as follows :—

Scientific Name	Local Name
<i>Catla catla</i>	Katla Thaila
<i>Labeo rohita</i>	Rohu
<i>Labeo calbasu</i>	Kalbans
<i>Wellago attu</i>	Mullee
<i>Mystus Singhala</i>	Singhara
<i>Mystus aor</i>	Singhara
<i>Mystus Cavasiuss</i>	Tengra
<i>Mystus Vitlâsus</i>	Kigigar
<i>Channa marulius</i>	Soul
<i>Channa striatus</i>	Sauts or Drula
<i>Channa gauchua</i>	Douli
<i>Channa punctatus</i>	Karrar
<i>Notopterus chitala</i> or <i>Notopterus notopterus</i>	Pari or Moh

FORESTS

There were no regular forests except *birs* at Hisar and Hansi and these did not contain any timber of value. Generally some trees of the nature of *Van* (*Salvadora eleoides*), *Kikar* (*Acacia nilotica*) and *Jand* (*Prosopis cineraria*) could be seen in the *birs* or in the country-side. There was practically no forest development activity till Independence and only fringe plantation of trees was

along the canals which had a fine growth. A few trees were also planted along the roads with the aid of canal water.¹

The Forest Department, under the charge of Divisional Forest Officer, Hisar looks after the development of forests in the district. The department has initiated control programmes to halt the march of the desert from Rajasthan and to protect agricultural economy. The total area affected by sand dunes is estimated to be 5,000 hectares. The problem is tackled by planned afforestation of *sarkanda* and other tree species to provide biological barriers. An intensive desert control programme was introduced in the district in 1977.

The department has also undertaken the afforestation of water-logged area in Hansi tahsil. Forest strips have been developed along rail, road and canal banks and act as shelter belts against strong sand bearing winds. The farm forestry is also promoted along with other farm operations. The idea of farm forestry is to make farms more or less self-sufficient in respect of timber, fuel, grazing and other requirements of the cultivators.

The details of afforestation work carried out during 1975-76 to 1977-78 is as under :—

Year	(Hectares)		
	Afforestation under Desert Control Scheme/ Water-logged Area	Afforestation under Farm Forestry	Strip Forests
1975-76	—	10	300
1976-77	56	20	118
1977-78	58	20	140

The forest produce include timber, firewood, grasses and fodder and the income from State owned forests during 1977-78 was Rs. 17,62,554.

The district is deficient in forest and the area under forests in 1977-78 was 7,900 hectares which was hardly 1.25 per cent of the total area of the district. The forest area worked out to 60 hectares per lakh persons.

FAMINES

The first famine of which we have any authentic account is that of A.D. 1783, known as *Chalisa Kal* (Samvat 1840). The preceding year had been

1. *Hissar District Gazetteer*, 1915, p. 175.

dry and the harvest was poor but in 1783 it entirely failed. The country was depopulated, the peasants abandoned their villages and thousands died because of disease and want. Only in the neighbourhood of Hansi did the inhabitants held their own, but even there the smaller villages were deserted by their inhabitants who took refuge in the larger villages until the severity of the famine was passed.

Next noticeable severe famine occurred in 1860-61 when large number of cattle died and many cattle and people left the district. The district suffered again in the famine of 1869-70 and influx of starving people from Rajasthan added to the misery.

The scarcity conditions prevailed in the district in 1877-78 but from 1895 the district was normal. The monsoon of 1896 failed almost completely and prices rose very high. The failure of rain led to wide-spread scarcity. Again the district was struck by famine in 1899-1900. There were no famines for the next three decades. In 1929-30, the district was in the grip of scarcity due to successive crop failures in the preceding years. Famine conditions prevailed in the district in 1932-33, 1936-37, 1938-39, 1939-40, 1940-41 and 1941-42 and its intensity was felt in unirrigated areas of Hisar, Fatehabad and Tohana tahsils.

These famines brought great distress to the people and successive failure of rains and crops forced people along with their cattle to leave for the areas with better availability of grains and fodder. The government aid was the remission or suspension of revenue, grant of *taccavi*, sometimes in kind and opening of test relief works. After Independence, the position changed altogether and government became active to the urgent needs of the scarcity hit areas. The developed means of communication and transport enabled the government to transport immediate supply to scarcity hit areas. The worst what we call these days is drought which occurs due to successive failure of rains.