CHAPTER IV

AGRICULTURE AND IRRIGATION

INTRODUCTION

As in other districts of the state, agriculture is an important means of subsistence for the majority of the people of this district. The economy of the district depends primarily upon agriculture. Though the land in the district is not so fertile, yet the irrigation facilities are on the increase.

Land Utilisation

The total area of the district according to village papers was 298 thousand hectares in 1977-78. The land utilisation pattern during 1972-73 to 1977-78 was as under :—

(thousand hectares)

Year	Total area according to village papers	Area under cultivation	Land not available for cultivation	Other uncultivated land excluding fallow land
1	2	3	4	5
1972-73	302	259	35	8
1973-74	298	256	35	7
1974-75	298	256	34	8
1975-76	298	256	34	8
1976-77	298	255	35	8
1977-78	298	254	36	8

Year	Area under forests	Fallow land	Net area sown	Area sown more than once	Total cropped area
1	6	7	8	9	10
1972-73	5	9	245	102	347
1973-74	5	11	240	145	385
1974-75	5	6	245	130	375
1975-76	5	2	249	145	394
1976-77	5	2	247	127	374
1977-78	5	3	246	135	381

In 1977-78, the total land of the district measured 298 thousand hectares of which 5 thousand hectares (1.7 per cent) were under forests, 36 thousand hectares (12.1 per cent) not available for cultivation, 8 thousand hectares (2.7 per cent) other uncultivated land excluding fallow land, 3 thousand hectares (1.00 per cent) fallow land and the remaining 246 thousand hectares (82.5 per cent) comprised the net area sown of which 135 thousand hectares were sown more than once.

Cultivated area.—In revenue terminology, land is termed as cultivated if it has been sown even once during the previous four harvests. The cultivated area comprises current fallow lands and net area sown. Every effort is being made to make available as much water as possible to the centuries old thirsty land of the district through minor irrigation. With the growing trend for intensive cultivation, the practice of taking crops from the same plots successively for a number of years is coming into vogue. Total area under cultivation in this district during 1977-78 was 254 thousand hectares. Of this, 3 thousand hectares remained fallow and 246 thousand hectares were actually sown. An area of 135 thousand hectares was sown more than once. Thus the total cropped area was 381 thousand hectares.

Land not available for cultivation.—This includes land which cannot be brought under plough except at an exorbitant cost as well as the land covered by buildings, roads, railways and canals or otherwise provided for non-agricultural purposes including forests. An area of 36 thousand hectares accounted in this category in 1977-78.

The forests mainly consist of waste strips on sides of the roads, canals and railways, protected forests and some private land closed under section 38 of the Indian Forest Act, 1937 and sections 4 and 5 of the Land Preservation Act, 1900. In 1977-78, 5 thousand hectares of land was under forests in the district[1].

Other uncultivated land excluding fallow land.—This category of land includes permanent pastures and other grazing land, land under miscellaneous tree crops and groves not included in net area sown and cultivable waste. An area of 8 thousand hectares was under this category in 1977-78.

HARYANA LAND RECLAMATION AND DEVELOPMENT CORPORATION LIMITED

It was established in March, 1974 with its registered office at Chandigarh. The main objectives of this corporation include reclamation

1. According to Forest Department the area under forests in 1977-78 in the district was 8,157 hectares.

of alkaline and saline land and levelling, grading and shaping of uneven and undulating land in Haryana. A part of the Mahendragarh district has uneven topography. The corporation has set up Regional Manager's Office at Bhiwani and a Manager's Office at Mahendragarh.

More than 19,945 hectares of area is uncultivable in the district. Out of it, 2,500 hectares is covered by the sand-dunes. The landowners are keen to get their land levelled and shaped so that they can utilise the irrigation resources to improve their economic conditions.

The tractors equipped with necessary implements needed for carrying out the job are operating in the Mahendragarh district on hire basis. In order to extend irrigation facilities in the district, an area of 280.3 hectares of land had been levelled up to March 31, 1978. The tahsilwise break-up is as under :—

Name of tahsil	Area levelled	No. of families benefited
	(hectares)	(number)
(i) Mahendragarh	90	173
(ii) Rewari	18.6	62
(iii) Narnaul	163.7	257
(iv) Bawal	8.0	32
	280.3	524

The farmers are helped through loans from the primary land development banks and commercial banks and a sum of Rs. 1,30,000 has been paid to the farmers of this district as subsidy for land-levelling work. Technical staff such as Agriculture Inspectors of the Corporation posted with the Manager assist the farmers by rendering guidance in technical matters and in the execution of works. Under the International Development Agency Aid Scheme the Corporation has imported 65 tractors of 55 H.P. of David Brown make.

IRRIGATION

A successful agriculture in a state like Haryana with its peculiar problems without artificial application of water is not possible. About 5.5 lakh hectares land of the state bordering Rajasthan is almost completely arid. The rain-fall in this desert-like area is irregular and uncertain both in time and space. Most of the meagre amount of precipitation is lost by evaporation caused by high temperatures and absorpotion

by sandy surface. The result of these vagaries has been severe droughts and famine-like situation. This area contains either negligible amounts of ground water or exceedingly brackish water. Some places have brackish as well as lesser amount of ground water available at very deep levels. Absence of natural vegetation as a result of arid climate, high temperature and stormy winds lead to soil erosion on a mass scale. At the height of all this, the shifting sand dunes aggravated the situation. Besides, the Aravalli track in this zone with adverse slopes puts serious hurdles in the way of implementing normal means of irrigation.

Irrigation Facilities

The following are the main sources of irrigation in the district :—

1. Rainfall
2. Canals
3. Wells and tubewells
4. Bunds and Barrages

Rainfall.—Before Independence, it was the chief means of irrigation in the district. The agriculture was mainly dependent upon the mercy of nature. During the failure of rain, no cultivation could be done. After the creation of Haryana as a State, some other means of irrigation like canals/distributaries and bunds are being provided in the district.

Canals.—Mahendragarh district is one of the southern districts of Haryana. Topographically, the area comprises small hillocks as a part of Aravalli range and sand-dunes. There is no perennial stream in the district. As stated earlier, the rainfall is low, less than 20".

On account of its peculiar topography, i.e. rise in the country slope from North towards South, the district could not be included in the net-work of canals before 1975-76 as the area could not be considered fit for irrigation by way of gravity flow.

In the absence of abundant irrigational facilities, the economic backwardness of the region could not be removed. Keeping in view the economic backwardness and recurrence of drought, the government introduced scheme of lift irrigation for this area. As a part of the above scheme, the work on Jawahar Lal Nehru (JLN) canal was started in 1974-75.

JLN lift irrigation scheme envisages the supply of water for irrigation purposes up to the border of the Haryana state by successive lifts. Water is proposed to be lifted by the high capacity pumps in

stage of about 23 feet lift. The aggregate lift up to the remotest area of the district will be of the order of 467 feet.

The above scheme includes construction of JLN Feeder, JLN Canal, Dewana distributary, Mahendragarh Canal, Narnaul Branch and Mahendragarh distributary. The JLN Feeder which is 104-kilometre long channel, off takes from the tail of Delhi Parallel Branch at Khubru. The JLN Canal and Mahendragarh Canal take off at R.D. 3,43,100 of JLN Feeder and the discharge at this point is 2,990 cusecs. These channels comprising a net-work of 1,247 kilometres will become perennial when the supply of water from Satluz Yamuna Link Canal is made available. The canal will command a gross area of 3.12 lakh hectares.

Wells and Tubewells

The desert of the adjoining Rajasthan State encroaches the southern and western parts of the district. The Dohan, Sahibi and Krishnawati streams entering from Rajasthan are sources of groundwater recharge in addition to rainfall. The depth of water varies from 20 ft. (6.1 metres) in the western part. The movement of the water is from south-west to north-east. The rocks of Delhi system are exposed at several places and sand-dunes are very common. The bed rock is encountered at shallow depth in the south-western part of the district particularly in Nangal Chaudhry block. The quality of groundwater is fresh along the courses of streams.

Groundwater exploration was started in the district in 1958 by the Central Ground Water Board, Government of India, to locate the water bearing formations at deeper level and to determine the quality of groundwater. They drilled exploratory boreholes at Bhojawas, Bawana, Kanina, Gokalgarh, Jhabwas, Mahendragarh, Jarthal, Nangal Pathani, Masani, Darauli, Dahina, Jainabad and Khaliawas to a depth varying from 123 ft. (37.5 metres) to 610 ft. (185.9 metres). The boreholes in villages Darauli, Khaliawas and Dahina-Jainabad of tahsil Rewari were converted into production tubewells. The discharge varies from 14,500 to 55,800 USGPH (United States Gallons per hour) with drawdown[1] from 14 ft. (4.41 metres) to 38 ft. (11.7 metres). The boreholes in other villages were abandoned due to lack of granular zones.

The Haryana State Minor Irrigation (Tubewells) Corporation to whom the responsibility of groundwater exploration was entrusted by the state government, took up further exploration in the district in 1968.

1. Draw down is the difference between the pumping water level and the static water level.

In all, 41 exploratory boreholes were drilled, out of which 26 proved sucessful where exploratory tubewells were constructed. The successful bores are at Asraka Majra, Asalwas, Bharaf, Bachini, Bhojawas Bohatwas Bhondu, Dhar Chanan, Jhabwas, Kharkra, Kariya-I, Kariya-II, Kaimla, Lisan, Mahasar, Musepur, Mori-I, Mori-II, Nandrampur, Raipur, Sagarpur, Mohanpur, Rothal Garhi, Khatawali, Dharuhera and Khaliawas. The discharge from the tubewells varies from 17,000 to 47,000 USGPH with drawdown from 17 ft. (5.2 metres) to 62 ft. (18.9 metres).

As stated earlier the recharge into the groundwater body is mainly provided by the Dohan, Sahibi and Krishnavati streams apart from the limited recharge by rainfall seepage. Computations of groundwater recharge and draft components as on March 31, 1978, in different blocks of the district was evaulated by State Ground Board and the figures of groundwater balance are given below :—

Block	Total usable recharge	Total draft as on 31-3-78	Balance groundwater potential
	(Acre ft.)	(Acre ft.)	(Acre ft.)
Rewari	35,742	56,806	21,064 (Over draft)
Bawal	36,005	54,357	18,352 (Over draft)
Khole	28,042	43,182	15,140 (Over draft)
Jatusana	24,665	62,029	37,364 (Over draft)
Ateli	31,742	35,706	3,964 (Over draft)
Narnaul	34,099	37,555	3,456 (Over draft)
Nangal Chaudhry	28,528	24,131	4,397
Kanina	37,483	27,694	9,789
Mahendragarh	51,633	24,834	26,799

The above figures indicate that there is little scope for further exploitation of groundwater in Khole, Jatusana, Rewari, Bawal, Ateli and Narnaul blocks as there is already over draft in these blocks.

With the demarcation of fresh water boundary in the district, the groundwater potential can be usefully exploited for irrigation through tubewells and pumping sets.

Wells, though not on large scale, were the only source of irrigation in the district. Due to the quality and the depth of water, well

irrigation could not make much headway. After the introduction of diesel pumping sets and tubewells the well irrigation increased and in 1977-78 an area of 46 thousand hectares was under well irrigation. There were 22,478 pumping sets and shallow tubewells and 111 deep tubewells in addition to 177 masonary wells.

Tanks and Bunds

Another source of irrigation in the district is tanks and bunds. During rainy season, water is stored and later used for irrigation. A very small area less than 500 hectares is irrigated from this source.

The following table shows the area irrigated through different sources of irrigation in the district from 1973-74 to 1977-78 :

(Thousand Hectares)

Source	1973-74	1974-75	1975-76	1976-77	1977-78
Government Canals	(a)	(a)	—	—	—
Tanks	—	—	—	—	—
Wells	1	2	—	1	(a)
Tubewells	45	43	42	42	46
Other sources	—	—	—	—	—
Total :	46	45	42	43	46
Percentage to net area sown	19.2	18.4	16.9	17.4	19

(a) means less than 500 hectares.

Flood Embankments and Marginal Bunds

Flood embankments and marginal bunds have been constructed to confine a stream in prescribed reach and to stop its water from flooding the adjoinining area.

Three main streams, viz. the Sahibi, the Dohan and the Krishanavati enter the district from Rajasthan. All these cause floods in the rainy season and have been a source of damage in the district. Keeping in view the flood loss in the region, the Government of India decided to launch flood-control schemes. The efforts have been made to harness the water of these streams for the purpose of flood control and to utilise the flood water for irrigation. The details regarding bunds and barrages made for the above purpose are as under :—

Masani barrage.—The Sahibi *nadi* was the biggest menance of flooding in the district and the other adjoining areas. The floods in the year of 1977-78 caused a havoc in the area. The barrage at an estimated cost of 36 crore near the Masani village is under construction[1]. This barrage will save the district from floods and it will provide irrigation to an area of 50,000 acres.

Hamidpur bund.—The Dohan stream enters the district from Rajasthan. To control the floods, this bund was constructed near Hamidpur village in the Narnaul tahsil in 1975. The bund is proposed to be augmented.

Another protection bund on the Dohan stream near Mahendragarh town was constructed in 1975. The protection bunds for villages—Lawan and Malra have also been constructed. It is proposed to canalize the excessive water of Dohan stream near Gulawala village (Mahendragarh tahsil).

The other bunds and flood protection schemes of local importance over the nullahs are given in the *Table III* of Appendix. These bunds have been constructed for the dual purpose of flood control and minor irrigation and are controlled by the Bunds and Investigation Division, Narnaul. Lastly, these have proved very useful for raising the sub-soil water level, sweetening the brackish water, basin irrigation and reclamation of land.

AGRICULTURE

Set-up of the Agriculture Department.—The Agriculture Department in the district is represented by the Project Officer, Integrated Dry Land Agricultural Development Scheme, Narnaul, who is responsible to the Director, Agriculture, Haryana, Chandigarh. He is assisted by 3 Agricultural Officers, one each at the three sub-divisional headquarters, Narnaul, Mahendragarh and Rewari. For implementation of the Agricultural Production Programme, 8-10 Base Level Workers, viz. Agricultural Development Officers and Village Extension Workers have been provided in each of the 9 development blocks in the district.

The Agriculture Department guides the farmers in the latest technological advances in agricultural production. These include intensive methods of cultivation for higher production per unit area through new cropping pattern suited to their conditions. These also comprise preparation of crop plans, control of various pests and diseases affecting

1. The cost of project has been revised to Rs. 63.69 crore and is expected to be completed in the early years of the 7th Five-Year Plan.

agricultural crops and gardens, use of fertilizers and good seed, and laying out of demonstration plots to show to the cultivators the superiority of new varieties and agronomic practices recommended for the district. The Agricultural Development Officers impart training to the farmers in their respective areas.

Training of all the functionaries is organised. In every crop season, officers' workshop is held in Haryana Agricultural University (HAU), Hisar, for mutual discussions to solve field problems and to acquaint officials with the latest technology available at H.A.U. Immediately thereafter, a district training camp is organised for the benefit of the whole extension agency of Agriculture Department and the allied functionaries including Krishi Gyan Kendra. They are given training in latest technology and campaign strategy to be followed in the particular season. The training facilities are further extended in the area at various places—blocks and villages for the benefit of farmers. For intensifying training efforts, village to village mass contact programmes are organised through teams of extension agencies and Haryana Agricultural University experts. At the time of sowing, village to village demonstration programmes based on the full package of practices are conducted for main crops in both the seasons. A follow-up programme is also pursued to achieve maximum results. Necessary inputs like seeds, fertilizers and pesticides are made available at convenient supply points throughout the district. The farmers are given information for managing the crops throughout the growing season and field days are organised at harvesting time at various places to convince the farmers about the results of new practices. Efforts are also made on campaign basis for introduction of new crops (through demonstration) in newly covered irrigated areas. The students of local village schools are also involved in levelling of un-even fields and anti-ratting campaigns.

Soils

The soils of the district are highly deficient in organic matter and require heavy doses of manure for improving the fertility. But heavy manuring is not possible without abundant water-supply which is not still available. Wind erosion is most common feature. At many places, particularly in Mahendragarh and Narnaul tahsils, the soil is bedded with lime, *kankar*, stone and rock.

The soils of the district can be sub-divided into the sandy, the loamy sand, the relatively sandy loam and the light loam. The soil cover is sandy in the western part of the Mahendragarh tahsil and loamy sand in Narnaul tahsil. These soils are locally known as *Bhur*

and *Rausli* respectively and subject to excessive wind erosion and to outlaying by drifting sand cover or aeolian sand. These suffer from the drawback of maximum permeability causing excessive drainage, a tendency to dry up rapidly and a low water holding capacity. These features cause limited crops like *bajra, guar,* barley and oil seeds to grow.

The soils of northeast of Mahendragarh tahsil and south-west of Rewari tahsil except its central part, are the relatively sandy loam. In the eastern and western parts of the Rewari tahsil, the poor fertility sandy soil is predominant and is locally knowu as *Bhur*. A big block of sandy loam with a tendency towards the light loam, locally known as *Magda* is found in the centre of the Rewari tahsil which is very productive. It needs little ploughing and readily retains moisture. It is very good soil for dry-farming and intensive agriculture may be done successfully.

Crops

The crops grown in the Mahendragarh district are divided into two main categories, viz. kharif and rabi locally named as *sawani* and *sadhi*. The former is the summer and rainy season sowing and the latter is winter sowing. Any crop which does not strictly fall in timing within these two harvests is known as a *zaid* crop and its harvests is called *zaid* kharif or *zaid* rabi according to the harvest with which it is assessed. *Toria*, an oil-seed, is cultivated as *zaid* kharif, vegetables, melon, moong, tobacco and green fodder as *zaid* rabi.

The major kharif crop of the district is *bajra* (spiked millet) which occupies about 50 per cent of the cropped area. The other kharif crops are *moong*, groundnut and *gwara*. Gwara is used intirely as a fodder crop. To grow *bajra* is good as this crop does well on sandy soils. Vegetables, onions, turnps and cucumber also deserve mention.

The major rabi crop is gram which occupies about 40 per cent of the cropped area. The other rabi crops are wheat, barley, rabi oil seeds and vegetables. Tobacco is grown in some villages of Khole, Kanina and Jatusana blocks. The tobacco is grown is of *hooka* variety.

Bajra, gwara and pulses (during kharif) are comparatively drought resistant and grow well in light soils. Similarly gram, oil-seeds and barely (during rabi) are also suitable for these soils as the flood water of the Sahibi stream is helpful to these crops in the Rewari sub-division. The high yielding varieties of wheat cover 20 per cent of the cropped area and are grown in irrigated areas. Groundnut cultivation has also been introduced in some parts of Rewari, Khole and Jatusana blocks. An area of about 500 acres is covered under this crop.

Some particulars about the crops grown in the district are given below :—

Name of the crop	Local name	Kind	Soils required	Time of sowing	Time of harvesting
		Kharif Crops			
Bajra	*Bajra*	Foodgrain	Sandy, sandy loam, loamy and even sand-dune areas	June to July (first good soaking shower)	September
Gwara	*Guar*	Fodder	Sandy to sandy loam and loamy	July to middle of August	September to November
Moong	*Moong*	Pulse	Sandy to Sandy loam	June/ July	September
Jowar	*Jowar*	Foodgrain/ Fodder	Sandy loam and loamy	April to July	September
Groundnut	*Moongfali*	Oil-seed (cash crop)	Sandy to sandy loam	June/ July	October
		Rabi Crops			
Wheat	*Gehun*	Foodgrain	Sandy loam to loamy	End of October to end of November	April
Gram	*Chana*	Pulse	Sandy, sandy loam and loamy	October	March
Barley	*Jao*	Foodgrain	Sandy loam to loam	Second week of October to November	End of March to April
Sarson *Raya* *Taramira*	*Sarson* *Raya* *Taramira*	Oil-seed (cash-crop)	Sandy loam and loamy	October	March

The table below shows the production of principal crops in the district :

(Production of Principal Crops)

(Thousand tonnes)

Crops	1973-74	1974-75	1975-76	1976-77	1977-78
Foodgrains					
Rice	—	—	—	(a)	—
Jowar	1	1	1	1	1
Bajra	130	20	80	85	8
Maize	—	(a)	—	—	—
Wheat	70	62	79	115	108
Barley	46	56	48	38	36
Gram	36	31	83	72	88
Pulses					
Mash	—	(a)	—	—	—
Moong	—	0.4	0.7	0.6	0.3
Massar	—	—	—	—	—
Other pulses	0.1	0.2	0.3	0.4	0.2
Oil seeds					
Groundnut	(a)	0.2	0.4	0.2	0.3
Rape and Mustard	8	31.0	8.0	11.0	12.0
Sesame	(a)	(a)	—	—	—
Linseed	—	0.1	—	—	—
Others					
Sugarcane (in terms of *Gur*	—	(a)	—	—	—
Potatoes	—	(a)	—	0.1	0.1
Cotton (American Lint)	—	—	—	—	—
Cotton (*Desi* Lint)	—	(a)	—	—	—

(a) less than 50 tonnes

Cropping pattern.—The cropping pattern adopted in the district during 1972 to 1977 is given below :

Name of crop	Percentage of area under each crop					
	1972	1973	1974	1975	1976	1977
Kharif						
Bajra	46	47	50	56	42	42
Gwara	12	12	14	13	6	7
Pulses	1	1	2	2	1	0.5
Jowar	1	1	2	2	1.5	1.5
Fallow	40	39	32	27	49.5	49
Total :	100	100	100	100	100	100
Rabi						
Wheat	14	15	14	16	16	15
Gram	43	42	36	42	33	35
Barley	10	12	15	13	6	6
Oil seeds	12	11	15	7	5	8
Fallow	21	20	20	22	40	36
Total :	100	100	100	100	100	100

Important crops are *bajra, gwara, jowar* and pulses in kharif and gram, wheat, barely and oil-seeds in rabi. In kharif *bajra* occupies 42 per cent of the total cropped area followed by *gwara* (7 per cent) and *jowar* (1.5 per cent). The percentage of area under kharif pulses is just 0.5 per cent signifying that farmers have not yet realised importance of these crops.

In rabi, gram occupies 35 per cent of the total rabi cropped area. It is generally grown under unirrigated conditions. Other unirrigated crops are rabi oil-seeds. There is a considerable fluctuation in the acreage under these crops depending upon rainfall pattern. The area under wheat reveals rising or consistent trend in comparison to barley although both are irrigated crops. This is due to the reason that wheat is more remunerative crop than barley.

Rotation of Crops

The district being largely *barani*, the choice for crop rotation is limited. About 20 per cent of the area is irrigated where farmers select crops for rotation and grow wheat and barley. The major *barani* crops during kharif are: *bajra, gwara* and kharif pulses (*moong*). Invariably these crops are followed by gram sowing in rabi. Where irrigation facilities are available pulses and *gwara* are followed by wheat and barley. Some area is kept fallow for the cultivation of oil-seeds. *Gwara* is a very good soil building crop and the crop which follows it is always good.

Fodder Crops

The main fodder crop is *Jowar*. It is grown during kharif and covers 2 per cent of the area. The cattle are fed on *bajra* (*karbi*) throughout the year due to non-availability of green fodder. During the years of poor rainfall when *bajra* crop also fails, stocked *Jand* leaves named as pala (*Cenchrus setigerous*) are used as fodder for the cattle. It is considered rich in food nutrients.

During rabi no fodder is grown in the district. Now the farmers are being encouraged to grow *barseem* and oats.

The area and production of fodder crops in the district from 1973 to 1977 was as under :

(Area in thousand hectares
Production in thousand Tonnes)

Year	Jowar		Bajra	
	Area (Hectares)	Production (tonnes)	Area (Hectares)	Production (tonnes)
1973	5	1	151	130
1974	4	1	133	20
1975	3	1	139	80
1976	5	1	140	85
1977	5	1	138	8

Dry Farming

Mahendragarh is a dry farming district and 80 per cent of its area is covered under it. In dry farming the production is low.

Bajra is the most efficient and remunerative crop during the year of normal or near normal rainfall. In a year of low rainfall *moong* is more remunerative than *bajra*.

Gwara is the most staple crop of the district under all conditions. It is most suitable for sowing under late conditions, if kharif sowings are delayed due to any reason.

The areas where moisture is conserved during kharif, better soils are put under oil-seeds and poor under gram. Oil-seeds respond better than gram under favourable moisture conditions. The crop varieties are as under:

Seed per Hectare	Crop	Variety	Optimum Sowing Time
5 Kg.	*Bajra*	PHB-14, BJ-104, HS-1, Local	First advent of monsoon under rainfed conditions, second fortnight of July
25 Kg.	*Gwara*	FS-227, Local	From April upto middle of July
20 Kg.	*Moong*	Hybrid-45, Varsha, S-9 P.Basakhi, Local	First week of July to first week of August
40 Kg. to 50 Kg.	Gram	G-24, C-214, H-208, Local	Middle October
5 Kg.	*Taramira*	Selection-A	October
5 Kg.	*Raya*	Parkash, R.L. 18, Varuna, T-59	First fortnight of October
5 Kg.	Rapeseed	B.S.H.-I, Local	End of September to first week of October
87 Kg.	Barley	C-138, BG-25, BG-105, Local	Second fortnight of October to mid of November

To conserve the moisture in the soil the field is levelled as far as possible and *bunds* are put around the field and individual plots. The ground is ploughed deep if there is hard layer below, and the surface soil is cultivated after every crust forming for quick absorption of rain water.

To decrease the evaporation losses, the surface soils are loosened as soon as field comes into working conditions after an effective rain and the weeds are thoroughly eradicated. The ridge and furrow system of cultivation across the general slope is followed and crop is planted in paired rows on ridges. Wherever feasible direct surplus water from plots on higher elevation to plots on lower elevation is provided to conserve moisture in the soil for use by the subsequent rabi crop.

Soils which have hard sub-soil is ploughed deep with reversible plough with the help of a tractor before the start of the monsoon for quick penetration and conservation of moisture. Except the Mahendragarh block the practice is followed in other parts of the district.

Attainment of uniform crop pattern is essential for getting a full expression of yield potential. Small seeded crops like *bajra* and *raya* often have patchy stands due to improper seeding techniques. Lister seeder drawn by tractor is used throughout the district to seed the kharif crops on ridges and rabi crops in the bottom of furrows.

The dry fields are ploughed and kept ready in the second half of June. Sowing is completed with the first shower of the monsoon. *Moong* is sown during third week of June to first week of July. *Bajra* is sown during first week to third week of July. When the sowing is delayed beyond third week of July, the *bajra* is sown during a wet spell. *Gwara* sown in April upto middle of July is planted in rows 30 centimetres apart in place of 45 centimetres apart. If the rains are delayed beyond middle of July, *bajra* or *gwara* is sown in dry soil in paired 30 centimetres apart on ridges with soil cover of approximately 1 to 1.5 centimetres. Space between the plants in *bajra* field is filled by transplanting seedlings up-rooted from densely growth places. Inter-culture with blade type *kasola* is carried out after every crust forming shower till the crop covers the ground. For the success of the crops timely plant protection measures are carried out.

Regional Research Station, Bawal (Haryana Agricultural University).— It was established in 1978 by the Haryana Agricultural University, Hisar, to find out ways and means to solve the problems of farming community and to increase agricultural production in Mahendragarh district. There was a small centre at Bawal to cater to the needs of southern tract of the State, which as a whole is semi-arid and extensive sand-dunes in the south-west. In 1978, this centre was conducting preliminary research on development of production technology for dry areas, identification of suitable varieties of crops like *bajra*, gram, mustard and rapeseed. Some preliminary work on vegetables and fruits of the semi-arid regions

was also taken up. The experts of the station conduct research and advise the farmers on problems pertaining to field crops and fruit production, diseases, soil management, water management, lay out of irrigation systems, working out most economic crop rotation and farm plans, livestock and poultry diseases, with particular emphasis on raising crops under deficient rainfed conditions.

The Research Station, Bawal, has been strengthened as a sub-station under the National Agricultural Research Project, with the addition of scientific manpower and physical facilities. The Research Station, Bawal, has developed and released improved varieties of barley: C 164, C 138, BG 25 and BG 105. All except BG 105 are suitable for normal sowing conditions. BG 105 is late sown variety . C 138 is suitable for barani areas while C 164 and BG 25 for irrigated areas. New varieties, namely: Sarson BSH-I, Raya Parkash and Groundnut C 501 and MH-I have also been recommended for the district. Research to evolve improved varieties of gram, *bajra* and wheat is being done by the experts of the Research Station. The station has demonstrated that vegetables such as *bhindi*, *ghiya*, *tori* and *sem* can be successfully grown under rainfed conditions. Fruits, *i.e.* guava, *phalsa*, pomegranate and *ber* are being popularised by developing suitable management practices.

Krishi Gyan Kendra Narnaul (Haryana Agricultural University).— Department of Agriculture, Punjab started a Farm Advisory Service Scheme in March, 1961 for the district of Mahendragarh at Narnaul[1]. From 1963, the scheme was transferred to the Punjab Agricultural University wherein four District Extension Specialists in the disciplines of Horticulture, Plant Protection, Agronomy and Soil Sciences were posted. From 1966 another specialist in the discipline of Farm Management was posted. After the bifurcation of the Punjab Agricultural University and creation of Haryana Agricultural University in 1970-71, specialists in the field of Animal Sciences, Veterinary Science and Agricultural Engineering were also posted. During the year 1970-71 the farm advisory service scheme was named as Krishi Gyan Kendra which has become popular in the district.

The objective of the institute are to disseminate the latest technology in the fields of agriculture and livestock farming to the rural people, field evaluation of research findings and to provide a feed-back to the scientists about the field problems. The dissemination of knowledge is done by organising demonstrations, training camps, campaigns, exhibitions

1. Krishi Gyan Kendra was shifted to its own building at Mahendragarh on October 6, 1981.

and film shows. Field days on different crops in respect of adoption of package of practices, cattle shows, vegetable shows and calf rallies are arranged throughout the Mahendragarh district and best animals/ crops and crop products are awarded prizes to foster a sense of competition among farmers. The farmers of the district are apprised of the results based on the latest agricultural technology developed by the university scientists from time to time as a result of which the agricultural production has increased throughout the district.

In 1975, University adopted five villages, *i.e.* Salarpur Bhojawas, Totaheri, Akbarpur and Dhani Bhathotha under its village adoption programme. The dissemination and adoption of different practices related to agriculture and animal husbandry has resulted in lot of development in these villages which have served as a model for the surrounding villages and other areas.

Recommended steps for Improving Agriculture Land

The introduction of flow irrigation from canals which is likely to commence with the availability of water supply from Satluj Yamuna Link Canal, will increase the erosion intensity and lower the fertility status of the soil by the removal of top soils. Keeping in view the slopes of an area, the land levelling should be carried out to increase the efficiency of canal water and ensure uniform irrigation. The area having 3 to 5 per cent slope and above is uneconomical for levelling and the area having below 3 per cent slope should be levelled. In sandy loam area one per cent slope should be maintained for the surface irrigation.

The area, which is either level or is levelled should be irrigated with check plot or furrow method of irrigation. The areas which are either sandy or have slopes greater than 3 to 5 per cent should be irrigated with sprinklers. For rabi crops irrigation is done by minor irrigation units, *i.e.* tubewells, pumping sets and wells. Sprinkler irrigation has been adopted by a large number of farmers in Mahendragarh and Kanina blocks.

The number of watering and fertilizer requirement of major crops are as follows.:

Crop	Number of watering	Doses of fertilizer (Kilogram per hectare)		
		Nitrogen	Phosphate	Potash
1	2	3	4	5
Bajra (*desi*) (*barani*)	One-two (for the normal year during September)	35	—	—

Bajra (hybrid) (Irrigated)	One or two (for the normal year during September	120	60	—
Wheat (*Desi*) Irrigated	Three (35, 65 and 105 days after sowing)	60	30	13
Wheat (High Yielding) Irrigated	Three (35, 65 and 105 days after sowing *i.e.* critical stage)	120	60	30

The lift canal system is under way and has not yet started supply of water. Presently the only source of irrigation is minor irrigation units. In 1977-78, there were 22,478 pumping sets and tubewells. The method of irrigation is either flow basin, or sprinkler. The crops irrigated are wheat, barley and sometimes oil-seeds.

Horticulture

Area under horticulture in the district is limited. The district is known for its *ber* fruit (*Chawara Ber*) which is very sweet. Recently under Applied Nutrition Programme/Drought Prone Area Project Programmes more area is being brought under *ber* trees. The area is also suitable for guava, *shahtoot*, *phalsa* and citrus. Narnaul, Nangal Chaudhry, Bawal, Rewari, Khole and Mahendragarh blocks are suitable for cultivation of *ber*, guava and citrus. An area of 20 hectares was under horticulture during 1977-78.

Vegetables

With the availability of irrigation water the area under vegetables is picking up. In 1975-76, 320 hectares of land was under vegetable cultivation. It increased to 455 hectares in 1977-78. The vegetables grown are onion, sweet potatoes, carrots and cucurbits. Farmers of Khole and Jatusana blocks are more interested in the cultivation of onions. Two Horticulture Inspectors, one at Narnaul and other at Rewari, give guidance to the cultivators in the plantation of fruit trees and vegetable cultivation. The extension programmes are conducted by the Agriculture Officers/Village Extension Workers who propagate horticulture alongwith other agricultural practices. The area under vegetables from 1975-76 to 1977-78 was as follows:

Year	Area under Vegetables
	(Hectares)
1975—76	320
1976—77	380
1977—78	455

Soil of the district except some areas of Mahendragarh and Kanina blocks is suitable for the cultivation of potato. But due to non-availability of cold storages, the areas under its cultivation is very limited.

Agricultural Implements

The old type implements commonly used by the farmers are :—

Hal	(plough)
Jua	(Yoke)
Por, Orna, or *nali*	(Seed drill made of strips of bamboo and held together by a long narrow piece of leather (*badi*) wrapped carefully round them. It is secured to the *hatha* or upright handle of the plough with its lower extremity just above the ground behind the *hal* and has a wide mouth into which the seed is put, and so drops through the *por* into the plough furrow).
Kassi	(Spade)
Kuhari	(An axe for cutting bushwood and *pala*)
Gandasa or *Gandasi*	(Choppers of different sizes)
Jeli	(Two-pronged, pitchfork, the fork is called *singar* and handle *nala*)
Tangli	(Three-pronged pitchfork)
Kasola	(Hoe with a long handle, *binda*, used for reaping and cutting grass)
Khurpa	(Short-handled spade or hoe for digging up grass by the roots)
Sohaga	(Flat board, used for harrowing by drawing it over the ground)
Dandeli	(Rake with 6 or 8 teeth used for collecting cow dung and making the ridges or *kiaris*)
Chhaj	(Winnowing basket)
Gopia	(Sling made of rope with which stones are thrown in order to scare away the birds which damage the crops when ripening)
Gaddi	(Cart)

Any improvement in agriculture is inconceivable without corresponding improvement in the implements used. Modern implements, popularised by the government through different schemes, are being gradually adopted by the farmers. A description of agricultural implements in common use is given below :

Plough .—The cultivator's most important implement is the plough (*hal* or *munna*). It refers primarily to the piece of wood shaped like a boot, into the top of which the pole (*hal*) and to the bottom of which a small piece of wood (*chou*) is fastened; the latter in its turn carries the pali or the iron plough share. The *hal* is perhaps the most important part of the plough as upon its weight and size depends the adaptability for ploughing various kinds of soil. In case of sandy soils it is light and is called *hal* whereas in the case of the firmer soils it is heavier and called *munna*.

In the light soil the ploughing of the fields is done with camels. The pole of the plough is fastened with a thong to a curved piece of wood called *pinjni* which again is strapped on to the back of the camel by the *tangar*, a sort of camel harness which is kept in its place by the *palan*, a small saddle on the camel's back.

This plough merely scratches the soil up to 4 or 5 inches. The chief defect in it lies in the fact that it leaves ridges of unploughed land between the V-shaped furrows which it makes. The plough also fails to eradicate weeds properly. In small land-holdings and non-contiguous plots, the plough is highly suitable. In 1977, there were 52,023 ploughs (51,296 wooden and 727 iron) in the district.

Tractor .—By and large cultivation is done with the help of animal power (camels and bullocks) although the tractor has also appeared on the scene. The number of tractors in use in 1973-74 was 135 which increased to 462 in 1977-78 .

Bullock/Camel Cart.—This is the usual load carrying device of the farmer. It is commonly used for carrying the farm produce to the threshing ground, grains to the homestead and surplus if any, to the market and for other transportation needs. The cart is fitted with iron wheels, wooden wheels or inflated tyre wheels. The carts are manufactured locally and are also purchased from other districts.

Ghani (oil-expeller) .—The number of *ghanis* increased from 1 in 1972 to 14 in 1977. These are mostly found in urban areas and big villages.

Sugarcane crusher .—It is used for crushing cane. It is made of wood or iron. There were 79 sugarcane crushers in the district in 1977.

Mechanised farming

There were about 462 tractors in the district owned by the farmers. The Haryana Land Reclamation and Development Corporation which is a State government undertaking is also extending help to the farmers in mechanised farming. The Haryana Agro Industries Corporation had a service centre at Rewari, but it has now been closed.

Seeds

Better varieties of seed enhance considerably the yield of agricultural produce. The Agriculture Department concentrates on multiplying and distributing improved seeds to farmers. The better yielding varieties of seeds are : —

Kharif varieties

Bajra	Hybrid No.3, PHB-14, BJ-104
Moong	Varsha, H-45, Puro Baisakhi
Gwara	F.S.-227
Groundnut	Pb. No. 1

Rabi varieties

Wheat	C-306, K. Sona and Sonalika, WH-147, HD 2009
Barley	C-164, C-138, BG-25, BG 105
Raya	R.L.-18, Parkash, Raya Varuna
Sarson	B.S.H.-1
Taramira	Selection No. 1
Toria	I.T.S.- A, Sangam
Gram	G. 130, H 208, C 214

There are government agricultural seed farms at Gokalpur (Narnaul tahsil), Rampura, Tehna Depalpur, Dulhera Kalan (Rewari tahsil) and Mahendragarh (Mahendragarh tahsil) where improved seeds are grown for distribution among the cultivators. These, however, meet the demand only partly. The farms at Rampura (Rewari tahsil) are on

barani land. A few other details of the farms are as under :—

Seed Farm	Year of Establishment	Area (approximate)	Crops Sown for Seed
		(Hectares)	
1. Rampura	April, 1958	10	Gram, Oil-seed, *Gwara*
2. Tehna Depalpur	January, 1959	10	Barley, Oil-seed
3. Gokalpur	December, 1959	9	Wheat, Gram, Oil-seed, *Gwara*
4. Dulhera Kalan	April, 1968	9	Wheat, *Gwara*, Oil-seed
5. Mahendragarh	October, 1976	10	Wheat, Oil-seed

The varieties of improved seeds of principal crops distributed by the Agriculture Department and the area under improved varieties in the district during 1973-74 to 1977-78 were as follows :—

Year	Improved Seeds Distributed (Tonnes)			Area under Improved Varieties (Thousand hectares)		
	Bajra	Wheat	Gram	Bajra	Wheat	Gram
1973-74	29.00	133.00	29.00	20	35/21	30
1974-75	30.30	20.30	50.00	38	35/21	35
1975-76	68.70	74.90	42.70	16	39/24	40
1976-77	21.60	162.00	144.30	20	53/32	38
1977-78	—	299.00	220.00	—	50/40	55

Manures and Chemical Fertilizer

Next to water and improved seed, manure and chemical fertilizers are the most important inputs for increasing crop yields. In recent years, although the use of manures and fertilizers has increased considerably in advanced areas of the State, yet the efforts to increase the soil fertility by the farmers of the Mahendragarh district with chemical fertilizers are limited due to the absence of irrigation facilities. Still the farmers are conscious of the fertility maintaining factors by keeping the land fallow and to use farmyard manure. They also adopt the method of crop rotation to maintain soil fertility.

Manures.—In the villages, cow dung is still extensively used as fuel in preference to its use as farmyard manure. The State Government is popularising *gobar* gas plant by which the use of cow dung as fuel will be minimised. The *gobar* gas plant is a source of good farmyard manure as well as a source of fuel for cooking. It has made cooking easy for a house wife. By 1975-76, 913 *gobar* gas plants had been installed in the district and this number increased to 938 in 1977-78.

Extension education for compost making has also been intensified for proper use of dung and farm wastes. Regular campaigns are organised by the Agriculture Department to push up this programme. The compost prepared by the municipalities is utilised by the farmers in the vicinity of towns for growing vegetables.

Chemical fertilizers.—Distribution of fertilizers is done by the Haryana Agricultural Marketing Federation through agricultural marketing societies. As the use of chemical fertilizers has recently gained attention of the farmers with the increase of minor irrigation units in the district, the number of societies and sub-depots have been supplemented by stocking the fertilizers in the circle of an Agricultural Development Officer. The supply of fertilizers to the distribution points is regulated by the Project Officer, Integrated Dry Land Agricultural Development Scheme by co-ordinating this programme between extension agency and supply agency, i.e. HAFED and marketing societies. Under this programme fertilizers are made available to the farmers at the nearest possible place. The following figures show the distribution of chemical fertilizers among the farmers of the district from 1972-73 to 1977-78 :

Year	Chemical Fertilizers Distributed (Tonnes)		
	Nitrogenous	Phosphatic	Potash
1972-73	8,35.60	26.60	6.00
1973-74	1,850.00	120.00	31.00
1974-75	2,097.00	49.17	45.10
1975-76	2,649.00	138.00	13.00
1976-77	2,921.00	174.00	11.00
1977-78	3,482.00	364.00	48.00

Agricultural Pests and Diseases

The crops are occasionally exposed to damage due to diseases and pests. Downy mildew in hybrid *bajra* and wilt in gram are the two most serious crop diseases. The only control measure for wilt is to find a resistant variety which so far has not been evolved. Roguing of diseased plants immediately after appearance of the pest, alongwith one or two sprays with Miltox/Blitox Dithane M. 45 and Blitox are effective control measures against downy mildew. Efforts have been made to evolve a resistant variety of hybrid *bajra* against downy mildew.

Amongst the other insects and pests is *katra* (hairy caterpillar) which attacks all kharif crops during the rainy season. It causes serious damage to *bajra* and *moong* crops at early stage. This insect can only be controlled by blanket BHC 10 per cent dust in the early stages and by Endosulphon Thiodan sprays at later stages.

During certain years, aphids, mustered saw fly and painted bug cause damage to rabi oil-seeds. These can be controlled by BHC 10 per cent dust, Malathion/Metasyston and Dimecron sprays.

Rats are very serious pests for wheat, barley and gram. These are controlled by feeding baits poisoned with zinc phosphide/strychrine hydrochloride/Ratifin and fumigation with Celphos tablets. Stored grain pests like *dhora*, *khapra*, lesser grain borer and rust red flour beetle also destroy a large quantity of grains. These are controlled effectively by fumigating the stores, containers (grain bins/gunny bags) with Celphos Malathion and Methyle Bromide.

The Agriculture Department educates farmers regarding different control measures to reduce damages to crops. Moreover the department has been authorised to take legal action under the East Punjab Agriculture Pests, Disease and Noxious Weeds Act, 1949, against the farmers who do not eradicate weeds, pests and diseases before the maturing of crops. Fumigation work is being done by the department on a large scale through specially recruited staff for the purpose.

Agricultural Co-operatives

The small land-holdings are not economic units. It is through co-operative farming that the scanty resources of the agriculturists can be pooled, thus bringing to them the gains of large scale intensive farming. Through co-operative marketing, the erosion of profits to middle-men can be checked and higher dividends secured. Increased agricultural production depends on several significant inputs which include the provision of timely and adequate credit, supply of chemical fertilizers,

improved seeds, insecticides, pesticides and facilities for marketing agricultural produce as well as storage arrangements. It is only through agricultural cooperatives that the farmers get all these facilities in time and in a reasonable manner.

The total number of cooperative societies of all types and their membership was 635 and 1,05,679 respectively on June 30, 1976. The societies comprised 237 agricultural co-operatives, 308 industrial co-operatives and 90 other cooperatives. By June 30, 1978, their number increased to 719 having membership of 1,35,630. The societies comprised 372 agricultural cooperatives, 279 industrial cooperatives and 68 other cooperatives. The agricultural co-operatives included :

Type of society	Number as on	
	June, 30, 1976	June 30, 1978
(a) Agricultural Credit Service	172	155
(b) Central Cooperative Banks	2	2
(c) Primary Cooperative Land Development Banks	3	3
(d) Joint Farming	17	17
(e) Marketing	5	5
(f) Dairy & Milk Supply	38	190
Total :	237	372

For meeting requirements of credit, chemical fertilizers and consumer goods, there were 617 agricultural credit societies with a total membership of 68,468 on June 30, 1974. A number of these societies were not found viable. These were, therefore, amalgamated with bigger ones. The result was that by June 30, 1975. the total number of these societies decreased to 563, but the membership increased to 73,155. Again the number of societies decreased to 154 with membership of 74,146 on June 30, 1976. The number of societies was the same but the membership increased to 83,888 on June 30, 1977. On June 30, 1978 the number of societies was 155 with a membership of 87,895. The table below gives data regarding the amount of loan advanced, the number of sub-depots through which agricultural credit societies distributed chemical fertilizers, the quantity of chemical fertilizers distributed

and the value of consumer goods supplied by these societies from 1974-75 to 1977-78 :

	Loan Advanced	Sub-Depots in the District	Chemical Fertilizers Distributed	Consumer Goods Supplied
	(Rs. in lakhs)	(Number)	(Metric tonnes)	(Rs. in lakhs)
1974-75	279.37	38	3.60	3.19
1975-76	342.36	48	4.70	5.20
1976-77	490.87	24	1371	8.77
1977-78	529.76	28	1691	12.41

The Mahendragarh Central Co-operative Bank Ltd., Mahendragarh, which started functioning from February, 1954 advances short-term and medium-term credits to the various types of co-operatives. It advanced loans during 1974-75, 1975-76, 1976-77 and 1977-78 amounting to Rs. 104.94 lakh, Rs. 117.94 lakh, Rs. 211.31 lakh and Rs. 268.63 lakh respectively. Its membership on June 30, 1974 was 524 with owned funds (share capital) amounting to Rs. 11.67 lakh and working capital of Rs. 197.17 lakh. The total amount of deposits held by the bank amounted to Rs. 41.12 lakh. Similar figures at the end of June, 1975, June, 1976, June, 1977 and June, 1978 were as follows :

	At the end of			
	June, 1975	June, 1976	June, 1977	June, 1978
(a) Membership (Number)	505	265	261	255
(b) Owned funds, i.e. share capital (Rupees in lakh)	38.44	42.68	43.75	43.94
(c) Working capital (Rupees in lakh)	207.05	178.10	210.10	487.83
(d) Deposits (Rupees in lakh)	53.08	68.07	55.99	309.20

The *Brayne* Central Co-operative Bank Ltd., Rewari, has been functioning since October, 1922. It advances short-term and medium-term credits to various types of co-operative societies. It advanced a sum of Rs. 249.77 lakh, Rs. 276.85 lakh, Rs. 425.97 lakh

and Rs. 386.75 lakh during 1974-75, 1975-76, 1976-77 and 1977-78 respectively. Its membership on June 30, 1974 was 449 with owned funds (share capital) amounting to Rs. 52.15 lakh and working capital of Rs. 149.75 lakh. The amount of deposits held by the bank amounted to Rs. 53.97 lakh. The figures at the end of June, 1975, June, 1976, June, 1977 and June, 1978 were as follows :

	At the end of			
	June, 1975	June, 1976	June, 1977	June, 1978
(a) Membership (Number)	533	250	249	236
(b) Owned funds, i.e. share capital (Rupees in lakh)	39.31	39.31	45.30	45.50
(c) Working Capital (Rupees in lakh)	190.50	245.66	324.77	422.32
(d) Deposits (Rupees in lakh)	65.67	78.14	108.68	101.08

The long term credit requirements of the cultivators for sinking tubewells, purchase of tractors, land, etc. are met with by three Primary Co-operative Land Development Banks (one each at Mahendragarh, Narnaul and Rewari) which had a membership of 14,201 with share capital of Rs. 32.24 lakh on June 30, 1975. During 1974-75, 1975-76, 1976-77 and 1977-78, the banks advanced long term credit amounting to Rs. 83.01 lakh, Rs. 69.45 lakh, Rs. 96.79 lakh and Rs. 64.38 lakh, respectively.

Joint farming/collective farming societies in the district were organised during 1965-66 under a pilot project scheme in order to secure gains of large-scale farming without losing individual proprietorship in land. Government provides financial assistance to such societies and gives various concessions. The co-operative farming societies could not meet with success. There were 16 Joint farming and one collective farming societies in the district on June 30, 1975 with a membership of 532. In 1975-76, there was no change in number of societies as well as in membership. During 1976-77 and 1977-78, strength of the societies remained the same but the membership increased to 574. At present all the joint farming societies are lying defunct and the scheme has not been successful in the district.

The marketing societies supply fertilizers, improved seeds and agricultural implements to the agriculturists. On June 30, 1974, there were 5 marketing societies with a membership of 2,318 and working

capital amounting to Rs. 20.12 lakh. The information at the end of June, 1975, June, 1976, June, 1977 and June, 1978 was as follows :—

	June, 1975	June, 1976	June, 1977	June, 1978
(a) Number of Societies	5	5	5	5
(b) Membership (Number)	2,401	2,292	2,633	3,723
(c) Share Capital (Rupees in lakh)	3.28	3.39	3.41	4.25
(d) Working Capital (Rupees in lakh)	41.62	36.96	31.33	38.35

ANIMAL HUSBANDRY

The Animal Husbandry Department in the district is represented by the District Animal Husbandry Officer[1], Narnaul. He is responsible for all kinds of livestock development activities, such as cattle breeding, artificial insemination, control of the outbreak of contagious diseases, improvement of livestock and provision of veterinary aid. He is assisted by 23 Veterinary Assistant Surgeons[2], 31 Stock Assistants, 32 Veterinary Compounders and other miscellaneous staff.

Livestock Population

The district was noted for bullocks and goats, the bulls for breeding were imported. Camels were generally kept and were used for ploughing and riding.

The district is fairly rich in livestock which include cattle, buffaloes, sheep, goats, pigs, camels and others. The people of drought prone areas also depend on livestock. In bad years, animals being mobile can be taken away thus retaining some capital and means of survival for the family. The livestock population as per 1972 Livestock Census and 1977 Livestock Census is given below :

	Number (in lakh)	
	1972	1977
Cattle	1.52	1.33
Buffaloes	1.70	1.70
Sheep	0.45	0.49
Goats	0.61	0.77
Pigs	0.04	0.03
Camels	0.23	0.22
Poultry	0.09	0.18
Others	0.09	0.08

1. In 1981, the Deputy Director, Animal Husbandry was made the incharge of the department in the district.
2. The designation was changed to Veterinary Surgeon with effect from April, 4, 1978.

The cattle and buffaloes population which numbered 3.22 lakh in 1972 accounted for 69.4 per cent of the total livestock. Female population of cows and buffaloes in 1972 was 0.57 lakh and 0.88 lakh respectively. The cattle and buffaloes population decreased to 3.03 in 1977. It accounted for 65.6 per cent of the total livestock. The female population of cows and buffaloes in 1977 was 0.49 lakh and 0.84 lakh respectively. Their relative figures vis-a-vis those of males were :

(Figures in lakh)

		1972		1977	
		Cows	Buffaloes	Cows	Buffaloes
Males above 3 years	Breeding bulls	0.00 (a)	0.00 (a)	0.00 (a)	0.00 (a)
	Others	0.32	0.01	0.33	0.00 (a)
Females above 3 years	In Milk	0.34	0.63	0.28	0.56
	Dry	0.20	0.20	0.18	0.22
	Not calved even once	0.03	0.05	0.03	0.05
	Others	—	—	—	—
Calves below 3 years	Males	0.16	0.20	0.21	0.20
	Females	0.37	0.61	0.30	0.65

(a) means less than one thousand.

Cattle and Buffaloes.—Cows and buffaloes play an important role in rural economy and agricultural operations. The district is known for Murrah and Haryana breeds. Haryana cow is reared generally for its male produce, the bullock, which fetches premium price. The Murrah buffalo is famous for high milk-yield and is the main milch animal of the district. To increase the milk production and working efficiency of the cattle, a Key Village Scheme was evolved. The scheme envisages systematically planned method for the best utilisation of superior germ plasm obtained from superior stock throughout the district. The technique of artificial insemination is used to maximise utility of available number of approved bulls. Controlled breeding has been progressively brought through removal of all scrub bulls. To up-grade the low milk yielders, Haryana bulls known for their quality are being extensively used for breeding. To provide breeding facilities 4 artificial insemination

centres with 24 breeding centres are at work. The figures of artificial insemination done and calves born from 1973-74 to 1977-78 are as follows :-

Year	Artificial Insemination Done		Calves Born	
	Cows	Buffaloes	Cows	Buffaloes
1973-74	644	1,918	182	498
1974-75	2,669	2,777	399	798
1975-76	3,796	1,229	594	1,099
1976-77	2,054	2,713	593	308
1977-78	2,062	2,755	415	273

Sheep and Wool Development .—According to 1977 Livestock Census, the sheep population in the district was 0.49 lakh. There is good scope for the development of sheep and wool industry. Sheep provide meat for food, wool for clothes, skin for industrial enterprise and manure for agriculture. The number of sheep is large but all are not high wool yielders. To bring improvement in sheep stock, 4 sheep and Wool Extension Centres at Pali (tahsil Mahendragarh), Nangal Durgo and Kanwi (tahsil Narnaul) and Khole (tahsil Rewari) are functioning. These centres keep superior rams to fulfil the breeding needs of the breeders during tupping season and are taken back after the season is over. Apart from this facility, veterinary aid and other sheep husbandry facilities are also provided. The dry climate of the district coupled with prevalence of sub-mountainous region provides most ideal conditions for sheep rearing as grazing grounds are available and occurrence of outbreak of contagious diseases is minimum.

Piggery.—According to the Livestock Census 1977, the pig population is 0.03 lakh. However there is no government owned or private piggery farm. Pigs are reared by weaker sections of the society. The breed is indigenous and the animals are poor in constitution. The yorkshire pigs from Government Pig Breeding Farms, Ambala and Hisar are supplied to the breeders at subsidised rates for improvement of local inferior quality pigs. The veterinary hospitals and dispensaries attend to the work of disease control of pigs and impart technical education for establishing pig farms.

Camels .—There were 0.22 lakh camels in 1977. The camel is used for ploughing, transportation of goods through camel carts and for riding.

Animal Diseases

The common diseases affecting the livestock in the district are haemorrhage septicaemia, *galghotu*, foot and mouth (*muh khur*), black quarter, rinderpest, surra, sheep pox, caprine pleuro-pneumonia, haemoglobinuria, pica and stringhalt. These diseases generally appear due to unhealthy surroundings and drinking of unhygienic water by animals. With prophylactic vaccination, haemorrhage septicaemia, rinderpest, foot and mouth, black quarter, surra and sheep pox have been brought under control. Camels are very susceptible to surra and sufficient quantity of medicine is stocked in veterinary hospitals and dispensaries. Pica in camels and haemoglobinuria in buffaloes which caused high mortality in these animals in the past are now successfully treated. Springhalt affects camels more than the cattle. Surgical treatment development by the Haryana Agricultural University has proved very successful.

The Haryana Agricultural University Hisar, provides animals disease investigation and diagnostic service to the field veterinarians and livestock owners of the district. The field veterinarians carry out preventive and curative treatment. In case they fail to establish correct diagnosis of the disease outbreak in any species of livestock including poultry, the matter is referred to the disease investigation staff of the University. The Disease Investigation Officer examines the affected animals, carries out post-mortem examination on the carcase of dead animal to detect disease and conducts laboratory examination to establish a correct diagnosis of the disease affecting the animals. Suitable preventive and curative treatment is recommended to control the disease.

Veterinary Hospitals .—In the wake of livestock development programme, the subject of disease control, for combating various contagious and non-contagious diseases, assumes great importance. At the time of formation of Haryana, there were 8 veterinary hospitals and 21 veterinary dispensaries in the district. In 1977-78, there were 20 veterinary hospitals, 12 veterinary dispensaries, 1 veterinary mobile unit, 4 artificial insemination centres, 24 stockman centres, 2 veterinary checkposts, one rinderpest eradication party and 4 sheep centres for providing treatment and breeding facilities. The list may be seen in Table IV of Appendix.

A veterinary hospital functions under the charge of a Veterinary Assistant Surgeon assisted by a Veterinary Compounder or a Stock Assistant and other class IV attendants. A veterinary dispensary is run by a Veterinary Compounder with the help of class IV attendants. An artificial insemination centre is run by Veterinary Assistant Surgeon assisted by a Stock Assistant and class IV attendants. A stockman centre

is run by a Stock Assistant with the help of class IV attendants. A sheep centre is run by a Stock Assistant with other class IV attendants. A check post, is manned by a Veterinary Assistant Surgeon. At the Check Post of Nizampur/Ateli all the incoming cattle from Rajasthan and outgoing cattle are vaccinated against deadly contagious rinderpest disease. The Veterinary Assistant Surgeons, Stock Assistants or Veterinary Compounders apart from attending cases brought to a veterinary hospital/dispensary treat the sick animals during regular tours and administer prophylactic vaccination. Undesirable bulls are castrated.

At the time of droughts/floods preventive vaccinations are administered to the animals by the veterinary staff visiting the affected areas. Sick animals are treated and deworming of animals against the deadly parasites are done by the officials on the spot.

Slaughter Houses.—The district has recognised slaughter houses at Narnaul, Rewari and Mahendragarh. The animals (goats, sheep and pigs) in the slaughter houses are inspected by the Veterinary Assistant Surgeons before and after their slaughter to ensure that the meat being made available for human consumption is hygienic and free from disease. The meat is consumed locally. From the year-wise number of animals slaughtered as given below, it is evident that the consumption of meat is on the increase:

Year	Animals slaughtered
1973—74	5,299
1974—75	7,456
1975—76	8,504
1976—77	9,605
1977—78	7,327

Poultry Development. —The poultry population according to the 1977 Livestock Census was 0.18 lakh. One day old chicks of white leghorn produced at the Government Poultry Farm, Ambala, are made available to the breeders at subsidised rates. The veterinary hospitals and dispensaries impart education in poultry breeding with the latest techniques and help in setting-up poultry farms. Mass vaccination, debeaking and deworming are also carried out by these institutions.

Problem of Stray Animals .—The state government has a cattle catching party to round up wild, stray and useless cattle which create problems

for the farmers. The panchayat approaches the Gaushala Development-cum-Cattle Catching Officer having headquarters at Chandigarh and a party is deputed to the affected area for rounding up the animals. Such animals are put to auction and the unsold are sent to *gosadan*. In the district there is a *gosadan* at Khole (Rewari tahsil) with a capacity of 30-35 animals where infirm, old and useless animals are housed till their natural death.

Gaushala Development .—According to the old concept, *gaushalas* were the institutions opened under religious sentiments to house the unproductive, infirm and useless cattle. These were run on charity. Considering the potentialities of these institutions, these were converted into cattle breeding cum-milk producing centres with financial assistance and technical guidance provided by the state government. There are four registered *gaushalas* in the district at Rewari, Bawal, Mahenderagarh and Rampura. The income from the sale of milk and animals of the *gaushalas* is utilized in running these institutions which now also serve as breeding units.

Dairy Farming

Keeping in view the recurrence of drought conditions in the district, programmes for upgrading breed of milch animals and increasing of milk-yields were taken up by providing facilities of artificial insemination centres and stockman centres in the villages. A list of insemination centres is given in the Table V of Appendix. Two milk chilling centres at Narnaul and Jatusana were set-up for providing remunerative market for the surplus milk available with the farmers.

The Milk Chilling Centre, Narnaul which was set-up in 1977 has a capacity of 10,000 litres of milk per day. The milk collected at the centre is chilled and passed on to milk plants at Bhiwani, Rohtak and Ballabgarh for further processing. The cost of the project was Rs. 10 lakh approximately and Drought Prone Area Project, Narnaul provided a subsidy of Rs. 5 lakh for the project.

The Milk Chilling Centre, Jatusana, (Rewari tahsil) was set-up according to the 'Operation Food-I' programme by the National Dairy Development Board under the World Food Programme and was handed over to Haryana Dairy Development Corporation in 1978. This centre has a capacity of 20,000 litres of milk per day. These centres will be able to absorb increase in the surplus milk in future from the ancillary development programme of the Animal Husbandry and Dairy Development Departments. During 1977-78, the number of milk producers co-operative societies/direct collection centres which supplied milk to the milk chilling centres at Narnaul and Jatusana was 72 and 20 respectively.

FISHERIES

The Fisheries Development Officer, Bhiwani, looked after the department of fisheries in the Mahendragarh district during 1977-78[1]. He was assisted by 2 Fisheries Officers, one Extension Assistant, one Field Assistant, 5 Fishermen, one Accountant and 2 Clerks. The Mahendragarh office was under the charge of a Fisheries Officer. The Fisheries Development Officer functioned under the administrative control of the Director of Fisheries, Haryana, Chandigarh. In the absence of abundant natural sources of fisheries in the district, little development of fisheries schemes was carried out up to 1978.

Fisheries conservancy programmes are activated with an object of preservation, production and augmentation of natural resources in public waters. The public waters in the district are : Sahibi stream, Kasauti stream, Dohan stream and Indori nala. Closed season is observed from 1st July to 31st August to provide chance to brooders to breed once in their life time. Fishing rights in public waters are auctioned every year on 1st September for one year. Fishing in these waters is regulated under the Punjab Fisheries Act, 1914. Management and control for leasing out fishing rights in streams and tributaries vest with the State Fisheries Department.

In the villages, the right of management and control of pond fisheries rests with the Panchayat. In Mahendragarh district some private parties have also taken up fish farming in their ponds.

Fish farming is very economical and viable project. A comprehensive project has been formulated for intensive development of fisheries in the district and 700 village ponds were surveyed by the department. An estimated area of 300 hectares of water will be made available for fish culture after proper renovation and reclamation. The details are as under :—

Name of the Block	Water to be brought under fish culture
	(Hectares)
Jatusana	50
Kanina	35
Nangal Chaudhry	30
Rewari	35
Narnaul	35
Ateli	35
Bawal	35
Khole	35
Mahendragarh	10

1. In 1980-81, a separate District Fisheries Development Officer was appointed for the Mahendragarh district. He was assisted by two Fisheries Officers, one each at Rewari and Narnaul supported by technical staff.

FORESTRY

The Mahendragarh Forest division was created on September, 1, 1961, covering Mahendragarh, Narnaul and Dadri tahsils. After the re-organisation of Mahendragarh district on December 22, 1972, this division covered Mahendragarh, Narnaul and Rewari tahsils. Its jurisdiction has been made co-terminous with the boundaries of the civil district. The division is under the charge of the Divisional Forest Officer (also called Deputy Conservator of Forests) with headquarters at Mahendragarh. He is assisted by 3 Range Forest Officers (Forest Ranger) in-charge of Mahendragarh forest range, Narnaul forest range and Rewari forest range. Other staff include 10 Foresters (Deputy Rangers) holding the charge of blocks and 51 Forest Guards (in-charge of beats). Range is co-terminous with the civil boundry of a sub-division of the district. The Divisional Forest Officer is under the administrative control of the Chief Conservator of Forests, Haryana, Chandigarh, through the Conservator of Forests, Haryana, South Circle, Gurgaon.

The area under forests is classified according to ownership, private and state. Forests owned by corporate bodies and private individuals are included under private forests. The state forests, on the basis of legal status are categorised as reserved, protected and unclassified. Reserved forests are permanently earmarked for the production of timber or other forest produce and in these the right of grazing and cultivation is seldom allowed. In protected forests, these rights are allowed subject to certain restrictions.

The following area was under forests in the district :

Classification of Forests	Area on March 31, 1976	Area on March 31, 1978
1	2	3
	(Hectares)	(Hectares)
(A) State	4,615.00	5,263.00
Reserved		
(i) Salimabad	191.00	191.60
	(i) Salimabad	
(ii) Kanti	91.00	91.06
	(ii) Kanti	
(iii) Jhabwas	303.00	302.71
	(iii) Jhabwas	
	(iv) Nimbi	121.44
	(v) Duloth	70.01
	(vi) Kharoli	24.78
	(vii) Godania	65.56
	(viii) Sohla	264.26
	(ix) Budin	84.95
Total :	585.00	1,216.37

1	2	3
Protected		
(*a*) Compact areas		
(i) Bir Jatwas	6.00 (i) Bir Jatwas	6.07
(ii) Sohla	350.00	
(iii) Nimbi Duloth	281.00	
	637.00	6.07
(*b*) Strips		
(i) Rails	371.00	371.00
(ii) Roads	2,322.00	1,739.00
(iii) Canals (including drains and minors)	239.00	220.00
(iv) Bunds	52.00	52.00
	2,984.00	2,382.00
(*c*) Unclassed	409.00	1,659.00
(B) Private Forests		
Closed under section 38 of the Indian Forest Act, 1927	1,292.00	744.00
Closed under sections 4 and 5 of the Land Preservation Act, 1900	2,213.00	2,150.00
Grand Total :	8,120.00	8,157.00

The forests of this district mainly comprise waste strips on both sides of the roads, canals and railways, and private land closed under Section 38 of the Indian Forest Act, 1927 and Sections 4 and 5 of the Land Preservation Act, 1900.

These strips unfit for agricultural purposes are managed by the Forest Department for afforestation. The area of the forest closed under the Indian Forest Act, 1927 was voluntarily handed over by the owners to the Forest Department, partly for increasing the density of stock and partly as a soil

conservation measure. The area under sections 4 and 5 of the Land Preservation Act, 1900, was compulsarily closed in the interest of soil conservation.

The hill ranges are marked features of the district and provide natural meadows for animals. The district is short of good forests. Due to availability of *kana* grass, cottage industries of *ban*-making and *muddha*-making exist in the district.

Sand blowing caused by high velocity wind poses serious problems. The fertile soil particles, as a result of siltation are transported and scattered over long distances thus impairing soil fertility. In other situations coarse and infertile sand particles are carried away with the high velocity winds and dust storms and are deposited over fertile soil creating unproductivity. Thus the sand-blows threaten the agricultural economy. Research has established that a permanent vegetal cover brings substantial reduction in wind velocity and forms the foundation of entire programmes of agricultural development. The Mahendragarh Forest Division is engaged in the intensive implementation of the Desert Control Programme to halt the march of the desert from Rajasthan and to protect the economy of the district. Considering the deficiency of free growth and the problem of shifting sands, the policy of the Forest Department is to raise shelter belts and wind breakers for protective and production purposes and to meet the fuel requirements of the people. To make the farmers tree conscious, farm forestry has been introduced on a large scale in irrigated areas. The main projects are discussed below :

Fixation of sand-dunes.—The area affected by the active sand-dunes in the district is about 4,000 hectares. The advancement of the sand-dunes renders the cultivated lands infertile by accumulation of sand. These also block the roads and wells. Fixation of sand-dunes in the district is one of the main activities of the Forest Department which is being tackled by plantation of kana (*Saccharum munja*) and *Accacia tortilis*. These are the cheap methods of reducing wind velocity to control the movement of sand.

Raising of shelter belts.—The forestry schemes aim at afforestation of waste strips along rail, road and canals. Shelter belts perpendicular to the wind direction in the form of multiple rows are being raised along these strips so that these tree belts protect crops from the adverse effect of strong, hot and desiccating winds. A dense belt of trees against the strong sand bearing winds check velocity and thus the sand is accumulated towards the wind ward side instead of encroaching upon the cultivated lands on the leeward side.

Farm Forestry.—Plants are raised under this scheme on the south-western boundaries of cultivated fields to create wind breaks so that crops are protected from desiccating winds.

Pasture Development .—An acute shortage of fodder remains in the district. To overcome this problem under the Drought Prone Area Project, 'Pasture Development' Scheme has been introduced. Waste lands where coarse and unpalatable grasses were growing, are proposed to be converted into good quality pasture lands of nutritious and palatable grasses of *anjan* (*Cenchrus setigaris*). The yearwise work carried out is given below :—

Year	Pasture development	Beri-cum-pasture
	(Hectares)	(Hectares)
1975-76	10	—
1976-77	82	—
1977-78	150	71

Afforestation .—Afforestation and regeneration are essential parts of forestry in the district. Under the scheme waste and unproductive areas of panchayats and state forests are being put under valuable tree species.

Re-afforestation .—Under the scheme forests of less valuable species are being replaced by artificial plantations of more valuable species. The plantation is being done in Jhabwas Reserved Forest of Rewari Forest Range.

The forests must be raised and maintained constantly to protect the land from the ravages of erosion, to re-fertilize the soil, to arrest aridity and to improve upon the climate of the region. The following works have been carried out under different schemes in the Mahendragarh district :

Name of Works	Areas under Forest upto 1975-76	Area brought under forest during 1976-77	Area brought under forest during 1977-78
1. Afforestation	1,234 Row Kilometres 378 Acres	300 Hect.	909 Hect.
2. Pasture development	129 Acres 166 Hectares	183 Hect.	150 Hect.
3. Sand-dunes fixation	1,219 Hectares	222 Hect.	508 Hect.
4. Shelter belts	1,242 Row Kilometres 96 Hectares	185 RKM	1,220 RKM
5. Wind breakers	1,378 Hectares	—	—
6. Improvement of water resources	28 Hectares	23 Hect.	52 Hect.
7. Treatment of Forest land	68 Hectares	10 Hect.	10 Hect.
8. Gully Plugging	45 Hectares	—	—

Forest produce is divided into two categories : major and minor. The major forest produce includes timber and fuel wood such as, *Jand* (*Prosopis cineraria*), *shisham* (*Dalbergia sissoo*), *kikar* (*Acacia nilotica*), henna (*Acacia tortilis*) *siris*, (*Albizia lebeck*), *neem* (*Azadirachta indica*), *bakain* (*Melia azadarach*) and mesquite or *pahari kikar* (*Prosopis juliflora*). Minor forest produce consists of *sarkanda* or *kana* (*Saccharum munja*) which is used for *muddha*-making, *han* and thatches. *Acacia tortilis* is a good fuel wood and fodder species. *Jand* (*Prosopis cineraria*) leaves are good fodder for cattle during winter season. *Bad-beri* (*Zizyphus jujuba*) is used as agricultural wood and *pala* (*Zizyphus nummuloria*) is used as fodder during winter. The following figures show the income derived from the sale of major and minor produce from 1973-74 to 1977-78 :

Year	Income from forest produce		
	Major	Minor	Total
	(Rs.)	(Rs.)	(Rs.)
1973-74	1,21,380	20,600	1,41,980
1974-75	1,03,589	65,810	1,69,399
1975-76	1,93,100	55,270	2,48,370
1976-77	1,99,920	95,444	2,95,364
1977-78	2,94,530	19,846	3,14,376

Forests have played a very important role in the economy of the district by providing timber wood for local requirement. *Shisham*, *rahera* and *kikar* are important species in the district.

Plantation of forests carried out by the Forest Department[1] has created enough scope of employment in forest works like raising of nursery stock, plantation work and protection of forest works. The forest-based industries have provided good scope for indirect employment. On an average, about fifty thousand persons get employment annually both directly and indirectly under various activities of the department.

FAMINES

The first famine was that of 1783 A.D. known as *Chalisa Kal* because it occurred in 1840 *Samvat*. This was terrible famine which lasted for more than two years. The people could not get grain and thousands died of absolute starvation and most of them left their homes. The next famine was in

1. Social Forestry Division with headquarters at Rewari having jurisdiction over three districts, viz. Mahendragarh, Bhiwani and Rohtak has come into existence during 1982 for carrying out Rs. 32 crore World Bank Aided Social Forestry Project.

1812-13 A.D. in Mahendragarh and Narnaul tahsils. Severe scarcity conditions prevailed in Rewari tahsil. In 1833-34 famine, the harvests failed and prices rose heavily. The year 1837-38 A.D. also brought famine and it was severe in Rewari tahsil but not so severe in Mahendragarh and Narnaul tahsils. In 1860-61, there was again a severe famine but relief measures were provided by the British Government in Rewari tahsil and Patiala State Government in Mahendragarh and Narnaul tahsils. The district suffered severely in 1877-78 famine which was widespread.

The district was free from severe famines for next two decades but was in grip of a severe famine in 1899-1900. The grain famine was aggravated by a fodder famine every where and about 281 villages of Mahendragarh and Narnaul tahsils were affected. In Rewari tahsil also the crops failed and loss of cattle was very heavy.

Though the district was under stress of scarcity and drought off and on, yet the famine of severity occurred in 1929-30 and 1930-31. In these years, the people were confronted with problems of fodder.

The famines of 1929-30 and 1930-31 were followed by the famine of 1939-40. In these years also the first problem was fodder. The district was worst affected and practically there was no sustenance from land.

After 1939-40, there has been no famine but scarcity conditions prevailed in the district off and on. Land revenue and recovery of *taccavi* loans were suspended and local relief work was undertaken to provide employment to the people of affected areas.

Now with better means of transport, government is well-equipped to cope with any emergency and food can be rushed immediately to the affected areas. On the completion of various development programmes particularly extension of irrigational facilities through a net-work of canals, tubewells/ pumping sets, it is hoped that recurrence of famines would be prevented.