### Chapter IV

### AGRICULTURE AND IRRIGATION

#### INTRODUCTION

Gurgaon, like other districts or the State, is primarily an agricultural district and majority of its population lives in villages. Thus agriculture provides economic sustenance to about 80 per cent of the people either through direct cultivation or through subsidiary or allied occupations. Gurgaon has essentially been a district of peasant proprietors. According to the Gurgaon District Gazetteer, 1910,<sup>1</sup> out of the total population dependent on agriculture (viz. 61.3 per cent of the entire population of the district), 93 per cent were owners or their dependents and only 7 per cent tenants who consisted of ex-proprietors, who had lost their land owing to poverty or misbehaviour. and of menials. Many owners did not cultivate the land they owned; while there were many owners who cultivated land also as tenants. As Gurgaon was a poor district inhabited by numerous peasant proprietors owning small holdings, hired labour was not usually employed for general agricultural operations except by those tribes like the Rajputs whose women did not assist them in the field. In the cultivation of certain crops like cotton, however, all tribes were compelled to employ hired labourers. Cotton pickers were generally paid in kind, receiving one-tenth of the pickings, while other labour was paid in cash at the rate current. Accretions to the numbers of peasant proprietors accrued further as a result of the various land reforms introduced in the post-Independence period. Feudal institutions like jagirdari and biswedari have been liquidated. The occupancy tenants have come to acquire proprietorship. Similarly many tenants-at-will, who purchased the land they tilled have availed of the opportunity afforded by law to become proprietors. Some landlords were able to circumvent the law by entering into benami transactions and mutate their lands in favour of their relatives and confidents so as to retain ownership under a different guise. But now ceilings have been prescribed and law is becoming more helpful to tenants to purchase the lands they have been tilling.

One sequel of these land reforms has been that such former landlords, whose only interest in land was to realise rent, have taken to cultivation with

1. Ibid, pp. 89-90.

# GURGAÔN DISTRICT GAZETŤEÊR

1

their own hands to avoid their lands passing to the tenants. This change has given a welcome drive to mechanised farming. But in the process, many tenants have been evicted and in the absence of alternative vocations of their choice, they have had to work as agricultural labourers. In most cases, the resources at their disposal are meagre and they cannot afford to purchase land even when the law affords them opportunity. The result is that the number of agricultural labourers is also swelling.<sup>1</sup>

The activities and programmes of the Department of Agriculture are linked with those of the Departments of Irrigation, Animal Husbandry, Pisciculture and Forests which cover fields allied with agriculture.

As in the rest of the country, great emphasis is being laid on the need to adopt modern techniques, i.e. improved implements, better seeds, multiple cropping practices and in-puts like chemical fertilizers, green manuring, insecticides and pesticides.

Irrigation projects and facilities have a great bearing on agricultural output. Irrigation is the backbone of the Green Revolution. In addition to improving irrigation facilities, the Haryana Government is anxious to promote rapid mechanisation of agriculture in the State. Much ground has been covered lately; but the paucity of resources and, to some extent, traditional orthodoxy have stood in the way. It appears that, for sometime to come, bullocks will continue to play a key role in cultivation. Therefore, animal husbandry will also have to guide people in improving the livestock. The programmes of cross-breeding and artificial insemination at certain centres have already started making an impact. In order to promote nutrition and to add to the resources of the farmers, steps have also been taken to increase the milk potentiality of the district and to provide requisite facilities for the marketing of milk. With the same end in view, efforts are being made to boost poultry output.

By and large the people of the district are vegetarians and local fish consumption is, therefore, meagre. As, however, fish export has a very great future, Government is laying much stress on the development of pisciculture.

Afforestation checks the spread of desert through conservation of soil. It also increases the timber, fuel and fodder resources of the State.

1. Census of India, 1961, Punjab District Census Handbook, Gurgaon District, 1965, p. 14.

On all accounts, a multi-pronged approach is becoming essential in the development process to tap income-earning avenues and increase economic resources.

### LAND UTILISATION

The total area according to the village papers measured 486 thousand hectares in 1976-77. The land use classification is shown below :

Nature of land use	Area	Percentage to the total area
	(Thousand hectares)	
Area under forests	15	3.1
Land not available for cultivation		,
(a) Land put to non-agricultural uses	66	13.6
(b) Barren and unculturable land Other uncultivated land excluding fallow land:	15	3.1
(a) Permanent pastures and other grazing lands	10	2.1
(b) Land under miscellaneous tree crops and groves not included in net area sown		
(c) Culturable waste		
Fallow land	27	
Net Area sown	3531	72.6
Total area according to village papers	486	100.0
The utilisation of land since 1950-51 has been Appendix.	shown in Ta	ble VI of

1. Of this, 159 thousand hectares was sown more than once.

Water-logging.—The water-logging prevailing in the district in the beginning of the present century has been described in the Gurgaon District Gazetteer, 1910,<sup>1</sup> as follows :—

"Against the enormous benefits which the Agra Canal has undoubtedly conferred must be set certain disadvantages. The natural drainage of the tract has been seriously interfered with by the construction of the main canal and its net work of subsidiary branches and channels, and in years of heavy rainfall large areas are submerged for a long period as happened in 1908-09. Again there is the evil of excessive irrigation. Mr. Maconachie when Deputy Commissioner repeatedly urged on Government the necessity of restricting canal irrigation as far as possible, and presumably as the result of his representation rules 6 and 7 were included in notification No. 0857 I., dated 4th August, 1899, which contains the rules applicable to the portion of the Agra Canal situated in the Punjab. Unfortunately these rules appear to have been overlooked. No attempt has been made by the district or canal officials to restrict irrigation, which in many villages is over-abundant and has supplanted well irrigation. The results are water-logging, the spread of reh to a serious extent and the attendant evils of malaria and enervation".

However, it is no longer a serious problem in the district. During the rainy season, the water collects in the natural depressions particularly in the Centrally Hilly Region, making the land go out of cultivation for the *kharif* crops. It also causes the water-table to rise though temporarily. But the rise of the water-table in some areas of Palwal, Nuh and Fireozpur Jhirka tahsils is still due to canal irrigation. Consequently, salts have also appeared on the surface. As a sequence to this water-logging, the land is spoiled by *thur*,<sup>2</sup> kallar and sem.<sup>3</sup>

1. Ibid, p. 125.

2. Kallar is also classed as *thur*. Kallar or *thur* is of two types. The first type i white or ash coloured material consisting of harmful salts. It can be checked by prope bunding and good quality of irrigation water. The second type which is of dark colou contains sodium salts and is difficult to reclaim, except by using gypsum and other cultura practices.

3. The cultivated area which becomes unfit for cultivation due to rise in water-table is classed as *sem* or water-logged. Those areas which are badly affected and do not produce more than a four anna crop, are classed as *sem* in revenue records.

The tahsil-wise figures of area under water-logging are shown below :

(Figures in hectares)

			-	Tahs	il		0	
		Gur- gaon	Ballab- garh	Firozpur Jhirka	Nuh	Palwal	Rewari	Total for the
		1	2	3_	4	5	6	district
1966-67	Thur	3,895	1,572	1,824	2,575	4,217	145	14,288
	Sem	451	2	·	205	95	5	753
•	Total :	4,346	1,574	1,824	2,780	4,312	2 145	14,981
1967-68	Thur	3,833	1,571	2,081	2,615	4,282	2 145	1,4527
	Sem	433	2	·	25 <b>2</b>	9	5 _	782
	Total :	4,266	1,573	2,081	2,867	4,37	7 145	15,309
1968-69	Thur	3,805	1,536	2,167	2,644	4,26	7 145	14,564
	Sem	434	2	. <u> </u>	206	9:	5 -	737
	Total :	4,239	1,538	2,167	2,850	4,36	2 145	15,301.
1969-70	Thur	3,805	5 1,536	5 2,167	2,644	4,26	7 145	14,564
	Sem	434	2	:	206	9	5 _	737
	Total :	4,239	1,538	3 2,167	2,850	) 4,36	2 145	15,301
1970-71	Thur	3,88	l 1,60	3 2,230	2,66	8 4,34	4 142	14,868
	Sem	17	1 2	2	206	5 9	5 —	320
	Total	3,898	3 <b>1,6</b> 0	5 2,230	2,874	4 4,43	39 142	15,188
1971-72	Thur	3,88	1 1,76	2 2,230	2,610	0 4,34	14 142	14,969
	Sem	1'	7 _		253	3 9	5 —	365
	Total :	3,89	8 1,76	2 2,230	2,86	3 4,43	39 142	15,334
	-			·····				-

440					GURG	AÔN DIST	RÍCT G	AZETTEER
×		1	2	3	4	5	6	7
1972-7. and	3 f Thur	3,848	1,274	2,368	2,781	4,258	*	14,602
1973-74	4 [Sem	6			90	12	*	108
	Total :	3,854	1,274	2,368	2,871	4,270	*	14,710
1974-75	5 Thur	3,848	1,046	2,368	2,781	3,736	*	13,779
	Sem _	6	2		90	2	*	100
	Total :	3,854	1,048	2,368	2,871	3,738	*	13,879
1975-76	Thur	3,848	1,046	2,368	1,589	3,736	*	12,587
	Sem	6	2	·	74	2	•	84
	Total :	3,854	1,048	2,368	1,663	3,738	*	12,671
1976-77	Thur	3,848	1,046	2,368	1,589	3,736	*	12,587
	Sem	6	2	_	74	2	*	84
	Total :	3,854 *(Transferre	1,048 d to the N	2,368 Jahendraga	1,663 arh district	3,738 since 1972	*	12,671

It is evident that the tahsil most affected is Gurgaon followed by Palwal, Firozpur Jhirka, Nuh and Ballabgarh. But the problem is not very serious, as already observed. The lands affected by *kallar* or *thur* can be reclaimed by adopting suitable reclamation measures. Further, the area under *sem* in the Gurgaon tahsil which was 434 hectares in 1969-70, decreased to 6 hectares in 1976-77. This has become possible by the deepening and desilting of Najafgarh drain which carries the water of Najafgarh Jheel into the Yamuna. The Najafgarh Jheel has become almost a non-entity in the Gurgaon district.

Salinity and alkalinity.— The salinity and alkalinity problem is primarily due to the use of subsoil waters, which at places are of poor quality for purposes of agriculture. The following extract from the Gurgaon District Gazetteer, 1910,<sup>1</sup> gives the basic idea of the problem :---

"A marked peculiarity of the Gurgaon district is the saltness or brackishness of the water-supply in many parts; in some tracts, such as the Chiknot circle of Firozpur, the water is invariably salt, in the others it is everywhere sweet, and in others again it is impossible to tell beforehand whether a well will be sweet or salt; and sometimes there are two strata of water, one salt and the other sweet, so that the well when first worked is sweet, and after being worked some little time, yields salt water. It may be said that the wells are especially liable to be salt (1), when the depth to water is considerable and the soil of a clayey character (as a rule, in sandy villages the water is sweet); (2), in tracts which are low-lying and receive and retain the drainage of higher The wells are classed in the Settlement papers as sweet, brackish, or salt; the effect of the character of the water on the produce depends partly on the nature of the soil; where this is sandy, a certain amount of saltness in the water is a positive benefit, and where the water is very salt, very fine crops can be grown if the seed is once sprouted by rain water; on the other hand, on a clay soil saltness in the water is very prejudicial. Besides the above three descriptions of water, there is a kind of water found in some wells in Rewari, known as matwala, or hard, the crops on which are generally good; and there are also a few wells in which the water is sweet kallar; on sweet kallar wells and on very salt wells on clayey soils, it is often necessary to let the land, which has been watered one year, lie fallow or be cultivated with rain crops the next year, in order to prevent its becoming unculturable.

"In the worst cases the land can only be irrigated once in three or four years."

However, it was recently observed from the analysis of 1,914 water samples taken from 518 villages prior to the reorganisation of the district in 1972 that on an average 30 per cent of the villages in the district had good, 28 per cent marginal and 33 per cent poor quality underground waters.<sup>2</sup> In the marginal quality category, 11 per cent were marginally saline (Ec  $x10^{\circ} = 4000$ -8000, SAR 10) and 17 per cent were sodic, which had low salinity but very

1. Ibid, p. 119.

2. Manchanda, H.R. Khanna S.S. and Anand Parkash (1972): Quality Distribution of Underground Waters in Haryana State, Haryana Farming 1(4), 7-11,

high proportions of soldum and bicarbonates (Ec  $x10^{\circ} = 4000$ , SAR 10). The blockwise per cent distribution of each quality of water was as follows :---

Tahsil	Block	Percentage	water sample category	es in each
		Good quality	Marginal quality	Poor quality
		67	23	10
Gurgaon	Gurgaon	50	37	13
	Ballahearh	64	28	8
Ballabgarn	Faridabad	60	25	15
	Firozpur Jhirka	31	31	38
Jhirka	Punahana	22	11	67
NT 1-	Nuh	60	10	30
Nun	Hathin	22	35	43
Dalwal	Palwal	33 -	31	36
Laiwar	Hodal	24	28	48
Dewari	Rewari	27	29	44
Newall	Khol	32	28	40
	Bawal	11	44	45
	Pataudi	36	33	31
· · ·	Average :	39	28	33

Amongst the marginal quality, the marginally saline waters could be profitably exploited by either using them on light textured well drained soils for growing salt tolerant crops or by mixing them with canal water whereas sodic waters can be utilised by using them along with gypsum. The poor quality waters are unfit for irrigation.

It was reported in 1970 that acute soil salinity was a problem in Palwal and Hodal blocks; high salinity and moderate alkalinity in Rewari and Khol

blocks; high alkalinity but slight salinity in Pataudi block and both high salinity as well as alkalinity in Bawal block.<sup>1</sup>

Since the salinity and alkalinity problem in the district is primarily due to the use of brackish waters, the farmers are being advised to get their tubewell water tested from the Soil Testing Laboratories set up in the district at Gurgaon, Palwal and Ballabgarh, before these are permanently installed. Besides, demonstration trials for the reclamation of saline-alkali soils are being laid out in the fields by the Assistant Extension Specialist, Soils Science of Haryana Agricultural University, stationed at Gurgaon, to demonstrate how the problem could be overcome. In addition to the water quality appraisal, the soil testing laboratories also advise the farmers about the quality of their soil and their efficient management for judiciously exploiting the soil water potential.

### IRRIGATION

Introduction.—The district gets uniformly light rainfall and nearly the whole of it falls between June and September. The little rainfall in winter is most welcome since it benefits the *rabi* crops. It is, however, scanty and uncertain. Consequently, *kharif* is more important harvest and *rabi* on unirrigated land is rather precarious. A few unirrigated tracts in the district which sow *rabi* crops extensively, such as the Dehar and Chiknot assessment circles of Nuh and Firozpur Jhirka, the Khadar circle of Palwal and the Sahibi circle of Gurgaon are comparatively better off.<sup>2</sup> The success of *rabi* crops depends on adequate showers between mid-December and mid-February. If there is too little rain in winter or a strong west wind, the crops dry up. The first half of September is the critical period for the ripening of the *kharif* and the sowing of the *rabi* depends on the rainfall during this period. Since the problem of inadequate and uncertain rainfall can best be solved by irrigation, it is worthwile examining in detail the extent to which, irrigation serves the district for purposes of agriculture.

In 1970-71, 32.34 per cent of the net area sown was irrigated.<sup>3</sup> This included even those fields which received artificial application of water only

1. Duggal S.A., Soil Geographical Zones of Haryana HAU, Pub. No. 2/1970, p.37.

(Since the reorganisation of the district, Rewari, Khol and Bawal Blocks have become a part of the Mahendragarh district).

2. For a detailed description of these revenue assessment circles, see Chapter on 'Revenue Administration'.

3. Census of India, 1971, Series 6, Haryana District Census Handbook, Gurgaon District, 1973, p. 21.

once in the year and depended on nature for the rest of the period. Although the Rewari tahsil was excluded, the figure of net area sown which was irrigated rose to 47 per cent in 1973-74. The variations in rainfall affect the sowing as well as the harvesting of the crops particularly those of the *kharif* season. The artificial supply of water by means of canals, tubewells, percolation wells, tanks, etc., for irrigated agriculture is, therefore, necessary to take advantage of the richness of the soil and to ensure against drought.

The district has a considerable topographic diversity. The drainage problem is of a typical nature; it is difficult because of the drains tending to flow towards inland depressions instead of flowing out into some river. The soil is heterogeneous. At most places it is rocky and the water is brackish. Here the only easily available means of irrigation is the water stored up behind the bunds.

The progress of irrigation during 1960-61 to 1976-77 is given below :

(Thousand hectares)

Year	Net Area Irrigated							
	Gur- gaon	Palwal	Firozpu Jhirka	r Nuh	Rewari	Ballab- garh	Total	
1960-61	11	20	4	6	15	11	67	
1965-66	16	32	5	12	21	18	104	
1970-71	33	40	4	19	34	24	154	
1972-73 (New district)	49	37	8	19	. •	18	131	
1975-76 (New district)	35.5	34.2	7.9	11.5	~	24 5	112 6	
1976-77 (New district)	36.4	34.1	7.4	19.6		25.5	123.0	

Development of irrigation.—It is evident from the following table, which gives year-wise data about the net area irrigated in the district by different means of irrigation, that the area under irrigation increased more than twofold during 1960-61 to 1976-77. The subsequent data appertain

the re-organised district :---

Year	Net area irrigated (hundred hectares)							
	Govern- ment canals	Tanks	Wells	Other sources	Totel			
1960-61	203	15	375 -	73	666			
1961-62	133	10	422	10	575			
1962-63	1 <b>96</b>	14	430	42	682			
1963-64	194	36	448	39	717			
1964-65	213	15	510	48	<b>786</b> 🖓			
1965-66	278	32	389	341	1,040			
1966-67	274	25	391	562	1,252			
1967.68	127	24	<b>408</b>	386	945 -			
1967-60	204	9	597	686	1,495			
1908-09	264	15	565	512	1,456			
1969-70	270	12	501	757	1,540			
1970-71	219	10	173	989	1,391			
1971-72 1972-73 (New district)	226	2	131	948	1,307			
1973-74 (New district)	348	10	312	1,015	1,685			
1974-75 (New district)	226	5	38	910	1,199			
1975-76 (New district)	173	9	41	912	1,135			
1976-77 (New district)	286	1	16	927	1,230			

The gradual increase in the irrigated area is due to the sinking of new wells, repair of old wells, installation of tubewells, and other irrigation schemes,

The years 19/1-62 and 1967-68 experienced less rainfall and consequently the water level in the river as well as in wells went down. In fact, all the scurces of irrigation were disturbed and this resulted in the decrease of net area irrigated in the district during these two years. A similar phenomenon was experienced, though on a lesser scale, during 1971-72.

### **CANAL IRRIGATION**

Canal irrigation is done through the Agra Canal and the Gurgaon Canal Project.

Agra Canal.—An important irrigation work and also available for navigation, the Agra Canal is under the control of the Uttar Pradesh Government. It takes out of the Yamuna at Okhla in New Delhi. The canal was opened in March 1874, and irrigation commenced from it in the following winter.<sup>1</sup> The canal passes straight down through Ballabgarh Bangar into the Palwal tahsil and thence into the Uttar Pradesh. It enters the Gurgaon district at 9.6 kilometre and leaves it at 19.20 kilometre. Its course is fairly parallel with the Yamuna throughout and varies from 5 to 20 kilometres from the river bank. The canal has its outfall in Terminal Distributary near village Jodhpur on the southern border of the Mathura district which after about 48 kilometres finally joins the Utanghan river. The total length of the canal and its irrigation channels in the Gurgaon district is 595.90 kilometres<sup>2</sup> as shown below :

Name of Channel	Length		
	(Kilometres)		
Main canal	69.60		
Main distributaries	213.40		
Minors	179.60		
Escapes	21.60		
Drains	110.60		
Mill channels	0.20		
Total :	595.90		

1. Delhi District Gazetteer, 1912, p. 10; Gurgann District Gazetteer, 1883-84 p. 79.

2. The total mileage in 1908-09 was 305 miles 2 furlongs (about 489 kilometres); Gurgaon District Gazetteer, 1910, p. 122.

	Area
	(Hectares)
(i) Delhi (Union Territory)	93.100
(ii) Gurgaon district (Haryana)	63,313.000
(iii) Mathura district (Uttar Pradesh)	1,38,718.000
(iv) Agra district (Uttar Pradesh)	1,01,714.184
(v) Bharatpur district (Rajasthan)	1,586.000
Total :	3,05,424.284
and the second	

The following table shows the area (in hectares) irrigated by the Agra. Canal in the Gurgaon district during the period 1960-61 to 1976-771 :---

1960-	1965-	1970-	1971-	1972-	1973-	1974-	1975-	1976-
61	66	71	72	73	74	75	76	77
21,000	28,000	20,157	14,694	14,046	24,808	25,917	24,608	25,642

The above figures show that the area irrigated by the Agra Canal has varied greatly from year to year. This feature was noticeable even in the pre-Independence years.<sup>2</sup> As observed in the *Gurgaon District Gazetteer*, 1910 (p. 122), this is in all probability due to the reason that whereas the *kharif* area is fairly steady, the *rabi* area fluctuates violently. In dry years, every available acre is cultivated, while in wet years, the demand on water is much less.

Gurgaon Canal Project.—This project represents a bold experiment in the inter-basin transfer of river waters. It provides the transfer of Ravi-Beas waters across the basins of the Satluj and Ghagghar rivers to the Yamuna basin. This is a flow-cum-lift project and envisages the extension of canal irrigation to the arid areas of the Gurgaon district and of the Rajasthan State. It aims at irrigating a gross area of 1.45 lakh hectares and a culturable commanded area of 1.31 lakh hectares in the district. The commanded area would comprise a culturable area of 0.36 lakh hectares between the Agra

1. Scurce : The Deputy Commissioner, Gurgaon.

2. Gurgaon District Gazetteer, Statistical Tables, 1904, 1912 and 1935 (as updated by the office of the Commissioner, Ambala Division, Ambala), Table No. 24,

Canal and river Yamuna close to Delhi-Haryana border and the remaining 0.95 lakh hectares between the western command of the Agra Canal and the main range of the Aravallis. A culturable area of 0.70 lakh hectares will receive flow irrigation while the remaining 0.61 lakh hectares will be provided irrigation through lifts ranging from 2.92 feet (0.61 metre) to 30 feet (9 metres).

The work on the Gurgaon Canal Project was started in 1960-61 but was abandoned in 1962 owing to the Chinese aggression. It was resumed in April 1964 but again the Pakastani aggression in 1965 and the non-availability of the stipulated funds intervened to slow down its scheduled progress. The Project Report of 1964-65 which visualised its completion by 1967-68 at an estimated cost of Rs. 789.50 lakh, was again revised. The project is now estimated to cost Rs. 1206.64 lakh, of which the share of the Haryana State would be Rs. 881.78 lakh and that of Rajasthan Rs. 324.86 lakh. Since the net work of diversion works of Ravi-Beas waters is under construction and the full share of supplies to the Gurgaon Canal Project is not yet available, the commissioning of the project will take a few more years.

The project involves the re-modelling of the Agra Canal, the construction of the Gurgaon Canal Parallel Feeder, Gurgaon Canal, Rajasthan Unit and Nuh Sub Branch. It envisages 11.11 million cubic metres of earth work, 25.52 lakh square metres of canal lining and construction of 300 masonary works, big and small. By the end of 1968-69, 8.54 million cubic metres of earthwork and 12.95 lakh square metres of lining had been executed and 161 masonary works built. As against the total length of all the works of the Gurgaon Canal System of 501.97 kilometres on completion, 395 kilometres had been completed as a result of the enthusiastic effort of the Government. By the end of 1973-74, the length of all works was 419.47 kilometres and the number of masonary works had increased to 234. The length of channels yet to be completed was as follows :---

Name of distributary 1	Length in feet
1. Banarsi Disty.	91,315
2. Umra Minor	32,100
3. Gangwari Minor	40,000
4. Shadipur Minor	52,000
5. Saral Sub Minor	10,000
6. Harphala Minor	2,000

1	2
7. Fatchpur Minor	
8. Nuh Disty.	13,250
9. Rajaslka Minor	10,000
10. Kalanjar Disty.	11,700
11. Dhatir Disty.	1,150
	27,0515 or about 82 km

The details about the areas to be served by this project are given in Table I of Appendix.

The lined Gurgaon Canal Parallel Feeder has been built from kilometre 8 to kilometre 24 of the Agra Canal along its right bank to feed the Gurgaon Canal. For the block on the left on the Agra Canal, two distributaries, Chhainsa and Rampur have been provided which would ultimately be fed directly from the Parallel Feeder through crossings to be built under the Agra Canal. At present, they are supplied water from the Agra Canal by a mutual arrangement. The rest of the command area has been and would be covered by the distributary system of the main Gurgaon Canal. The lined Rajasthan Feeder would carry 500 cubic feet of water per second for Rajasthan areas from the tail of the Gurgaon Canal.

On the commissioning of the Project finally, the Gurgaon Canal would be essentially a perennial canal. It has been planned to utilize the spare capacity in Bhakra canals and provide perennial irrigation from the Ravi-Beas waters for 265 days in the year. For the remaining 100 days in the monsoon period, water will be drawn from the Yamuna as it then carries flows much in excess of the requirements of the existing Agra Canal. The present Okhla Barrage is not capable of giving the desired supply in the rainy season. Arrangements are, therefore, to be made for the construction of a new barrage, estimated to cost Rs. 600 lakh, about 2.5 kilometres down stream of the existing barrage, for feeding the Gurgaon Canal all the year round. The water-supply for the Gurgaon Canal for the *rahi* crops would be delivered at Okhla through Bhakra Canal System and Western Jamuna (Yamuna) Feeder. The supply is to be conveyed through Nangal Hydel Channel onward to Bhakra Main Line up to the head of Narwana Branch and

then through Narwana Branch-Karnal Link to the Western Jamuna (Yamuna) Main Branch at RD 81000 near Karnal. The total discharge allotted for the Gurgaon Canal at the head of the Agra Canal would be 2242 cusecs. Out of this. Rajasthan's share for delivering at Haryana-Rajasthan border would be 500 cusecs for kharif only (516 cusecs at the head of the Gurgaon Canal). The remaining discharge will be used in the Gurgaon district. Owing to the full share of water-supply for this project not being available, maximum advantage of this newly built net work of canals has not accrued. The new Okhla Barrage is yet to be constructed and the Agra Canal has not been remodelled. The present Agra Canal can carry only a limited additional water supply to feed the Gurgaon Canal Project. What is being done at present is that about 250-300 cusecs of the Satluj water is released from the Narwana Branch into river Yamuna through the Munak Escape Channel during the winter season. It is fir thiverted into the Agra Canal at the Okhla Barrage and then into the Gu Canal. This provides irrigation for the rabi crops as also for the sowing of the Kharif crops. No water-supply is taken during the rainy season as the Agra Canal is closed. It is on this basis that the Gurgaon Canal has been operating in a limited manner even since April 1968. So far as Rajasthan is concerned, it is at present not receiving water-supply in the rabi season. During kharif, as and when the U.P. authorities release water from the Yamuna, it is taken to the Rajasthan areas through the Gurgaon Canal distribution system. But this supply is limited to about 10-12 days in the whole season.

The Gurgaon Canal was opened for a trial run on June 17, 1967 but it started regular service from April 1968 when an area of 2,521 hectares was irrigated. It was closed in July 1968 due to the closure of the Agra Canal on account of floods in the Yamuna. For practical purposes, irrigation started from the 1968 kharif and up to March 1969, an area of 9,068 hectares was irrigated. In the next year, i.e. 1969-70, it irrigated an area of 6,480 hectares only as against the target of 10,055 hectares, indicating a shortfall of 45 per cent. Two main factors had been responsible for this shortfall. Firstly, Uttar Pradesh had agreed to carry 600 cusecs of water in the Agra Canal up to mile 15 (kilometre 24) for the Gurgaon Canal till 1969, but it failed to do so. This caused short supply and a consequent fall in the achievement of physical targets. The non-co-operative and unfavourable attitude of the cultivators in utilising the already limited irrigation facilities was the second reason for failure to achieve the irrigation targets. The zamindars were shy of using canal water and as before they continued to sow barani crops. The situation improved in the subsequent years. But the enormous expenditure incurred on this

project is so for unproductive. Irrigation through the Gurgaon Canal System is bound to improve only when the scheduled supply of water becomes available and major works like the new Okhla Barrage and the remodelling of the Agra Canal are completed. It is also necessary that the landowners dig up lined water courses to take the maximum benefit of the water-supplies.

**Exploitation of Sahibi basin water in the district.**—The western part of the district, comprising mainly Pataudi, Gurgaon and Sohna blocks, is chronically deficit in perennial and for irrigation. It has a limited monsoon period but tropical climatic conditions. The soils in the area are sandy loam to sandy. The soil of Pataudi block has slight salinity but high alkalinity hazards. Gurgaon block has moderate salinity and moderate alkalinity hazards. There are no means of irrigation except private tubewells, pumping sets and dug wells. The density of tubewells and pumping sets is very low and the area covered by these means is about 25 per cent of the total area in these blocks. The remaining area is dependent on rainfall which approximates to 546 mm per year.

In order to arrange an assured water-supply for irrigation to this area, which falls in the rain-fed Sahibi Nadi basin, the Haryana State Minor Irrigation Tubewells Corporation carried out field investigations and exploration in the whole of the basin during the period February 1970 to October 1971 and a sweet water belt was delineated which according to present indications extends over an area of about 238 square kilometres in the present boundary of the district. It has been further established that the entire basin is yet under-developed and an additional draft of 0.08-10% MAF can be made which is sufficient for installation of 200 deep tubewells of 1.5 to 2 cusecs capacity and 400 shallow tubewells. The Haryana State Minor Irrigation Tubewells Corporation, however, considered it safe to restrict the development of half the available potential and to watch further the effect of pumpage on quality and ground water table carefully. It was, therefore, proposed to instal 100 tubewells of 1.5 to 2 cusecs capacity in the entire Sahibi Nadi basin of which about 30-40 tubewells were to be installed in the area falling in the Gurgaon district. The scheme has not been finally cleared by the Agricultural Refinance Corporation and so further drilling is not to be undertaken in this basin. Six tubewells have, however, been drilled in the Gurgaon district area. As and when the scheme for further drilling is cleared, the tubewells will be drilled on the specific demand of the people. As far as possible. deep tubewells will not be drilled in the areas where privately owned shallow tubewells are feasible. These shall be located suitably depending on the demand

of irrigation in each case so that there is no difficulty in optimum utilisation of discharge from these tubewells.

It has been observed that the farmers have stuck to the traditional pattern of cropping and no experiments have been made on the soil and climatic conditions. The principal Rabi crops are wheat, gram, barley and pulses while the kharfi crops are jowar, bajra and maize. Ultimately, the assured supply of water from the deep tubewells of 1 to 2 cusecs capacity will surely revolutionise the cropping pattern and ind the farmers to increase the agricultural inputs in the form of tractor cul\_ation, use of hybrid varieties of seed, fertilizers and insecticides. Each tubewell will have at least 3000 ft. (914 metres) of underground pipe line for supply of water to the field so as to serve as an incentive to farmers to construct their own field water courses in accordance with the underground lay out. With the increased supply of water, it is anticipated that an intensity of 133 per cent (i.e. 80 per cent of culturable commanded area in rabi and 53 per cent of similar area in kharif) will be achieved in the chak areas of tubewells by working the tubewells 12 hours a day. The water allowance and intensity of irrigation could be further increased by increasing daily working hours from 12 to 18 depending upon the demand and local requirements.

After the installation of all the tubewells, the net value of produce is expected to increase two to threefold.

#### MINOR IRRIGATION SCHEMES

The topography of the district does not permit coverage of all the cultivable areas with major and medium irrigation schemes. The soil of these unirrigated places is rocky and the water is brackish. The only easily available means of irrigation have been and still are the bunds and tanks where rain and flood water may be stored. The various streams which inundate the district and the natural drainage have been described in Chapter I.

The construction of bunds or embankments<sup>1</sup> to stop, divert, dispose of or distribute drainage water either for irrigation and sanitary purposes, or to act as training work to control the flow of rivers and streams is no new development. This method of conserving and utilising the surface flow of water for irrigating land appears to have been long known and practised. In the district, there are traces to be found, here and there, of old masonary embankments commonly known as Badshahi bunds (those at Arangpur and Sohna are fine examples) which must have at one time usefully held up the run

<sup>1.-</sup> The information is based on "Note on the Gurgaon Bunds" by Akhtar Hussain, I.C.S., Settlement Officer, Gurgaon, written in 1945.

off from the surrounding hills. The existing arrangements for controlling the drainage flow by a system of bunds and other works originated about 150 years ago in an effort 10 drain two large depressions, Kotla and Najafgarh, as described in Chapter I. Besides the Kotla and N jafgarh protection works, many bunds were constructed to control the Indori in the Taoru plateau (Nuh tahsil) and the myriad hill torrents all over the district. Under the British rule originally, these were placed under the charge of the Irrigation Department. But many of these were allowed to fall into disrepair on account of the small direct revenue derived from them. In 1879, they were taken over by the District Fund Committee (later called the District Board) and the system was greatly extended and as much attention was paid to the prevention of swamping as to the development of irrigation. In about 1910, 32 such bunds were managed by the District Board. In 1910, it was decided to provincialise these bunds and to place them under the direct control of the Deputy Commissioner who was to manage them with the assistance of the District Engineer.

In addition to the bunds managed by the District Baard, there were (i) bunds for controlling the Landoha floods and (ii) bunds constructed from Provincial or District Board revenues; but made over to the villages concerned for maintenance. Of the former, only three viz. Kanmaida, Madapur and Nagli were of importance.

During 1910-47, the following new bunds were constructed :---

Firozpur Tahsil

Bhond

Righar

Pinangawan

Kherli Lala

Gurgaon tahsil

Behalpa

Rithauj

Constructed in 1928-29. Constructed in 1929-30 to intercept drainage from eastern

Built in 1929-30. South of

Firozpur town to intercept

Built in 1930-31 as a famine

Constructed in 1930 as famine

Bhond. Breached in 1936.

work.

work.

hills proving useful to Sahjawas and Behalpa Villages.

Although situated in the Gurgaon tahsil, it is connected with Ballabgarh drainage. It holds

. 161

waters of the Kot Nala which passes into the Sarmathla depression.

Constructed in 1930 to check flow of water from the western hills into Chandaini Jheel. Abandoned in 1936 as a new bund nearer the hills was needed.

### Gajjoka

Bhatka

Constructed in 1930-31 as a famine work. Improved land in villages Taoru, Gajjoka and Goela.

A description of bunds of the Ballabgarh tahsil has been given in Chapter I.

When Mr. Brayne took charge of the district in 1921, he found that most of the bunds had fallen into disrepair owing to the inefficiency of the District Board Engineering Staff. So on his representation, the work of maintenance was transferred in 1923 to the Drainage Board, which was later reconstituted into the Rural Sanitary Board. In 1932, the work was re-transferred to the Deputy Commissioner. During this period, the old bunds were remodelled, improved and extended; several new bunds were constructed, extensive surveys were made; new sites for bunds were discovered and drainage schemes and plans and estimates for new bunds were prepared. Then followed a large cycle of dry years and not much attention was paid to the bunds. Ultimately in 1943, the Irrigation Department again took charge of all these works and since then holds it.

The minor irrigation bunds are actually multipurpose projects. They help in checkmating the erosion of land, distribution and dispersion of drainage water for either basin or outside irrigation conserving soil and water, raising of sub-soil water level, charging of brackish water, saving low lying depressions from flood and in developing desert lands. They also provide water for cattle and washing purposes. The bunds have thus proved very useful in improving drainage, agriculture and health of the district. A number of new bunds have been constructed in the district in addition to the old bunds which have been re-modelled and repaired. The total number of such bunds is 106; 97 under the Gurgaon Drainage Division, Gurgaon and 9 under the

Nuh tahsil

Faridabad Divisi n G.C., Faridabad. All these bunds are inspected by the Tahsil Inspection Committees of which the respective S.D.O.s (Civil) are Chairmen and suitable steps are taken to strengthen them wherever necessary. Other members of the committees are the representatives of the Public Works (B&R) and Irrigation departments and the Tahsildars of the tahsils concerned.

The following new schemes have been executed/proposed :---

# (i) Basai Khanzada Bund (tahsil Firozpur Jhirka)

This bund is to trap the local torrents in the catchment area of the Landoha coming from hill ranges in the Firozpur Jhirka tahsil near villages Basai Khanazada, Mohlaka, Kherli Kalan and Nai Nangal near Nagina. The bund would be 3.14 kilometres along involving 80 lakh cubic feet of earthwork and would cost about Rs. 3 lakh. It would provide basin irrigation for 63.5 hectares of land and 163 hectares of land outside the bund would be saved from soil erosion. Earthwork to the extent of 50 lakh cubic feet had been done up to February 1975 and was expected to be completed in 1975-76. It is situated about 5 km from village Morara on Barkli-Hodal Road.

# (ii) Dongrawan Shahzadpur Bund (tahsil Firozpur Jhirka)

This bund is located about 10 kilometres east of village Bhadas. It is 647 metres long and has cost Rs. 1.55 lakh. It caters to the needs of Dongrawan, Statzadpur, Bezadpur and Banarsi villages and benefits an area of about 53 hectares. It was completed in 1975.

# (iii) Panchagaon Bund (tahsil Nuh)

This bund is located about 5 kilometres south-east of Taoru Rest House and about 1.5 kilometres from the Sohna-Rewari Road. It is 1,295 metres long and cost about Rs. 5.00 lakh. It benefits 127 hectares of land of village Panchgaon. This bund was completed in 1972-73.

# (iv) Bhutlaka Bund (tahsil Nuh)

It is situated in Bhutlaka Patti of village Sisanla and is about 8 kilometres from Sohna on Sohna-Rewari Road. The catchment area of this bund is 3.9 sq. km and it has a length of 274 metres. It will control the waters of five nullahs which take off from the adjoining hills on the northern side of the road parallel to it. After crossing the road, these flow southward and fall into the basin of Dhulawat and Gojjaka Bund. The

Bhutlaka Bund was started in the beginning of 1974 and was expected to be completed during 1975-76 at a cost of about Rs. 6 lakh.

### (v) Bhandwri Bund No. II (tahsil Gurgaon)

During the rains, small local rivulets join and flow down towards the Ghata Bund which is situated about 13 kilometres south-east of Gurgaon beyond village Wazirabad. Besides causing erosion, these rivulets flood the Ghata Bund perilously. The excess water had to be released and flowed into Jharsa-Maidawas Bund situated on the periphery of Gurgaon town (from Civil Line to village Badshahpur). In excessive rains, the overflowing waters, posed a grave threat to Gurgaon town as in 1972. Bhandwari Bund No. II situated at about 4 kilometres from village Ghata, was designed to intercept the run-off of this area, check erosion and reduce flooding of the Ghata Bund. It was completed in 1973 with a total expenditure of Rs. 4.35 lakh.

Moderation of Landoha Nala Floods.—This project is a landmark in the irrigation history of the district. As already described in Chapter I, Landoha Stream is a monsoon torrent rising in Rajasthan. When in flood, its waters enter into the Gurgaon district from the south and cause damage in the Firozpur Jhirka and Nuh tahsils. The roads are sub-merged, communications are disrupted and there is acute shortage of food and fodder. The losses in these two tahsils were much too heavy in 1969 when the Firozpur Jhirka' tahsil suffered a loss of about Rs. 109 lakh and the Nuh tahsil of about Rs. 78 lakh.

The follwing extract from the Gurgaon District Gazetteer, 1910,<sup>1</sup> explains the position regarding the sharing of its waters :

"Considerable difficulty has always been experienced in maintaining fairly the respective rights of the Alwar and Gurgaon zamindars in its waters.

"....., after a long and exhaustive enquiry, the arrangements detailed in paragraph 30 of Mr. Channing's Settlement Report were made with the Alwar State for securing to the zamindars of the Firozpur valley their fair share of the Landoha waters. The agreement arrived at may be briefly summarized as follows :--

> (a) The Alwar State admitted its responsibility to maintain and embankment called the Jat *band*, so as in all seasons to prevent any portion of the stream passing to the east at this pcint.

### AGRICULTURE

175

### Soils

The district has the distinction of having all types of soils right from clay to sand dunes. They are classified into Heavy or Hard Clay (*Chiknot*, *Dakar* and *Rohi*), Clay Loam (*Narmot*), Sandy Loam (*Magda*) and Sandy(*Bhur*).

Heavy or Hard Clay (Chiknot, Dakar and Rohi).—As the name indicates, these soils are very hard in texture and render the cultivation difficult. These are mostly found at the basement of the hills and in regular flooded area of the district. They require a good deal of moisture. In years of good rainfall, they give a magnificient yield, but in dry years, these cannot be sown, or if sown, yield little or nothing. The approximate area under these soils in the district is 33,540 hectares which is mostly found in the Dahar circle of Nuh, the Dahar and Chiknot circles of Firozpur Jhirka and the Sahibi circle of Gurgaon tahsils. The crops grown are wheat, peas, rice and sugarcane.

Clay Loam (Narmot).—This is a medium type of soil and the crust is also not difficult to break. Addition of humous (organic matter) is essential for raising the crops. This type of soil, approximately 2,20,580 hectares, is scattered almost throughout the district but is mostly in the eastern parts including those of Nuh and Firozpur Jhirka tahsils which are canal irrigated. The crops grown are wheat, gram, barley, fodders, *bajra, jowar*, pulses, *sarson* and vegetables.

Sandy Loam (Magda).—As the name indicates this type of soil is easy to work. This is the representative soil of the district on which is based the entire cropping pattern. It is very much prevalent in the Taoru circle of the Nuh tahsil and the Gurgaon and Sohna circles of the Gurgaon tahsil. The approximate area under this soil is 2,65,190 hectares. Seepage is a major problem in the case of this soil and the addition of organic matter is essential to increase its water holding capacity. Thiss oil is suitable for raising all types of crops with top as well as fibrous root system such as *bajra*, *jowar*, gram, barley and oilseeds, such as *sarson*, *taramira* and groundnut, having low water requirements. Tuber crops also grow successfully under irrigated conditions.

Sandy (Bhur).—Sandy soil and sand dunes are found in scattered patches in all the tahsils of the district. The area under this category of soil is approximately 90,376 hectares. The soil suffers from erosions by wind and its shifting nature makes the raising of crops very difficult. It remains a cause of concern to the farmers and requires constant vigilance on their part.

**JURGAON** D

ZBTTER

The crops

Rain showers are the mayor factors in raising crops ' grown are : jowar, bajra, gram, sarson, barley a'

In general, the soils are deficient in n<sup>i</sup> the phosphoric content ranges from low to that for obtaining good yields, the soils ous and phosphatic fertilizers. The defice that the soils be also enriched with organic sultance like farm-yard manure, compost and green-manure. For the improvement of alkaline soils, greenmanuring occupies an important place in the development of agricultural programme.

Agricultural zones.—Agriculturally Gurgaon district may be divided into two zones, viz. the first zone comprising the Ballabgarh and Paltahsils and the second zone comprising the Gurgaon, Nuh and Firot Jhirka tahsils.

The first zone is the most fertile area of the district. The soils ran from sandy loam to clay loam. On its east flows the Yamuna and on its Wes re the remanents of the Aravalli. It avails of irrigation facilities from the Agra Canal. The subsoil water is sweet and fit for irrigation. The water table is comparatively high and water can be struck at a depth of 10-32 feet (3 to 10 metres). Lift irrigation is very successful. These conditions are favourable for the successful raising of all types of crops. The major crops grown are wheat, gram, barley, oil-seeds, cotton, sugarcane, pens. rabi and kharif vegetables, bajra, jowar, gowar and puslses. The difficulties, peculiar to this zone, in the way of successful agriculture are the presence of alkalinity, salinity, erosion by water, floods, defective drainage and depressions. The Government is already seized of these problems and is taking measures to overcome these hurdles. The Gaunchi Drain, now re-modelled, will ease further the water-logging and drainage problems. The uneven lands have been levelled by bulldozers and tractors. Subsoil water has been tapped wherever possible. The agricultural produce is being increased by practising intensive cultivation, using improved seeds and taking necessary plant protection measures. Some fruit gardens have also sprung up.

The soils in the second zone are mostly sandy or sandy loams or hard clay. The lands are fairly even but the cropping pattern depends on the

1. The soil PH varies from 7.5 to 9.0 per cent, the organic matter from 0.23 to 0.53 per cent and the calcium carbonate content from 0.23 to 2.23 per cent.

(Source : Divisional Soil Conservation Officer, Gurgaon.)

ragaries of water. This zone may conveniently be divided into two halves. In the portion comprising Nuh, Hathm, Punanana and Firozpur Jhirka blocks, the subsoil water is brackish and unfit for irrigation. However, this area is mostly subjected to floods during the rainy season. The major crops grown in this part are : bajra, jowar, sugarcane (to a limited extent), wheat, gram, barley and sarson. In the other half comprising Gurgaon, Sohna and Pataudi blocks, lift irrigation is practised where the sub-soil water is sweet. The major crops grown in this part are : wheat, gram, barley, groundnut, bajra, jowar, oil-seeds and vegetables. The difficulties peculiar to this zone which come in the way of agriculture relate to the absence or lack of sweet subsoil water, water-logging, soil erosion by wind, defective drainage depressions. Depressions are mostly due to the presence of Aravalli hills. Boring operations at the foot or in the bed of these hills are difficult. The Government has since arrarged Rig machines for deep and difficult borings. Gypsum is given on 50 per cent subsidy for the control and reclamation of alkaline soils. To take advantage of the accumulated water of floods and heavy rains, the C vernment has introduced sugarcane, rice and also groundnut crops which have ven promising results. The high-yielding varieties of wheat and bajra oo have proved successful.

The crops grown in the Gurgaon district are divided into two main tegories, viz. *kharif* and *rabi*, locally named as *sawani* and *sadhi*. The rmer is the summer season and the latter the winter season harvest. Any crop which does not strictly fall within these two harvests is known as a *zaid* orop and its harvest is called the *zaid kharif* or *zaid rabi*, according to the harvest with which it is assessed. *Toria* is cultivated as *zaid kharif* and tobacco as *zaid rabi*.

The major *kharif* crops are : *bajra*, sugarcane, cotton, paddy, maize, *jowar*, soyabean, groundnut, cow-pea; while the minor ones or subsidiary crops are: *kharif* pulses (moong, mash, moth, arhar, massar, and kharif vegetables (kaddu, karela, bhindi, kakri, tinda, ghia, chillies, tomato, brinjal, onion).

The major rabi crops are: wheat, gram, barley and rabi oil-seeds (sarson, taramira, raya); while the minor ones or subsidiary crops are: fodders (barseem, oats, sarson) and vegetables (raddish, carrot, turnip, brinjal, cauliflower, potato, pea, tomato, band-gobhi, ganth-gobhi, palak, methi).

Sugarcane, cotton, groundnut and vegetables (potato, chillies, oinion, pea, tomato) are the main cash crops of the district. Vegetables are generally

cultivated around the towns where there is comparatively a greater demand for them.

Table IX of Appendix give, details about the sowing and harvesting of *kharif* and *rabi* crops; Table X shows the area under principal crops; Table XI the yield per hectare and Table XII the production of principal crops from 1960-61 onwards.

A major break through in agriculture has been achieved after Independence by the evolution and introduction of high yielding varieties of various crops and by following the latest technology in processes connected with agricultural production including mechanisation. The multi-pronged approach adopted by the cultivator with the technical know-how and guidance imparted by the agricultural experts has also contributed greatly to increasing production in the district. During the last two decades, all existing resources have been exploited to the maximum extent. Apart from high yielding varieties and improved seeds, the other major factors are provision of major and minor irrigation facilities, rational and balanced use of chemical fertilisers and contreof pests and diseases. The secondary factors, such as the use of agricultura machinery and improved agricultural implements, seed treatment, optimun sowing time, initiation of various package programmes, soil testing reclamtion facilities, etc., have also helped to a great extent in increasing agricultural production. Technical guidance has been made available in su . a way as to ensure that the practices evolved by the experts are followed t the cultivators in the right manner. By virtue of this multipurpose approach, every inch of cultivable land is being brought under the plough. The increased production during 1970-71 was to the tune of 42 per cent as compared to 1966-67, and it increased to 65.93 per cent in 1976-77.

### FOODGRAIN CROPS

Wheat.—As per the Gurgaon District Gazetteer, 1910, (p. 92), "Gurgaon is not distinctively a wheat growing district and the average matured area under wheat for the 22 years from 1885-86 only amounted to 42,675 acres (i.e. 17,270 hectares) or 5 per cent of the total matured area". The total percentage under wheat and mixtures of wheat (gochni, i.e., mixed with gram and gojra, i.e. mixed with barley) was 10. Even in the Ballabgarh tahsil which was then part of the Delhi district, the percentage was 9. The estimated yield of well-irrigated wheat varied from 6 to 14 maunds (3.36 to 5.22 quintals) and of canal irrigated wheat from 11 to 12 maunds (4.11 to 4.48 quintals) per acre (0.405 hectare). On the whole, it averaged at about  $10\frac{1}{2}$  maunds (3.90 quintals) per acre (0.405 hectare). However, since Independence, wheat has a variety of purposes. The atea under gram is mostly dependent on the vagaries of weather. Timely rainfall increases its cultivation while late rainfall leads to decrease. This results in considerable fluctuations.<sup>1</sup> The area under this crop in 1950-51 was 75 thousand hectares. It was the highest in 1961-62 with 166 thousand hectares and the lowest in 1972-73 with 37 thousand hectares. The district ranked third in the State in the production of gram (10.27 percent) during 1970-71. The production of gram touched the lowest level in 1975-76 with 25 thousand metric tonnes and the area was 61.7 thousand hectares. According to the *Gurgaon District Gazetteer*, 1910, (Page 92), the out turn of gram per acre (0.405 hectare) varied from 8 to 12 maunds (2.99 to 4.85 quintals) on irrigated land, from 8 to 10 maunds (2.99 to 3.73 quintals) on flooded land, from 5 to 9 maunds (1.87 to 3.36 quintals) on loam and 4 to 6 maunds (1.49 to 2.24 quintals) on sandy soil. After Independence, various new varieties of gram have been developed and cultivated. These are disease resistant and higher yielders and are described as follows :---

- S-26 : The grains of this variety are bright yellow coloured. The plants are semi-spreading, medium in height and earlier in maturity. Its average yield is 6 quintals per acre (0.405 hectare). It does not fare well in light soils or humid areas.
- C-274: Its yield is slightly better than that of S-26. It is successful where S-26 fails.
- C-24 : It is tolerant to Ukhera disease and grows better under rainfed and light textured soils but not in humid areas. The grains are of chocolate brown colour and the yield is about 6 quintals per acre (0.405 hectare).
- **PUNJAB**—7: It gives slightly higher yield than C-24 and the grain colour is brown yellow. It is suited to irrigate or adequate rainfall conditions but not to humid conditions.
- C-104: It is known as Kabli gram because the grain size is double than that of other varieties. Its yield is about 7 quintals per acre (0.405 hectare).
- C-130: It has recently been evolved and its yield is higher than any other variety, i.e. about 8 quintals per acre (0.405 hectare). It is meant for irrigated area.

1. In 1929-30, the total area under gram was only 8,503 acres (3,441 hectares). It was over four lakh acres (1.6 lakh hectares) in 1924-25 and 1933-34. The variations in other years were also considerable. (*Gurgaon District Gazetteer, Statistiscal Tables*, 1935, Table 19, as updated by the office of the Commissioner, Ambala Division, Ambala).

Bajra.—A principal kharif foodgrain crop, bajra is mostly grown in the barani areas of the district. It constitutes an important item of food during the winter season and is preferred to wheat and gram. The cultivation of this crop needs rainfall at sowing time, frequent rainfall after short intervals and sunny weather at the time of harvesting. The dependence on rainfall leads to great variations in acreage under this crop. Prior to Independence, it ranged from 2,77,971 acres (1,12,491 hectares) in 1925-26 to 4,74,243 acres (1,91,919 hectares) in 1942-43.<sup>1</sup> In 1950-51, the area under this crop was 142 thousand hectares. Thereafter, the maximum acreage has been in 1967-68, i.e. 165 thousand hectares. In 1970-71, the district occupied the second position in the production of bajra (17.68 per cent) in the State, the first being Hisar (46.16 per cent). The sharp decline in 1972-73 was on account of the reorganisation of the district; the Rewari tahsil, where it is an important crop having been made a part of the Mahendragarh district. In 1976-77, the area increased to 96 thousand hectares but the production was only 38 thousand metric tonnes. According to the Gurgaon District Gazetteer, 1910, (Page 90), the yield per acre under bajra was from 3 to 8 maunds (1.12 to 2.24 quintals). After Independence, the farmer used better varieties of seeds like T-55 A, 1/2 and S-530. Since 1966-67, however, hybrid bajra varieties namely Hybrid Bajra I and Hybrid Bajra IV have been introduced and these have increased the production. But these have been found to be susceptible to serious diseases like Downy Mildew (Green ear) and Ergot. Then H.B. No. 3 which was considered to be disease-resistant was introduced. Hopes with regard to this variety have also not come true as it has also been affected by disease. Pesticides are the only remedy. Although the yield of hybrids has gone down in the circumstances, yet these are superior to local varieties as their yield potential is 100 to 150 per cent higher. Given the prescribed chemical fertilizers and favourable weather conditions and effective use of pesticides wherever necessary, the hybrid varieties yield 25 and 35 quintals per hectare under unirrigated and irrigated conditions respectively.

Maize.—Maize is locally known as makka. It is a kharif foodgrain crop and needs assured irrigation for its cultivation. The area under this crop was only a thousand hectares in 1950-51. It rose to two thousand hectares in 1960-61 and almost remained constant till 1965-66. In 1967-68 and 1971-72, it was six thousand hectares but the introduction of Baisakhi Moong after wheat has resulted in the shifting of the sowing time of maize from the monsoon to post-monsoon period when it is more economical and profitable

1. Gurgaon District Gazetteer Statistical Tables, 1935, Table 19, as updated by the office of the Commissioner, Ambala Division, Ambala.

for the farmers to raise hybrid *bajra* crop instead of maize crop. This accounts for not much increase in the area under maize. The main producing areas are Ballabgarh, Palwal, Hathin, Punahana and Hodal. Although new varieties, viz. Ganga-5, Hybrid Maize and Composite Vijay have been introduced, these are not popular. The local seed is preferred because it requires less quantity of fertilizers and can even be grown with the farmyard manure produced locally for which the farmer has nothing to pay.

Barley.-Dry climate suits this crop. Locally known as jaun, it is sown throughout the district. The most suitable area for the cultivation of this crop was Rewari tahsil which has since become part of the Mahendragarh district. Gurgaon no longer occupies the first position in the State for barley production. The area under this crop was 55 thousand hectares in 1950-51, 45 thousand hectares in 1960-61 and 52.3 thousand hectares in 1970-71. It had touched its highest in 1967-68 when the area under this crop was 101 thousand hectares. The area has considerably reduced since the re-organisation of the district. It was 36.1 thousand hectares in 1972-73 with a production of 39,000 tonnes. In 1974-75, the area increased to 64.4 thousand hectares with a production of 75.1 thousand metric tonnes. According to the Gurgaon District Gazetteer, 1910, (pages 90 and 91), the yield per acre under barley was 11 to 19 maunds (4.11 to 7.09 quintals) on Chahi lands, 7 to 91 maunds (2.61 to 3.54 quintals) on unirrigated lands and 41 to 7 maunds (1.67 to 2.61 quintals) on sandy soil depending on favourable rains. The popular varieties grown after Independence were T-4 and T-5. These varieties have been replaced by new varieties which are drought resistant, give better yields and have been specially recommended for this district. These improved varieties are :

- C-138: It is suitable under *barani* conditions, tolerant to rusts and fairly resistant to lodging. The grains are bold and amber-coloured and the average yield ranges from 3.5 to 6 quintals per acre.
- C-164: It is suitable for semi-irrigated areas. It is six rowed variety with compact ears and yields from 6 to 12 quintals per acre (0.405 hectare).
- B.G.I. (LOCAL SELECTION): It is suitable for unirrigated areas and yields about 6 quintals per acre (0.405 hectare).

PULSES

(i) Moong.—Cultivated throughout the district, moong crop requires dry climate with occasional rains and sandy or loam soil. It is also grown

at places where the canal water or lift irrigation is available. It is partly sown with *bajra* and partly as a pure crop. The ex raordinary variation in the area under *moong* results from the timings of the rainfall. The area is more in years of timely rainfall during the period of sowing.

The varieties being grown in this district are :

1. Pusa Baisakhi

or type 44 : It is an early maturing variety and takes about 65-70 days from sowing till harvesting. It is preferred as a summer crop, sown around Baisakhi and harvested before the rains. Its yield is about 4 quintals per hectare. It helps in obtaining three crops a year, i.e. bajra followed by wheat followed by baisakhi moong.

2. Moong No.305: It is recommended under barani conditions of this district and takes about 90 days to mature. Its average yield is 5.50 quintals per hectare though it has potential to yield 10 quintals per hectare.

3. Moong No. 54: This variety matures in 85—90 days and is moderately resistant to yellow bean mosaic and bacterial and fungal diseases. On an average, it yields 6.80 quintals per hectare though it has potential to yield 12 quintals per hectare.

. Hybrid 45 : A promising variety from the Madhya Pradesh it has been released for general cultivation by All India Coordinated Research Project. Its average yield is 8-10 quintals per hectate and its duration is 85-90 days. The grains are bright attractive.

(ii) Mash.—Locally known as *urd*, its cultivation, like *moong*, requires dry climate with occasional rains and sandy or sandy loam soil, and is cultivated throughout the Gurgaon district. It is also grown at places where canal water or lift irrigation is available. It is usually sown with *jowar*. The new better yielding varieties introduced in the district are No. 48 and Mash 1-1.

(iii) Massar.—Cultivated mostly in the irrigated areas, it also requires dry climate with occasional rains and loam or sandy loam soil. For this item also a new better yielding variety, namely *Massara* 9-12 has been introduced.

(iv) Moth.—Cultivated mostly in the dry areas, it requires the same climatic conditions as have been described for *moong* and *mash*. The following

(New district)

figures relating to the period 1965-66 to 1976-77 show that its prot been steadily on the increase :---

Year	Area (Heotaros)	Production (Metric tonnes)
1965-66	280.	168
1966-67	350	210
1967-68	378	246
1968-69	420.	384
1969-70	480	324
1970-71	520	364
1971-72	762	1,315
r 1972-73	196	
1972 74	295	8 .
1974-75	359	811
1975-76	318	795
1976-77	295	781

The new better yielding variety of moth introdced is T-3.

(v) Arhar (Pigeon Pea).-Its cultivation requires the same climate, soil, etc., as have been described for moong and mash. It is mostly grown under barani conditions. Its cultivation has also been on the increase as is evident from the following figures pertaining to the period 1965-66 to 1976-77 :---

Year	Area (Hectares)
1	2
1965-66	2,000
1966-67	2,000
1967-68	2,800
1968-69	3,000]

	1		2
	1969-70	. <del>.</del>	3,300
	1970-71		3,500
	1971	•	3,600
	1972-73	3.	3,450
ſ	1973-74		1,860
	1974-75		1,974
Ĭ	1975-76		2,747
حر	1076-77		1,991

New district

Cultivation is done with the local seed and no new variety has been introduced. This crop is grown with other *kharif* crops like *jowar* and *bajra* as a cash crop. It is a one-year crop, i.e. grown with *kharif* crops and harvested along with *rabi* crops.

(vi) Soyabean.-It requires damp climate with occasional rains and sandy or sandy loam soil. It can also be grown at places where canal water or lift irrigation is available. The cultivation of soyabean was totally unknown in the Gurgaon district. It has started very recently, i.e. from 1969-70 in a regular way. Demonstration plots were laid out on farmers' fields. These plots proved a success and the crop found its place in the cropping pattern. Subsidies were given for the inputs to the farmers, who were also assured of a support price by the Food Corporation of India. These incentives and the good harvest encouraged its cultivation. The area under this crop increased from 50 hectares in 1969-70 to 100 hectares in 1970-71. The corresponding increase recorded in its production was from 60 metric tonnes to 125 metric tonnes. The varieties sown were Charks-16 and Bragg. This experiment has, however, failed of late. Charks-16 has not proved successful. In 1971-72, only 10 hectares were under Soyabean and in 1972-73, in the reorganised district, the area was reduced still further. In 1976-77, the area under syoabean was only 2 hectares.

#### CASH CROPS

**Oil-seeds.**—Locally known as *tel ki fasal*, the oil-seeds have always been cultivated throughout the district. Loam to light loam soils with two showers for *kharif* crops and one shower for *rabi* crops are required for the cultivation.

of oil-seeds. Cloudy winter does not suit the rabi crop. 49, sarson and taramira at the rabi and til at the kharif were the only seeds grown. Til was sometimes sown alone, but more often in lines in bajra and cotton fields. It was a delicate crop and its yield was about 31 maunds (1.3 quintals) per acre (0.405 hectare). The total area under the crop was very small. Of the rabi oil-seeds, sarson was the most important and taramira was sown on inferior lands. A yield of 8 maunds (2.29 quintals) in irrigated and 41 maunds (1.67 quintals) on unirrigated land per acre was normal.<sup>1</sup> The area under oil-seeds has been fairly fluctuating. It has varied from 37,748 acres (15,276 hectares) in 1926-27 to 96,194 acres (38,928 hectares) in 1941-42. In the following years, it exceeded one lakh acres<sup>4</sup> :

1923-24	41 Acres	(43,156 hectares)
1928-29	189,395 Acres	(76,645 hectares)
1932-33	113,929 Acres	(46,105 hectares)
939-40	111,940 Acres	(45,300 hectares)

The area, as shown below, has been under the oil-seeds during 1965-66 to 1976-77 :

Year 1	Area (Thousand hectares) 2
1965-66	40.1
1966-67	41.8
1967-68	40.9
1968-69	19.7
1969-70	26.7
1970-71	29.0
1971-72	39.0

1. Gurgaon District Gazetteer, 1910, p. 95.

2. Gurgaon District Gazetteer, Statistical Tables, 1935, Table 19, as updated by the office of the Commissioner, Ambala Division, Ambala,

		1	2
	- آ ا	1972-73	26.0
		74	23.0
Ç	New district)	1974-75	35.0
		1975-76	20.0
	·	1976-77	16.0
	The improved seed	ls used in this district	are :
Name	e of the oil-seeds	Name of the old varieties used	Name of the new varieties introduced
Khar	IF CROPS		
1.	Groundnut	Local	Pb. 1 and M-145
2.	Castor	Local	No. 1
Rabi	CROPS		
1.	Toria	Local	Selection A
2.	Brown Sarson	Local	B.S.H.I
3.	Yellow Sarson	Local	Y.S. Pb. 24
4.	Taramira	Local	Selection A
5.	Raya	Local	L—18
6.	Linseed	Local	K-2
ຸ 7.	Japan Rape	Local	L.G.L.

Sugarcane.—Sugarcane is locally known as ganna or eekh. It requires a wet climate and considerable irrigation for its cultivation. The main producing areas are Ballabgarh, Hodal, Punahana, Hathin and Palwal blocks. Prior to Independence, the area under this crop was always less than fifteen thousand acres. Only in 1941-42, it was 25,743 acres.<sup>1</sup> From 5 thousand hectares in 1950-51, it rose to 14 thousand hectares in 1960-61 and to 20 thousand hectares in 1965-66. Thereafter, there has been a steady decline and the area was only 11.6 thousand hectares in 1976-77. The main reason is that this crop remains in the field for almost the whole year and the income from gur is much less than what two or three other crops may fetch from the same unit of land. Moreover, sugarcane is much too prone to the attacks of its diseases and this affects the quantity of gur.

1. Gurgaon District Gazetteer, Statistical Tables, 1935, Table 19, as updated by the office of the Commissioner, Ambala Division, Ambala.

### Of the new varieties, Co 1148 and Co 975 are grown in the trict.

**Cotton (Desi and American).**—Locally known as *kapas*, the cultivation of this fibre crop requires wet climate. Originally, cotton was one of the most impor *taples* in the district. It was mostly grown in the Ballabgarh, Pal: <u>A</u> and Firozpur Jhirka tahsils. The cotton of Firozpur Jhirka tahsil was esteemed as the best. On irrigated soil, the yield was about 6 maunds (2.24 quintals) per acre (0.405 hectare). On other soils, it varied from 3 to 5 maunds (1.12 to 1.87 quintals). The Agra Canal caused extension of the cultivation of early cotton. Only one type of cotton, namely Desi, was grown.<sup>1</sup> At the time of Second Regular Settlement in 1879-80, the total area under cotton was 75,312 acres (30,477 hectares) exclusive of the Ballabgarh tahsil. In 1914-15 it stood at 92,814 acres (37.561 hectares). Thereafter, there was a steady decline and in 1943-44, it was only 12,733 acres<sup>2</sup> (5,153 hectares).

The area under *desi* cotton further decreased from one thousand hectares in 1968-69 to 600 hectares in 1969-70. In 1972-73, it was only 862 hectares and it was 0.5 thousand hectares in 1976-77. The American cotton was introduced after Independence; but did not make any striking impact. The area under American cotton has varied from one thousand to two thousand hectares. Of the new varieties introduced, H-14 (American) and G-27 (Desi) are fairly popular. G-27 variety is more yielding and somewhat resistant to pests. The main producing areas are Ballabgarh, Faridabad, Palwal, Hathin, Hodal and Nuh blocks.

The phenomenal disappearance of a valuable cash crop from this district may primarily be attributed to the changes in the agro-climatic conditions due to which water table kept on rising and the salinity hazard increased. Pest and disease attacks also increased and adversely affected the quality of the crops. Finally, there was neither any market nor any ginning and pressing factory and resultantly, the farmers had to experience great hardships in selling their produce.

**Chillies.**—Locally known as *mirch*, it is cultivated throughout the district. It is becoming one of the most important cash crops of the district because of low investment and high yield. The sandy loam to loam soils with heavy dozes of humous and fertilizers are required for the successful

1. Gurgaon District Gazetteer, 1883-84, p. 81. Gurgaon District Gazetteer, 1910, pp. 95-96.

2. Gurgaon District Gazetteer, Statistical Tables, 1935, Table 19, as updated by the office of the Commissioner, Ambala Division, Ambala.

#### \* THOULTURE AND IRRIGATION

currentiation of this crop. It is grown under irrigated conditions both in kharif and rabi seasons. The seeds used are :

Old varieties Panipati, Tatiha and Patna

New high yielding varieties Sirhandi, Patna Red and N.P. 46-A

Sirhindi is heavy yielding variety with long thick fruit of red colour at maturity. This variety gives an average yield of about 100 quintals per hectare. Patna Red produces long red fruit and gives a yield of about 95 quintals per hectare. The fruit of N.P. 46-A is medium size red coloured with a yield of about 90 quintals per hectare. The area under this crop, as the following figures show, has been on the increase because chillies do not perish even after long storage and this is an item of daily use in every Indian kitchen :--

	Year	Area (Hectares)
	1966-67	468
	1967-68	706
	1968-69	482
	1969-70	543
$\label{eq:constraint} = \sum_{i=1}^{n} \sum_{m=1}^{n} \sum_{m$	1970-71	486
	1971-72	510
. ,	∫ 1972-73	850
	1973-74	952
(New district)	↓ { 1974-75	886
	1975-76	1,269
	1976-77	1,239

Consequent upon the increased cultivation of this crop and the introduction of numerous varieties, chillies are found in the market in green form almost throughout the year. The farmers have also taken up the cultivation of Capsicum popularly known as *Simla Mirch*.

**Potato.**—Potato, locally known as *alu*, is grown throughout the district. It is presumed to have been introduced in the district in the early twenties. But its cultivation was taken up after the initiation of the N.E.S. programme in Faridabad after Independence. The light loam soils with proper irrigational
facilities are ideal for its cultivation. High rate of humous and chemical fertilizers are also essential. The seeds used are :

Old varieties New high yielding varieties	Phalwa, Gola and Sufaida
	Kutri Chander Mukin, Kuhr Channer
	and Kufri Sinduri

Kufri Chander - Mukhi matures in about 90 days. The tuber has large size, smooth surface, white skin, flat eyes and white flesh. The average yield is about 100 quintals per acre (0.4 hectare). Kufri Chamatkar is a medium late variety and matures in about 110 days. Tubers are of medium size, round, white with deep eyes and pale yellow flesh. The yield is about 90 quintals per acre. It is resistant to viruses and rate of degeneration is very low. Its keeping quality is good. Kufri Sinduri is also a late variety, maturing in about 120 days. The average yield is about 120 quintals per acre (0.4 hectare) and the tubers are of pale yellow flesh. Consequent upon the increased cultivation of potatoes, 7 cold storages with a storage capacity of 3 lakh maunds (about 1,11,973 quintals) have sprung up in different parts of the district, viz. one each at Ajraunda,  $M_{a}$ , T, Fat hpur Chandila, Lakerpura, Meola Maharajpur (Faridabad block), Balla. fh (Jahabgarh block), and Gurgaon (Gurgaon block). It is noteworthy that the potato tubers for use as seed, are now exported to Patna (Bihar State) from where this district used to import this commodity in the past.

**Tobacco.**—Known as *tambaccu*, it is also cultivated throughout the district. Light soils are good for this crop. It is grown under irrigated conditions. The seed's used are :

Old varieties Desi and Calcutti

New high yielding varieties T-238 and T-17

The Central Excise on this crop acts as a check on further extension of its cultivation. Whatever is grown, is consumed in the State. There are two warehouses at Gurgaon which cater to the storage need of this commodity.

**Pea.**—Pea is locally known as *mattar*. The moist soil at the time of sowing suits this crop very much. The area under this crop was 8.5 thousand hectares in 1950-51, 13.15 thousand hectares in 1960-61; but 9.3 thousand hectares in 1970-71. It has varied as follows in the subsequent years :—

Year	Area (Hectares) 2
1	13,105
1972-73	8,459

1	2
1973-74	6,515
1974-75	6,483
1975-76	8,389_]
1976-77	7,757

The main producing areas are Palwal, Hodal and Punahana blocks. In addition to old varieties, the following four varieties have been introduced:

Early Badger.—An early, dwarf variety with wrinkled seeds. Pods are good sized. Yield is about 15 quintals per acre (0.405 hectare).

New line perfection.—A mid-season variety, having medium sized pods. Yield is about 25 quintals per acre (0.405 hectare).

**Bonneville.**—A mid-late variety. Pods are good sized with sweet grains. Its yield is about 25 quintals per acre (0.405 hectare).

Multi-Freezer.--M i-podded late variety, tolerant to frost, with very sweet tender pea Yield is about 25 quintals per acre (0.405 hectare).

Bonneville has become popular with the farmers.

Mehndi (Henna).—It is a rabi crop sown in the month of the March and April. It requires sandy loam soil and sub tropical climate. Frequent irrigation after 15 to 20 days is essential for this crop. The name of old seed used is Henna and no new variety has been introduced. It is grown in Faridabad block of the Ballabgarh tahsil and the area under this crop from 1965-66 onwards has been as follows :—

Year 1	Area (Hectares) 2
1965-66	1,515
1966-67	1,000
1967-68	1,008
1968-69	1,004
1969-70	1,008
1970-71	800
1971-72	325_

1	2
1972-73	575
1973-74	502
1974-75	539
1975-76	565
1976-77	374

Since most of the area specially meant for the cultivation of *mehndi* has been acquired for the needs of the Faridabad Township, the area under this crop has decreased considerably. *Mehr* " is exported to France, U.S.A. and Middle-East countries. The year-wir igness of export are as under :

Year	Export value
······································	(Rs. in lakhs)
1965-66	28
1966-67	29
1967-68	26
1968-69	31
1969-70	28
1970-71	30

#### FODDER CROPS

Eight per cent of the total cropped area of the district is under fodder crops. The stalks of bajra, jowar and maize and the chaff of wheat, gram and minor cereals are used as animal feed. The forage crops are sown in irrigated as well as un-irrigated areas and are grown during both kharif and rabi. The important and popular among fodder crops are gowar, peas, jowar and barseem. Of these, gowar and jowar are the leading crops and cover about ninety seven per cent of the forage crop area. When fed green, jowar is called chari and when harvested after ripening and turned into hay, it is called karb or kurbi. Table XIII of Appendix shows the area under different fodder crops in the reorganised district during the period 1972-73 to 1976-77. The area under gowar in the district has gradually decreased from 18,022 hectares in 1972-73 to 12,640 hectares in 1976-77. The area under peas has increased from 2,436 hectares in 1972-73 to 4,000 hectares in 1976-77. Under oats, the area has decreased from 267 hectares in 1972-73 to 150 hectares in 1976-77 and under barseem also, the area has decreased from 560 hectares in 1972-73 to 140 hectares in 1976-77. There is no substantial change in the area of jowar.

Π

### PASTURES

An area of about 3,157 hectares was under permanent pastures and grazing lands during 1950-51. It increased to 8,424 hectares in 1955-56 and 10.147 hectares in 1960-61. It was 10,169 hectares in 1965-66.

During the consolidation operations, pastures and grazing lands were reserved in every village according t the pr visions of the Consolidation of Holdings Act, 1948. The consol: on work was completed in all the villages of the Gurgaon district in 1965-66 and as such there was no increase in the area of pastures and grazing lands afterwards. The area in the re-organised district is 9,795 hectares.

### FRUITS

Fruits form an essential part of human diet, as they contain natural elements like proteins, starch, minerals and vitamins. Against the per capita daily requirements of 3 to 4 ozs. of fruits, Haryana produces only 1.5 ozs. and the Gurgaon district 1.45 ozs. Of 12,000 hectares under fruit cultivation in the State, Gurgaon has only about 171 hectares.

Fruit cultivation ceased to be a hobby of a few affluent persons after Independence. It then began to attract the attention of Government which took steps to provide facilities under the Five-Year Plans to those who took to fruit cultivation. To intensify the production of fruits, the State Government introduced a number of schemes such as Applied Nutrition Programme, Intensive Cultivation of Grape Vine and Garden and Nursery Production Work. The results have been encouraging. The area under fruit cultivation has increased by 33 per cent. There is no garden colony, but there are 10 model gardens, mostly of grapes, in villages Bhorakalan, Dundahera, Garhi, Harsaru and Mulahera (tahsil Gurgaon) and at Ballabgarh, Palwal and Pataudi. While the owners of the old gardens are not keen to run these on a commercial basis, the new gardens have come up as business concerns.

Lift irrigation supplies water to many gardens though canal water is used in the Ballabgarh and Palwal tansils.

The two private nurseries, Jogindra Nursery in Faridabad and New Rajoria Nursery in Gurgaon, find it not possible to meet the fruit plants requirement of the district.

The table below shows the fruits grown in the district, their average

yield per tree and average gross income per hectare :

Fruits	Average yield per tree (Vine in the case of grapes) –	Average gross in- come per Hectare
	(Kil ram)	(Rs.)
Grapes		40,000
Mangoes	100	10,000
Rem	120	7,500
ber Malta	50	6,000
Malta	50	7,500
Kagnzi Lime	20	10.000
Papaya	20	7.000
Peach	50	10,000
Falsa	10	10,000
Pomegranate	25	6,000
Guava	75	7,500

Gardens and nurseries.—There is no Government garden or nursery in the district. Of the two approved private nurseries, named already, one is located at Faridabad and the other at Gurgaon. Numerous varieties of decorative plants, shrubs, ornamental trees and flower and fruit plants are available at these nurseries. The people of the district also supplement their requirements of fruit and ornamental plants from the Government nurseries located at Pinjore, (district Ambala), Hansi (district Hisar), Sirsa and Jind. For the benefit of the growers, the Horticultural Division of the Haryana Agricultural University has, since 1971, set up a garden-cum-progeny nursery called the Agricultural Research Sub-Station at Sohna Road, Gurgaon.

#### VEGETABLES

With the increase of irrigation facilities, the cultivation of vegetables has increased considerably. The increase is notable particularly in or around the towns and adjoining villages as marketing facilities are easily available. The eating habits of the people in the villages are also changing and vegetables are becoming an important part of the diet. Consequently, a majority of farmers in villages having water enough for irrigation have started glowing vegetables not only to meet their own requirements, but also to make some additional money out of it. The increase in production of vegetables in the district is borne out by the fact that at present large quantitites of vegetables are being daily exported to Delhi from Gurgaon, Sohna, Faridabad, Palwal, Ballabgarh and other towns after meeting the local requirements.

According to their growing season, the vegetables are divided into two main groups, i.e. (i) Summer vegetables (ii) Winter vegetables. Summer vegetables include tar or kakri, kharbooza., tarbooz, ghia, kaddoo, tori, pe'a, tinda, karela, brinjal, tomato, bhindi, different types of saag and sweet potato. Winter vegetables include a wide range ables such as (a) root crops like radish, turnip, carrot; (b) leafy cole crop., take palak, methi and sarson ka sag (c) cole fruit crops like cauliflower, cabbage, knol khol, etc. Recent researches carried in the improvement of vegetables by the Indian Council of Agricultural Research, New Delhi and the Haryana Agricultural University, Hisar have introduced many new varieties which not only give higher yield over the old types but have also improved their quality and nutritive value. Seeds of all varieties of vegetables are produced and multiplied at the Haryana Agricultural University Vegetable Seed Farm, Gurgaon. Some of the seeds are also supplied from the Government Vegetable Farm, Gharaunda (district Karnal).

Kitchen gardening.—The State aided programme of kitchen gardening was taken up in the district in 1971, and it covers Gurgaon, Faridabad and Ballabgarh blocks. About 3,000 kitchen gardens in urban houses and educational institutions had been set up by the end of March 1972. Seeds and technical guidance in respect of planting and aftercare are given by the field staff.

**Fruit preservation.**—A short course on fruit preservation is some times. organised by the Central Food Technological Research Institute or the Herticultural Division of the Indian Agricultural Research Institute, New Delhi, for the benefit of the housewives. One such course was organised by the rmer Training Centre, Gurgaon, for five days in 1971 under the Women Framers Training and Education Programme. A team of specialists from the Horticultural Division of the Indian Agricultural Research Institute, New Delhi, also participated. About 100 ladies took advantage of this course.

Applied Nutrition Programme.—This programme was initiated in the Gurgaon district during 1965 under a Centrally sponsored scheme. It aims at making the villagers conscious of the necessity of taking balanced and nutritive food as their diet. This is being advocated through practical means. To start with, only two blocks, viz. Ballabgarh and Sohna, were selected but in 1971 this programme was extended to two more blocks namely, Firozpur Jhirka and Gurgaon. In each of these blocks, about ten villages have been selected for this programme. Ten kitchen gardens, one community garden and one school garden have been set up in each of these villages. Vegetable seeds, fruit plants and garden tools have been provided free of cost to the owners of the gardens. Technical advice about the cultivation of fruits and vegetables is given regularly.

Fa

Rotation of crops.—The cultivators of the district have been aware of the advantages of crop rotation. The general rotation of crops followed by the farmers in canal irrigated, well irrigated and *barani* areas is as follows :—

(i) Canal irrigated areas

Sugarcane-cotton-wheat Bajra-wheat-moong baisakhi Bajra-wheat Maize-potato-wheat Maize-potato-wheat-moong baisakhi

(ii) Well irrigated areas

Bajra-wheat Paddy-wheat

Maize-potato

Maize-wheat-moong baisakhi

Bajra-pea

Bajra-berseem

(iii) Barani areas Bajra-gram Bajra-barley Gowar-barley Bajra-wheat Gowar-wheat Bajra-rape and mustard

PROMOTION OF SCIENTIFIC AGRICULTURE THROUGH Administrative Machinery

F Apart from land and irrigation, agricultural operations depend on Ę, other resources which must be scientifically exploited to achieve higher ; ٦ Even for a number of years after Independence, the Indian cultivator ren ed tradition-bound in spite of Community Development Programme. ( dually, agriculture assumed national importance, as India, like other countr could not hope to feed its growing millions without developing the means produce enough food for all her people. Scientific agriculture requires knowledge of various kinds based on the application of fundamental research to local conditions. It is becoming more and more the responsibility of the State to make this knowledge available, to encourage its understanding and to provide financial and other facilities to cultivators who are getting keener to use scientific methods in their cultivation. Any notable achievement in this direction on the part of Government as well as the cultivators is bound to be revolutionary in character. It was not, therefore, at all surprising that the State became involved on many fronts in an effort to improve all the factors

of scientific agriculture. It began to spend large sums of money to achieve self-sufficiency in food production so that India may not have to go on buying large quantities of food from other countries.

This effort on the part of Government can be studied usefully if we first keep in view the nature of the administrative machinery which has grown over the years.

An office of the Agriculture Department in the district was set up as early as 1929, under the supervision and control of a District Agriculture Officer. Since 1967, it has been functioning under the charge of a Deputy Director of Agriculture. He is assisted by a District Agriculture Officer (District Work), 4 Sub-Divisional Agriculture Officers (High Yielding Variety Programme), 24 Agriculture Inspectors (High Yielding Variety Programme), 11 Agriculture Inspectors (District Work), 7 Agriculture Inspectors (Oil-seed), 20 Agriculture Inspectors (Intensificient of Agriculture Production), 3 Farm Managers (Fertilizer Scheme), 11 Agriculture Sub-Inspectors (District Work) and 7 Agriculture Sub-Inspectors (Oil-seed).

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 patterns suited to their conditions. These also comprise preparation of crop plans, control of various pests and diseases affecting agricultural crops and gardens, use of fertilizers and good seeds, and laying out of demonstration practices recommended for the district. The Agricultural Inspectors impart training and education to the farmers in their respective areas on matters relating to improve techniques resulting in better management for getting more production, use of improved seeds, manures and fertilizers, improved agricultural implements, plant production, horticulture and other agricultral practices.

The Agriculture Extension Agency gives a great push to scientific agriculture through the package field demonstration on a large scale. The demonstrations are laid on the fields by the farmers themselves with the scientific knowledge provided by the Government experts. When the results of field demonstration are found to be of marked improvement, Kisan Melas are held on such fields where all the package operations are explained to the farmers. Seminars are also held in these Melas and discussions amongst the farmers on various improved agricultural practices are held where the Extension Specialists and the Extension Officers remove such doubts as the farmers may have, With the evolution of high yielding varieties the results have been convincing \_ and widespread.

The administrative machinery not only provides knowledge and practical demonstration but also administers financial and other help under various heads as provided by the State. Let us now review in some detail the position in respect of the various factors of scientific agriculture.

### SEEDS

Good seed is the basis of successful agriculture. The Agriculture Department rightly pays much attention to ensure the multiplication and supply of seeds of improved varieties. It also gives wide publicity in favour of improved seeds. Eleven seed farms were set up in the district ir different blocks between 1958 and 1961 to meet the growing demand for improved and better varieties of 'seeds. The reorganised district has eight of these farms. On an average each seed farm, except the seed farms at Daulatpur and Pinangwan, covers an area of about ten acres (4 hectares). The area of the farm at Daulatpur is about 18 hectares and of the one at Pinangwan is about 22 hectares. Seeds of wheat, gram, barley, bajra and sarson are multiplied at these farms depending upon agroclimatic factors. In fact all the improved agricultural practices are being followed at these farms which are also serving as demonstration centres. Relevant details of these farms are given in Table XIV f Appendix. The better yielding varieties of seeds recommended for the district have already been mentioned while discussing individual crops.

In 1929, a 100-acre Government Agriculture Demonstration Farm was set up at Gurgaon on the Delhi-Alwar Road, at a distance of about  $1_{\frac{1}{2}}$  kilc metres from the district courts. Research work on oil-seeds, wheat, barley, *bajra*, tobacco and millets was being carried on at the Barley Research Centre located at the farm. It has since been shifted to Bawal in the Rewari tahsil. The following types of promising strains and varieties have been evolved and tried in the fields on a large scale :—

C—302 Strain of Tabacco (Nicotiana)

Brown Sarson Gurgaon I

Brown Sarson Gurgaon II

Raya Gurgaon

The farm has been under the charge of the Haryana Agricultural University, which has since set up Vegetable and Fruits Research Sub-Stations, each covering an area of 8 hectares. The University had also set up a Farmers Training Centre with a hostel with aid from the Government of India since

I

December 1968. A Krishi Gyan Kendra has also been constructed to serve as an advisory centre for the farmers. The remaining area has been transferred for the construction of the Mini-Secretariat at Gurgaon.

The district is notified under the East Punjab Seeds and Seedlings Act, 1949, under which it is an offence to sow varieties of seeds, particularly of wheat and cotton, other than those on the approved list of the State Agriculture Department. The defaulters are liable to a fine which may extend up to Rs. 500.

The quantities of improved seeds distributed by the Agriculture Department in the district and the area under the same from 1966-67 onwards are as shown below :

	Year	Agricultural Seeds distributed	Area under improved varieties
	· · · · · · · · · · · · · · · · · · ·	(Metric tonnes)	(Hectares)
and a second	1966-67	12	1,200
	1967-68	111	16,000
an <sup>™</sup> in the second se	1968-69	97	48,000
	1969-70	108	81,000 .
	1970-71	285	1,35,000
	1971-72	187	1,22,000
	r 1972-73	198.7	1,20,000
	1973-74	125.60	1,59,357
(New district)	1974-75	176.30	1,83,823
	1975-76	248.10	1,90,685
	1976-77	531.91	1,86,666

Since in the beginning, the farmers were not aware of the benefits which could accrue from the use of improved varieties of seeds, the demand and consequently the distribution were insignificant. As the farmers got enlightened about more yield, larger quantities of seeds were distributed year after year. By now, the farmers have enough of the improved seeds produced on their own fields.

Farmers Training Centre, Gurgaon.—The Farmers Training Centre, Gurgaon, covering the whole of the district, was started in December 1968 as one of the five centres provided to Haryana State by the Government of India, which bore the entire expenditure of this scheme. The training is classified under two general headings : (a) Institutional and (b) Non-Institutional,

**Institutional training.**—The institutional type of training is carried out in the form of short specialised courses at suitable places where physical facilities and expertise exist, such as Government farms, research stations, agricultural colleges and training centres. The short duration institutional training of farmers has been an important component of farmers' training and caters to the needs of farmers who would like to have higher knowledge and skills in certain specialised areas such as fertilizers, machinery, water use, plant protection, farm management, storage, etc. Ten such specialised courses of 5 days duration are held in a year and are attended by 25 farmers interested in acquiring advanced knowledge.

Recent advances in agriculture have opened up new vistas for the farm women to acquire larger responsibilities especially in relation to storage, seed selection, method of cooking, high yielding varieties and preparation of nutritional diet from cereals, pulses and horticultural products. Training of farm women as, therefore, become very important. In this scheme separate training courses, 10 in number, are organised either at the Farmers Training Centre or in the field. The training is taken care of by the woman officer provided as a member of the peripatetic team in the scheme.

Specialised courses for the men and women conveners of farmers discussion groups commonly known as *charcha mandals* are also organised under the farmers training and education programme. The courses for conveners include special areas such as development of leadership qualities, procedures for obtaining credit, fertilizers, pesticides and spare parts and procedures governing the use of irrigation water, electricity and related matters.

Every year 25 courses on an average are organised for farmers and farm women at the Farmers Training Centre. Thus the institutional training programme in a year covers 625 participants, each course having a strength of 25 participants. Out of 25 courses, 5 courses are for men and women conveners of the Farmers Discussion Programme. Thus training is provided to 500 participants in special fields and to 125 conveners of the Farmers Discussion Programme. These courses are properly supported by audio-visual aids and radio.

Non-Institutional training.—It is conducted with the help of a peripatetic team of the Farmers Training Centre. The programme includes short production-cum-training camps at the points (farms) of demonstration to educate the farmers on high yielding varieties, film shows, film strips, etc.

In the training camps organised for farm women, stress is laid on the

importance of agricultural production, consumer education on the high yielding varieties of cereals and domestic storage of grains.

These training camps are attended by neighbouring farmers participating in production programme, e.g. H.V.P. multiple cropping and any other important agricultural effort. Audio visual van provided in the scheme is used by the team for carrying crop specimens, samples of inputs, posters, leaflets and other training materials. The team also provides guidance to the participants of the training camp on high yielding varieties, answers questions and gives instructive material, all with a view to supporting the demonstration and ensuring that the instruction given is followed up. About 100 such training camps are organised in a year.

**Farmers Discussion Groups.**—Organisation of farmers discussion groups popularly known as *charcha mandals* forms another very important act. ity of th. scheme. There are 300 such groups in the district. These are closely linked with the demonstrations carried out in the district by the specialists and serve as a forum for exchange of views and experience on these demonstrations and also for thrashing out field problems faced by the farmers in adopting improved practices demonstrated. These groups are fully equipped with material such as listening sets, bulletins on farmers' training, literature on high yielding varieties programme, audio-visual aids and preaddressed envelops along with stationery and postage for correspondence.

The convener of the group leader has to arrange a discussion on farm broadcast made by the All India Radio. The group discusses the content of the broadcast in relation to their own field experiences. The problems that emerge from these discussions, the convener brings these to the notice of the specialists through the Radio Contact Officer, who in turn seeks the solutions and arranges for answers to be broadcast.

To make the discussion effective, the membership of the discussion group is limited to 20 farmers. Separate discussion groups are formed for farm men and farm women.

**Conducted tours of farmers.**—In the present situation, where majority of the farmers are not literate, conducted tours to agricultural research stations, universities, experimental farms and the farms of progressive farmers have a special significance for purposes of adoption of recommended technology. Such planned visits by the farmers make their training more effective through education and exchange of experience.

Information support.—The All India Radio plays a key role in farmers training and education programme. The Radio Contact Officer, provided at

the centre, is responsible for collecting information about the high yielding varieties programme from all the relevant sources at the district level and passing them to the farmers through radio broadcasts. He also receives information relating to farmers' problems from the conveners of discussion groups and secures solutions for them from the specialist concerned and arranges broadcasts. The field demonstrations provide the basic information for every broadcast. The All India Radio, in order to meet the requirements of farm information, has set up Farm and Home Units to cover the district in the high yielding varieties area. The Delhi TV's Krishi Darshan programme plays a significant role by its comprehensive and topical coverage of items of special interest and utility for the farmers.

Training courses in agriculture for the pre-released personnel from service.—With a view to imparting training in scientific agriculture to those personnel from services who are to be released shortly and likely to settle on the land after retirement, courses are organised for them at the Farmers' Training Centre so that they may take up farming in a right way as a profit-earning business. This training was taken up at this centre during 1973-74 on the suggestion of the Ressettlement Wing of the Ministry of Defence, Government of India and selected persons from the three services are sent to this centre for training for a period of 2 months. During 1973-74 three such courses were arranged and 100 persons were trained.

#### MANURES AND FERTILIZERS

Crops consume various plant nutrients in substantial quantities from the soil during the course of growth. The continued depletion of plant food elements from the soil leads to low soil fertility and lower agricultural yields. It is, therefore, essential that besides irrigation facilities and the improved varieties of seeds, plant nutrients are replenished through the increased use of manures and fertilizers so that the soil is kept at a high level of fertility and crops continue to give good yields. In recent years, the consumption of manures and fertilizers has increased considerably. Before Independence, hardly any quantity of chemical fertilizers was used in the district. The people were under the erroneous belief that chemical fertilizers adversely affected the crops and spoiled the land. Even the night-soil and other urban wastes were neglected about 20 years ago, as the people did not like to use them due to special prejudices. But the picture is different now. The laying of demonstration plots at various places has removed their prejudices and the cultivators have realised the benefits of manures and fertilizers.

(i) Green-manuring.—As green-manuring with leguminous crc ps adds

to the fertility of the soil, it has been found to be the cheapest among all kinds of manuring practices. Chemical fertilizers give very good results when the fields have in them sufficiently high amounts of organic matter supplied by green-manuring. It is an important practice which increases soil fertility by direct addition of nitrogen and improve soil texture by addition of humps or organic matter. The addition of organic matter improves both heavy and sandy soils for it has a binding effect on the loose particles of sandy soil and makes the tough and heavy soil less heavy. The water-holding capacity of the soil is also increased. Further, it creates better conditions for the increase of useful bacteria in the soil. Green-manuring is very useful from the production point of view, but shortage of irrigation facilities in the district and low rainfall greatly limit its use. It has not been possible for the cultivators of the district to adopt green-manuring because of adverse weather conditions. The Government, however, encourages the adoption of green-manuring by the cultivators in areas where it can be adopted with chances of reasonable success. It distributes free seed packets of dhaincha, grants subsidv at the rate of 6.25 per cent per hectare for the area green manured and also grants remission of water rate, if crops are buried in the soil before the 15th September. Apart from dhaincha, gowar and sani are also used for greenmanuring.

The following table indicating area under green-manuring crops during 1960-61 to 1976-77 shows that the cultivators are realising the usefulness of green-manuring :---

	Year	Area under green-manuring
	1	2
•		(Hectares)
	1960-61	3,658
•	1961-62	3,303
	1962-63	1 9,093
	1963-64	10,228
	1964-65	8,608
	1965-66	13,249
	1966-67	13,464

	<b>1</b>	2	
ĸ	1967-68	14,326	
	1968-69	16,349	
	1969-71	14,244	
	1970-71	19,544	
	1971-72	18,356	
	r 1972-73	16,643	
,	1973-74	6,000	
New district)	1974-75	6,500	
	1975-76	6,900	
	1976-77	7,700	

(ii) Chemical fertilizers.—The soils in the district are alkaline in nature and are deficient in organic matter, nitrogen and phospherus. So apart from green-manuring, chemical fertilizers are indispensable for increasing crop yields quickly and these are used in combination with organic manures.

As a result of a large number of village demonstrations, the cultivators have started using chemical fertilizers in increasing quantities.

Previously the District Wholesale Cooperative Marketing and Supply Society received and distributed fertilizers to their depct-holders on cash as well as on credit. The State Government provided *taccavi* to the farmers for the purchase of chemical fertilizers from these depots whose number in 1970-71 was 187. Later on, this *taccavi* system was stopped and crop loan system introduced. It is working quite effectively. Under this system, short term loans are being advanced by the Central Cooperative Bank to the members of the Cooperative Societies, for the purpose of purchasing fertilizers.

Now the Haryana Cooperative Supply and Marketing Federation arranges supplies of fertilizers to the Cooperative Supply and Marketing Societies in the district. These societies are located at Gurgaon, Sohna, Pataudi, Nuh, Taoru, Firozpur Jhirka, Palwal and Ballabgarh and have branches at the block level and sub-depots at the village level.

The number of fertilizer depots opened by each society fell from 10 during 1973-74 to 5 during 1974-75, as the financial position of these societies was not sound and fertilizers could not be purchased on cash payment basis,

In addition to the 39 societies depots, in 1975-76, there were 38 private depots which sold fertilizers on cash payment.

The following table shows the distribution of chemical fertilizers since 1960-61 :--

	Year	Nitrogenous (in term of Ammonium Sulphate)	Phosphatic (in term of Super Phosphate)	Potash (in term of Muriate of Potash)	Total
-	1960-61	734	27	<u> </u>	761
	1961-62	1,101	6		1,107
	1962-63	3,381	115		3,496
	1963-64	4,020	112		4,132
	1964-65	7,155	200	<u></u>	7,355
	1965-66	7,240	225	<u> </u>	7,465
•	1966-67	10,742	747	20	11,509
	1967-68	17,967	945	78	18,990
	1968-69	15,611	2,386	166	18,163
	1969-70	17,977	1,338	219	19,534
	1970-71	22,030	3;440	316	25,786
	1971-72	33,077	3,153	443	36,673
	r 1972-73	6,000	600	350	6,950
	1973-74	5,543	650	280	6,473
(NTorre district)	1974-75	5 3,490	215	95	3,800
(mew district)	1975-76	5 3,863	375	89	4,327
•	1076-7	7 6 380	698	261	7,339

(iii) Compost manure.—Also called farmyard manure or cattle dung manure, it is an all-round good manure to maintain and improve soil fertility. However, the farmyard manure commonly used by the cultivators is poor

205

(Metric tonnes)

both in quality and quantity. This is largely due to faulty method of its preparation and incomplete utilisation of the useful ingredients contained in cattle dung. In the context of emphasis on high yielding varieties programme, it has been inevitable that larger quantities of good quality manure are produced in villages and the Department of Agriculture is making all efforts in this respect. For this reason, the entire district has been notified under the East Punjab Conservation of Manure Act, 1949, whereunder the farmers are required to conserve the cattle dung and other negative wastes in pits of proper dimensions for making the compost.

As already stated, the soil of the district is composed of all types ranging from sandy to clayey. Addition of compost is useful for all the types. In sandy soil, the compost is useful in keeping together the soil particles and in clayey soil humus material is absolutely essential to improve the soil texture. With the increase of irrigation facilities and the adoption of the multiple cropping programme, the use of compost has assumed a special significance. Whatever compost is prepared in the district is used in agriculture especially for vegetables, sugarcane, cotton, and better yielding varieties of other crops. The district on the south and south-west is touched by Rajasthan and from that State numerous herds of cattle come every season in search of fodder and water. The farmers in the Firozpur Jhirka tahsil utilise the urine and dung of these herds on their fields on payment.

To popularise compost manure several incentives are given by the State Government. The total quantity of rural compost prepared during the period 1960-61 to 1976-77 is given below :

Year 1	Compost prepared 2	
1960-61	(Metric tonnes) 8,50,000	
1961-62	8,90,000	
1962-63	9,50,000	
1963-64	_9,80,000	
1964-65	10,00,000	
1965-66	10,20,000	
1966-67	10,40,000	
1967-68	22,60,000	

•	1	4
	1968-69	12,40,000
	1969-70	15,40,000
	1970-71	16,30,000
. л	1971-72	21,60,000
ſ	1972-73	26,40,000
	1973-74	3,31,988
(New district)	1974-75	3,38,106
	1975-76	3,65,801
	1976-77	3,51,971

In spite of incentives for compost-making, cattle dung is used as fuel in the form of dung cakes. With a view to meeting the farmers' need for fuel, Gobar Gas Plant Project has been initiated. The cattle dung thus can be utilised to supply gas for cooking purposes as also for compost. This project started a decade ago, by the Khadi Board, did not make headway and only 12 plants were established. The State Government has now taken up this project with a target of 500 plants for the district. Twentyfive per cent subsidy is given for a plant under this project.

The Faridabad Complex and the Municipal Committees of Gurgaon; Palwal, Hodal, Nuh, Firozpur Jhirka and Sohna prepare compost under the supervision of Sanitary Inspectors. These inspectors are trained by the State Biochemist in the preparation of compost. The State Government advances loan to the municipal committees for the purchase of tractors, trollies and other carriers on the recommendations of the State Agriculture Department. The compost so prepared is owned and disposed of by the municipal committees. The total quantity of urban com-post prepared during the period 1960-61 to 1976-77 is given below :

	Year 1	Production 2					
• •		(Metric tonnes)					
,	1960-61	35,000					
	1961-62	37,000					

	<u>i</u>	2
	1962-63	40,000
	1963-64	45,000
· · ·	1964-65	48,000
· ·	1965-66	52,000
	1966-67	58,000
•	1967-68	62,000
	1968-69	65,000
	1969-70	74,000
	1970-71	79,200
	1971-72	81,300
	۲ 1972-73	84,400
	1973-74	3,12,116
(New district)	1974-75	3,18,122
	1975-76	3,46,504
	1976-77	2,99,871

## AGRICULTURAL PESTS AND DISEASES

Crops are occasionally exposed to damage from an immense variety of pests and diseases. These attack the standing crops and stored grains with varying intensity. Suitable control operations against the attack of pests and diseases of cereals, fruits, vegetables and stored grains are, therefore, necessary for the successful raising of farm crops. The Agriculture Department is propagating different control measures to check these causes of damage to the crops. Under the East Punjab Agricultural Pests, Diseases and Noxious Weeds Act, 1949, as applicable to Haryana cultivators who do not eradicate weeds, pests and diseases before the maturing of seeds, are liable for legal action.

Most important and common pests and diseases occurring in the district, as elsewhere, are detailed in Table XV of Appendix. Apart from this, agriculture is subject to heavy damage caused by hail storms and floods. Table XVI of Appendix gives details about the damage done in the district, through different agencies during 1960-61 to 1976-77.

## AGRICULTURAL IMPLEMENTS

Any improvement in agriculture is inconceivable without a corresponding improvement in the implements used. Modern implements are being gradually adopted by the farmers in accordance with their utility and scope for use. These are popularised by the Government through different schemes. The agricultural implements used in the district are given below :

## Old type implements

Hal (Plough)

Maij or Sohaga (flat cold-crusher)

Dranti (sickle)

Kohari (hatchet)

Gori (leveller)

Kasoli (smaller mattock for weeding and heoing)

Jeli (four-pronged fork)

Gharaunchi (stand for oiling card)

- Baguri (small khurpa like implement used for the hoeing of sugarcane at the time of the first and the second hoeing)
- Datrali (used for wat bandi in the irrigated areas)
- Rahat (persian wheel used where water table is not low)

Gadi (cart)

Unt gadi (camel cart)

Phala (large mattock spade)

Jua (yoke)

Kolhu (round cold -crusher)

- Gandasi (long handled chopper used for cutting sugarcane, cotton sticks and bushes)
- Dikri (drag rake dragged by men for levelling high land)

Kasola (large mattock for weeding and hoeing)

Chhaj (winnowing basket)

Belan (hand ginning mill, also sugar-press)

Orna (seed drilling tube)

Gandasa (hand fodder cutter)

Tipaya (stand for winnowing)

Kutti-ki-machine (chaff-cutter)

Kassi (spade) Kolhari or lod (store roller)

Khurpa (grass spade)

Garhi-ki-machine (wheat thrasher) Rehru (small cart) Behli (bullock cart) Rath (chariot)

Damcha (watchman's controlling station)

Gopia (bird scarer)

Tat (bird scarer)

Gulail (bird scarer)

Dhainkli (appliance for manual water-lifting suitable for small holdings)

Charsa (leather bucket)

Thela (four wheeler bullock cart)

Bijoudi (seed bag)

Gandola or Khodna (digging tool)

Santa (ox goad)

Kuthla (seed storage)

Kothi (indigenious bins)

## Modern implements

Anaj nikalney wali machine (power thrasher)

Tubewell

Pumping set

Tractor

Harrow

Cultivator

Nalai gudai wala hal (hoes) Trolly

Beej-aur-khad-boney-ki-machine (fertilizer-cum-seed-drill) Triphali (three tined cultivator) Panch datta (five tined cultivator) Kapas boney wala hal (cotton drill) Tar-davai-ki-machine (sprayer) Sooki-davai-ki-machine (duster) Mitti Palatney wala hal (soil inverting plough)

The old types of simple implements are in use due to their low initial cost, simple construction, easy availability and also for the reason that some of them can be use\_\_\_\_or multifarious agricultural operations and these cannot be dispensed with. The description of agricultural implement in common use is given below:

**Plough.**—It consists of three major parts the beam (*halas*) wooden body (*hal*) and the coulter (*panhiari* and *kuis*). It may be of wood or iron but one in common use is generally of *kikar* wood, made by the village carpenter. It merely scratches the soil up to 4 to 5 inches and does not really serve the purpose of a plough. The chief defect in it lies in the fact that it leaves ridged of unploughed land between the V-Shaped furrows which it makes. The plough also fails to eradicate weeds properly. However, a sturdy and intelligent farmer makes full and efficient use of the plough with a string pair of even. Still in the small land-holdings and fragmented and non-contiguous plots the plough is very much suited and it does not disturb the level of the land.

In 1951 there were 35, 760 wooden ploughs in use in the Gurgaon district. The number rose to 42,270 in 1961; but decreased to 38,210 in 1965, owing to an increasing use of iron ploughs by the farmers. The number of iron ploughs consquently increased from 205 in 1951, to 4,062 in 1961 and 5,880 in 1965. However, the wooden plough still held the field, being cheaper. Its number rose to 95,885 in 1970 and 99,354 in 1972. But the iron plough is changing the outlook of the local farmers. Its number was 6,270 in 1970 and 11,658 in 1972. The number of wooden ploughs decreased to 73,833 in 1976 and iron ploughs to 10,203.

**Tractor,**—The use of tractor is limited to a few big farms. The number of tractors in use increased from 115 in 1951 to 740 in 1961, 972 in 1965, 1,416 in 1970 and 1,874 in 1972.

**Bullock-cart.**—This is the usual load carrying device of the farmer. It is commonly used for carrying the farm produce to the thrashing ground, grains to the homestead and surplus, if any, to the market and for all other transportation needs. The carts are manufactured locally. Different types of carts are in vogue in different tracks of the district in consonance with the topography. Wooden as well as iron wheels are used. But the use of inflated rubber tyre wheels is gaining popularity. There were 27,512 carts in the district in 1951, 32,810 in 1961, 35,775 in 1965, 48,810 in 1970 and 42,433 in 1972. This was indicative still of the popularity and indispensability of the bulkock-carts with the not-too-rich farmers who were in majority and could not afford to replace bullock-carts by auto-vehicles. However, decrease in the number of carts to 34,833 in 1976, shows a change in the trend in favour of the tractors ard trollies.

**Cane-crusher.**—It is another important agricultural implement used, mostly on co-operative basis, for crushing the cane. Wooden crushe's, in vogue sometime back, have mostly been discarded and those of steel have taken their place. There were 1,720 cane-crushers in 1951, 1,725 in 1961, 1,820 in 1965 and 1,920 in 1970. In 1972, the number was 1,468 and it further decrue of to 1,212 in 1976.

Although the scope of mechanised farming is limited because of the small land-holdings, modern implements are being gradually adopted by the farmers. Scarcity of labour and improved economic conditions of the cultivators have accelerated this process. The following comparative study for the years 1951, 1961, 1965, 1970 and 1972 to 1976 is revealing :--

	1951	1961	1965	1970	1972	1973	1974	1975	1976	
1. Plough					,			·		-
(i) Wooden	35,760	42,272	38,210	95,885	99,354	94,350	90,680	74,991	73,833	
(ii) Iron	205	4,062	5,880	6,270	11,668	10,990	10,685	10,311	10,203	
2. Tractors	115	740	972	1,146	1,874	••	••	••	••	
3. Carts	27,512	32,810	35,775	48,810	42,443	36,890	36,180	35,220	34,833	
4. Sugarcane crushers	1,720	1,725	1,820	1 <b>,9</b> 20	1,468	1,468	1,350	1,275	1,212	
·		~								

Particulars

Number

### TRACTOR TRAINING CENTRE

> (i) To impart training to farmers in the working, handling, maintenance and ordinary repairs of tractors and other allied farm machinery.

(ii) Registration of agricultural implements manufactured in the State.

(iii) Distribution of raw material to fabricators in the State.

- (iv) Quality marking of agricultural implements.
- (v) Advise farmers regarding machines and agricultural implements.
- (vi) To regulate the distribution of tractors to the farmers under the Tractors Control Act.

As part of the Scheme, a Tractors Training Centre was set up at Gurgaon. It gives training to the young farmers of the Gurgaon and Mahendragarh districts in the following :---

(i) Driving and operation of tractors.

(ii) Use of Agricultural machinery.

(iii) Repair and maintenance of tractors and implements.

(iv) Use of pesticides and insecticides on crcps by mechanical means.

In June 1971, the first batch of fourteen trainees was admitted for training which was of two months duration. The total number of trainees trained till the end of 1976-77 is as follows :--

Year	Trainees
1971-72	74
1972-73	75
1973-74	75
1974-75	. 77
1975-76	62
1976-77	76

## SOIL AND WATER TESTING SERVICE

Soil and Water Testing Service was started in the Gurgaon district during 1969-70. Its object was to check the increasing menace of alkalinity and salinity hazard in the district, carry out soil samples and give necessary advice about application of suitable fertilizers, etc., on the basis of soil tests. The service is provided through a net-work of five laboratories located at Gurgaon, Palwal, Ballabgarh, Nuh and Firozpur Jhirka. The laboratory at Gurgaon was established in 1969-70. The Ballabgarh and Palwal laboratories wera

set up in 1971-72. The Nuh laboratory started functioning in January 1975 and the Firozpur Jhirka laboratory in 1975-76. Each laboratory is under the charge of an Assistant Soil Testing Officer who is assisted by 5 Junior Scientific Assistants and 5 Laboratory Attendants. There is a target of testing 10,000 samples for each laboratory. This has already been achieved by the Gurgaon laboratory. The service also provided a mobile soil testing unit to help the farmers in the field itself. This unit also worked under an Assistant Soil Testing Officer and took help from the nearest laboratory in carrying out the tests. The unit was shifted to Karnal in 1974 after completing its target of testing 10,000 samples.

The service provides valuable advice to the farmers of the district regarding the quality of ground water. They are made aware of the harmful and hazardous elements in the irrigation waters. In some pockets of the district, the problem of salt due to intermittent use of brackish water has taken an alarming position and the farmers are feeling perturbed on this account. The tests carried out by the laboratories have considerably helped them to under tand the prblem and take steps to check this menace.

## STATE ASSISTANCE TO AGRICULTURISTS

Prior to Independence, loans were regularly given to the agriculturists in the Gurgaon district and erstwhile Pataudi State under the Land Improvement Act and the Agriculturists Loans Act respectively for wells, seeds, and bullocks. Money was advanced for seed at the beginning of the *rabi* season for sowing irrigated and flooded lands cn which the seed was certain to germinate and advances were not made for bullocks unless there was a reasonable probability of the owner being able to maintain them. In times of drought, advances were made for the purchase of fodder.

After Independence, the scope of loans, etc., was considerably widened to cover purchase of fertilizers, tractors, development of horticulture, installation of pumping sets, tubewells, etc. The loans thus advanced during the period 1961-62 to 1976-77 are shown in Table XVII of Appendix. A number of other semi-Government agencies like corporations and banks have now come into the field to help the agriculturists, to meet their requirements of loan thus lessening the burden on State.

### AGRICULTURAL COOPERATIVES

The small land-holdings are not economic units. The scarcity of labour and its high charges require that the cultivation of land be carried cut on a cooperative basis. Cooperative farming refers to a system of agricultural

organisation wherein cultivators of an area voluntarily associate themselves together, pool their individual holdings for purposes of cultivation and manage the whole affair as one unit under an elected management. Its main object is to combine the incentive of ownership with the 'size economics' possible in agriculture. The scanty resources of a farmer can be pooled with those of others in order to bring to all the participants the gains of large-scale intensive farming.

Cooperative farming is yet not a reality. Meanwhile the agriculturist stands in need of help of various kinds during the course of his multiple operations. If he can obtain on requirement, short, medium or long term credit for improved implements, adequate quantity of fertilizers, improved seeds, insecticides, pesticides, irrigation facilities and facilities for storage and marketing of his agricultural produce, he can get the best out of his efforts. It is only through agricultural cooperatives that he can get all these facilities in time and in a reasonable manner.

In the Gurgaon district, the indebtedness of the cultivator had assumed a serious proportion by the end of the nineteenth century. As detailed in the Gurgaon District Gazetteer, 1910, (Page 106), the total ascertained indebtedness the district excluding the Ballabgarh tahsil, both by way of consideration on , nd and unsecured loans, amounted to about Rs. 1.70 crcre. The causes of debt were: (1) general extravagence, which led to debt in ordinary years; (2) marriages and funerals, the expenditure cn which was enormously disproportionate to income; (3) drought, which always found the agriculturists without any savings and in which his cattle died and compelled him to be rrow to pay the revenue and support his family and (4) neglect to pay the interest on debts already contracted, which rapidly multiplied themselves. Very heavy rates of interest were charged on the unsecured loans and, more often than not, it was compound interest. The cultivators who incurred debts, were always in the clutches of the money-lenders and ultimately had to mortgage or sell their lands, becoming absolute paupers and ultimately labourers. The money-lenders were not interested to sink more money in improving the land obtained by them and in most cases, the land remained fallow and deprived of cultivation and finally rendered banjar, dwindling the national resources of foodgrains. This process accentuated scarcity conditions in subsequent conditions of drought and famine.

In order to meet this situation the Governemnt passed the Punjab Land Alienation Act, 1901, imposing restrictions on the transfer of agricultural lands to money-lenders and mortgagees. At the same time, facilities for cooperative credit were created with the passing of the Cooperative Societies Act, 1904.

In the begining of 1907, ten cooperative credit societies were started at the followidg places :----

(1) Firozpur Jhirka

(2) Nagina

(3) Santhawari

(4) Dharuhera

(5) Sidhraoli

(6) Pinangwan

(7) Marora

(8) Tankri

(9) Rathiwas

(10) Khanpur Ghati

Unfortunately at this early stage the most successful form of cooperative credit society for the Punjab had not yet been evolved and, as elsewhen societies were founded by a single individual. As the members belonged to number of villages, there was no basis of unity. There has thus been none of that common action or enthusiasm among the members which are necessary in order to make a society successful. Such societies being far remote from the Registrar's headquarters also suffered through lack of proper supervision. The result was that one society was cancelled, three were ready to wind up their business and none of the remaining six showed a prospect of successful development. If these were started on proper lines and were properly supervised there was no reason why these cooperative credit societies should not have flourished in Gurgaon as they did elsewhere and in 1910, only the Dharuhera society was working well and a new society was about to be started at Jatusana.<sup>1</sup>

With increasing awakening among the land-holding communities and the propaganda in this behalf at both Governmental and political level, the idea of cooperative credit societies took root.

By 1944, there were 4 central and 852 primary agricultural credit societies with a membership of 993 and 20,559 respectively. Other particulars of these

1. Gurgaon District Gazetteer, 1910, pp. 99-100,

societies were as follows :---

	Share capital	Reserved and profit	Total capital	Annual turn over (in 1939)	
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	
Central Credit Societies	1,56,350	8,21,693	24,07,833	39,37,409	
Primary Agricultural Credit Societies	1,24,499	3,39,535	14,07,177	8,30,075	

There were other cooperative societies with specific functions relating to supply and sale, production and labour thrift, consolidation, better farming, stock breeding, etc.<sup>1</sup>

In the erstwhile Pataudi State, in 1932, there were 17 primary agricultural credit societies with a membership of 318. The ad a total capital of Rs. 1,05,593 and annual turnover of Rs. 70,500.<sup>2</sup>

"The movement made steady progress and the number of societies went on increasing till Partition which affected its growth considerably. The apex institutions like the Provincial Cooperative Bank and the Punjab Cooperative Union were left behind in Pakistan. Deposits accumulated in long years were lost overnight. The mass migration of the Muslim members suddenly depleted the ranks of societies and the loans advanced to them became bad debts. With courage, patience and hard work the cooperative movement, however, recovered from that rude shock within a few years and dashed for still better achievements as is indicated by the following increase :---

Year	Societies	Members
1950-51	2,294	73,164
1955-56	2,644	81,719
1959-60	3,957	1,59,662

"By 1960-61,12.9 per cent of the entire population of the district had been brought within the fold of cooperation. Cooperative Banks and Banking Unions financed the societies affliated to them. There were four such banks

1. Gurgaon District Gazetteer, Statistical Tables, 1935, Table 21-A, as updated by the office of the Commissioner, Ambala Division, Ambala.

2. Pataudi State Gazetteer, Statistical Tables, 1936, Table 21-A.

in the district in 1950-51 with membership of 974 and working capital of 3,101 thousand rupees. They issued loans to the tune of 3,101 thousand rupees. In 1959-60, the number of these banks remained the same but their membership increased to 2,013 and their working capital increased to 11,614 thousand rupees and the loans issued stood at 8,110 thousand rupees.

"There are credit societies whose membership and loan operations confined exclusively to the Harijans. In 1950-51, there were 668 Agricultural Credit Societies with a membership of 17,474 and a working capital of 1,308 thousand rupees and these societies issued loans of 1,335 thousand rupees. By 1959-60, their number increased to 1,371 with a membership of 58,328 and a working capital of 9,179 thousand rupees, in that year they issued loans to the tune of 7,945 thousand rupees.

"In 1956-57, there were six societies for cooperative marketing and processing of agricultural products, with a mem rship of 2,072. By 1959-60, their number went up to 10 although the number of members came down to 1,442. Besides functioning as commission agents in the markets, these societies purchased wheat and other commodities for Government whenever required. There is a big cooperative oil mill at Nuh.<sup>1</sup>

"Irrigation Societies encourage installation of tubewells and pumping sets on cooperative basis. In 1959-60, there were two such societies with 22 members. The number of Farming Societies increased from 7 with 157 members in 1950-51 to 34 with 610 members in 1959-60.

"To eliminate the exploitation of the artisans by the middlemen and to help the members in the purchase of raw material and disposal of finished products, efforts are being made to organise small-scale and cottage industries on cooperative line. There were eight Weavers' Societies in the district in 1959-60 with 159 members, 36 Milk-Supply Societies with 681 members and 12 Consumers' Societies with 870 members. In 1959-60, there were four Housing Societies with 405 members."<sup>4</sup>

The Central Cooperative Bank Ltd., Gurgaon, established on February 27, 1919, is the central agency for advancing short and medium term credit to cooperative societies. Prior to re-organisation of the district in December 1972, the bank at Rewari also served this district. These two banks advanced loans

2. Census of India, 1961, Punjab District Census Handbook No. 3, Gurgaon District, 1965, pp. 35-36.

<sup>1.</sup> Since closed a few years ago.

as follows during 1967-68 to 1971-72 and the Gurgaon bank from 1972-73 onwards :--

•	Year		Loan advanced
			(Rs.in lakhs)
	1967-68		127.66
* 1	1968-69		188.48
÷.	1969-70		249.46
•	-1970-71		275.35
	1971-72		295.91
	f 1972-73	• • • • • • • • • • • • • • • • • • •	379.15
	1973-74		442.43
(New district)	1974-75		487.14
	1975-76		485.76
	1976-77	•	718.35

It is apparent that the Central Cooperative Bank, Gurgaon, advanced a larger amount of loans to the cultivators than that advanced by both the banks before bifurcation. The increased amount of loans being advancedby this bank every year shows an increasing desire among the cultivators to raise more and more loans for improving their agricultural requirements leading to greater production and consequent prosperity. Keeping in view the needs of the rural population, crop loan system has been introduced and maximum credit limit of the members as well as that of the societies has been increased considerably and this has resulted in the increase of advances by this bank.

The Primary Land Development Banks too play a great role in the economy of the cooperative sector. There were five such banks in the Gurgaon district before its re-organisation located at Gurgaon, Ballabgarh, Palwal, Nuh and Rewari. Due to re-organisation of the district during 1972-73, the Rewari Primary Land Development Bank was transferred to district Mahendragarh. These banks advanced loans for long term credit for the purchase of tractors, installation of pumping sets, digging of tubewells, debt redemption, purchase of land and improvement of land, etc. The loans advanced by these

(Rs. in lakhs)

banks to the cultivators for these purposes during 1969-70 to 1976-77 are given in the following table :--

		Danks	Members	hip Share capital	Loan advance- ment
		(Number)	(Number)	(Rs.)	(Rs.)
1	<b>969-</b> 70	5	5,818	15.06	96.37
19	70-71	5	7,680	21.15	109 61
19	71-72	5	9,727	27.51	119.53
19	72-73	4	12,335	29.15	140 50
197	73-74	4	12,135	36.31	122 42
f 197	4-75	4	13,929	42.86	134,29.
(New district) { 197:	5-76	4	14,479	48.04	131.61
[ 1976	i-77	4	16,307	59.74	197.32

It is evident from the above data that these banks are playing a vital role in the advancement of loans to the cultivators. During the period 1969-70 to 1976-77, the advancement of loans has increased to Rs. 197.32 lakh from Rs. 96.37 lakh, i.e. more than two times. Similarly share capital has increased to Rs. 59.74 lakh from Rs. 15.06 lakh and membership has increased from 5,818 to 16,307, i.e. more than three times.

In 1967-68, there were 85 Joint Farming Societies with a total membership of 1,672 and these commanded 11,660 acres (4,719 hectares) of land under cultivation. In 1969-70, the number of societies decreased to 75 with a membership of 1,438, and 9,193 acres (3720 hectares) of

220

Year

1

land under cultivation. The details for the succeeding years are given as under :

	Year	Societies	Member- ship	Land under cultiva- tion	Produc- tion (In terms of money)
	~	(Number)	(Number)	(Hectares)	(Rs. in lakhs)
	1970-71	70	1,399	3,704	3.74
	1971-72	<b>69</b> -	1,349	3,633	3.05
	1972-73	54	834	3,550	2.24
Ī	1973-74	53	795	3,475	1.72
(New district)	 { 1974-75	54	799	3,503	2.36
	1975-76	53	786	3,352	0.68
•	1976-77	53	788	3,352	0.13

At the outset, these societies were organised with the idea that members will be benefited by large-scale intensive farming and cost of production will be reduced to enable the members of the farming societies to earn more profits through joint cultivation. However, the movement could not be popularised among the masses as a result of which some of the societies became defunct and non-viable units. This is mainly responsible for the decline in the number of the societies. Moreover, the governmental financial assistance was not available to these societies in the subsequent years; so the movement did not pick up momentum.

The total number of cooperative societies of all types excluding industrial cooperatives in the Gurgaon district was 1,925 on June 30, 1968. It decreased to 1,909 in 1969, 1,890 in 1970 and 1,869 in 1971. There was some increase in 1972 when the number rose to 1,883, but it decreased to 1,528 on June 30, 1973 due to re-organisation of the district. Similarly, the number of members decreased from 1,72,965 to 1,52,066 during the corresponding years. The number of such societies as on June 30, 1974, was 1,566 and the membership increased to 1,60,239. The agricultural credit and service societies were re-organised by amalgamating all the societies in a patwar circle into one society. This led to decrease in the total number of these

societies which came down to 910 in 1975-76. However, their membership increased to 1,73,701. It further increased to 1,92,488 in 1976-77. The decrease in the number of societies should not give the impression that the cooperative movement has become less popular among the masses. On the contrary, it exhibits the geniune stability and soundness of the movement's hold in the district as most of the non-viable and defunct societies have been amalgamated and liquidated and all the credit and service societies have been formed at Patwar level which are called 'Mini Banks'. These 'Mini Banks' now serve in a better way to provide credit facilities and other service facilities to their members in a well organised way.

A few details of the societies for the years 1974-75 to 1976-77 are given in table below :

(Rs.	in	lakhs)
------	----	--------

Type of society		1974	-75		1975-76		r-	1976-77		
		Societies	Member- ship	Owned Funds	Societies	Member- ship	Owned Funds	Societies	Member- ship	Owned Funds
		(Number)	(Number)	(Rs.)	(Number)	(Number)	(Rs.)	(Number)	(Number)	(Rs.)
1.	Central Cooperative Bank	1	1,768	157.20	1	· 981	184.57	1	968	219.55
2.	Agricultural Credit & Service Societies	1,054	1,08,966	146.42	443	1,13,923	157.50	446	1,27,286	188.49
3.	Primary Land Development Bank	4	13,929	55.56	4	14,479	63,65	4	16,307	82.97
4.	Marketing Societies	5	2,208	11.97	5	1,998	16.41	6	2,850	26.30
5.	District Wholesale Society	1	658	7.12	, 1	658	9,08			
6.	Sugar Mills	1	56	0.28	To 1	56	0.28	1	171 <sub>.</sub>	0.55
7.	Non-Agricultural Credit Societies	63	3,239	2.90	61	3,312	3.36	62	4,563	4.01
8.	Other Processing Societies	3	2,389	6.94	3	2,095	7.43	3	1,929	7.61
9.	Central Consumer Stores	2	8,576	5.89	2	8,262	7.92	2	8,291	13.66
10.	Primary Consumer Stores	12	2,891	1.25	15	3,249	1.38	15	3,359	1.35

						9					
11.	Labour Construction Unions		1	32	0.64	1	31	0.73	1.	37	0.86
12.	Labour Construction Societies		44	4,359	3.10	44	4,515	3.37	45	4,670	3.51
13.	Women Societies		29	580	0.09	29	580	0.08	27	550	0.07
14.	House Building Societies	<u>L</u> .	19	5,198	6.53	19	5,229	5.56	21	5,369	5.62
15.	District Cooperative Union		1	701	0.09	· 1	701	0.01	1	701	0.04
16.	Farming Societies		54	799	5.78	53	786	5.66	53	788	5.45
17.	Garden Colony Society		1	38	0.02	1	38	0.02	1	38	0.02
18.	Poultry Societies		17	340	0.39	17	332	0.34	17	308	0.36
19.	Transport Societies		10	330	5.32	10	330	5.39	ŕ 9	318	5.31
20.	Milk Unions	•	1	109	0.75	1	110	0.81	1	112	1.30
21.	Milk Supply Societies		<b>` 179</b>	10,356	8.46	179	11,165	10.84	183	12,929	11.21
22.	Other Societies		17	728	1.31	19	871	1.57	19	944	1.61
	Total:		1,519	1,68,250	428.01	910	1,73,701	485.96	918	1,92,488	579.95

### SMALL FARMERS DEVELOPMENT AGENCY, GURGAON

Small Farmers Development Agencies have been set up in the country as pilot projects to give adequate credit support for various programmes of agricultural development and subsidiary occupations for the benefit of small/ marginal but potentially viable farmers. The All India Rural Credit Survey Committee had observed that although the small/marginal farmers constituted a very large number and owned sufficient agricultural lands, yet they had not been able to avail of the facilities provided by various plan programmes particularly in the field of agricultural development. In this context, the Survey Committee recommended special programmes for such farmers so that they could also join in the main-stream of the green revolution and accordingly 46 Small Farmers Development Agencies and 41 Marginal Farmers and Agricultural Labourers Development Agencies were set up in various States of the country in the years 1970-71 and 1971-72. The number of such agencies increased to 165 on March 31, 1977. Gurgaon is one of the three districts in Haryana where a Small Farmers Development Agency has been established.

Organisation, Composition and Functions of the Agency.—The Small Farmers Development Agency, Gurgaon, was registered on January 7, 1971, under the Registration of Societies Act. The whole of the old district of Gurgaon (i.e. the present district of Gurgaon and Rewari sub-division of the Mahendragarh district) is covered under its programme.

The agency gets funds as grants-in-aid from the Government of India for implementing its various programmes. Its tenure, originally fixed for the Fourth Plan period was subsequently extended first up to 1975-76 and afterwards up to 1978-79. The funds placed at its disposal amounted to Rs. 150 lakh for the first tenure ending March 31,1976. The agency expended its entire budget till the end of March 1975 and Government of India, after being pleased with its excellent performance, granted an additional amount of Rs. 30.38 lakh for the year 1975-76 which was also fruitfully utilised by the agency in the implementation of its programmes. The agency has been granted a financial outlay of Rs. 100 lakh for the extended period of three years commencing from April 1, 1976 to March 31, 1979. Out of these funds of Rs. 100 lakh, the agency received a sum of Rs. 19 lakh as grants-inaid for the year 1976-77 and expended the same on its programmes during the year. This way, the agency secured a sum of Rs. 199.38 lakh as grants-inaid till the end of March 31, 1977 from the Government of India against which it incurred a sum of Rs. 212.83 lakh. The difference is mainly due to the

recovery of 10 lakh from the Gurgaon Central Cooperative Bank Ltd. Gurgaon which was granted this sum as a loan for maintenance of non overdue-cover. The rest of difference is covered due to interest on Small Farmers Development Agency deposits in the bank and some refund of subsidies in respect of participants found ineligible.

The supreme body which watches, manages and guides this agency is its Governing Body. Besides the Chairman (Deputy Commissioner, Gurgaon), Vice-Chairman (Deputy Commissioner, Mahendragarh), and Member-Secretary (Chief Executive Officer, Small Farmers Development Agency, Gurgaon), it has 19 official and non-official members. In addition, the heads of concerned department and all the M.L.As. and M.P.s from the Project Area are invited as special invitees.

Staffing Pattern.—The Chief Executive Officer, who is drawn from the the Indian Administrative Service/State Civil Service is the principal officer of the agency. He is assisted by three Assistant Project Officers and two Extension Officers. The office establishment consists of one Head Cleark, one Statistical Assistant, one Accountant, one Steno-typist, four Clerks, one Jeep Driver, one Car Driver and four Class IV employees. The field work is executed through the existing staff of various development departments of the State Government and other financing institutions.

Functions.—The first and foremost function of the agency is to identify and select viable small/marginal farmers.

When the agency started working it was only meant to deal with small farmers, i.e. farmers owning land between  $2\frac{1}{2}$  and  $7\frac{1}{2}$  acres. Although it subsidised marginal farmers also (farmers owning less then  $2\frac{1}{2}$  acres) by treating them as small farmers, it showed no extra consideration to them. Since July 1, 1974, the definition of a small farmer has been changed. A farmer owning more than  $2\frac{1}{2}$  acres (1 hectare) of Class I and up to 5 acres (2 hectares) of Class II land with an income, from sources other than agriculture up to Rs 200 per month, is considered to be a small farmer. The agency has also started dealing with marginal farmers. A marginal farmer is a person who owns less than  $2\frac{1}{2}$  acres of Class II land and has less than Rs. 200 per month income from sources other than agriculture. In each case, where the land is of Class I land quality, the ceiling of land is reduced by half, i.e. one acre of Class I land is treated equal to 2 acres of Class II land. The agency deals with agricultural labourers as
well. The agricultural labourer is a person whose main source of livelihood is labour on the farm of somebody else. Since July 1, 1974, the marginal farmer is entitled to  $33\frac{1}{3}$  per cent subsidy while small farmers continue to be entitled to 25 per cent subsidy. The change in the definition of the small farmers has necessitated fresh identification. About 92 per cent of the villages were covered by March 31, 1977.

The agency also arranges short-term credit for seeds, fertilizers, insecticides and pesticides. It provides agricultural implements, storage bins and additional irrigation facilities. It finds subsidiary occupations for selected farmers. It promotes all activities to improve the economy of the identified farmers like agricultural marketing and rural artisan schemes. It functions as a catalytic agent of financing institutions for strengthening their structure by providing them risk fund and a managerial subsidy. It provides interestfree loans to small farmers for purchase of shares of cooperative societies in order to enable them to avail credit facilities easily. It also gives financial help to small farmers in the form of subsidy, etc., on various programmes undertaken by it.

Achievements of the agency.—Up to March 31, 1977, the agency has got identified 1,95,355 farmers (50,909 small and 1,44,446 marginal) against the overall target of 80,000 up to March 31, 1979. 49,704 small/marginal farmers belong to the Rewari sub-division of the Mahendragarh district. This identification of small/marginal farmers has been got done as per revised definition enforced after July 1, 1974. It is a continuing process as holdings go on being bifurcated.

Membership of cooperative societies.—55,495 small/marginal farmers and landless agricultural labourers have been enrolled as members of primary agricultural credit service societies now the 'mini banks'. Of these 17,504 small/ marginal farmers and landless agrcultural labourers are from the Rewari subdivision of the Mahendragarh district.

Minor irrigation programmes.—One of the major tasks of the agency was to arrange credit support for small/marginal farmers to install their own minor irrigation units. It included installation of shallow tubewells, percolation wells, blasting of wells, community irrigation works such as panchayat tubewells and deep tubewells. Prior to implementation of these programmes, the Minor Irrigation and Tubewell Corporation was persuaded to undertake an extensive underground water survey of selected areas. On the basis of this survey, the implementation of the programmes was contemplated and planned.