

Department of Agriculture Statistical Information

District Rohtak with its 147 village and five blocks is having geographical area of 166847 hectares (1668 sq.kms). The cultivable area of the area is 146444 hectares. The total cultivated area during the year 2009-10 was 141877 hectares and the total cropped area is 223931 hectares. Total irrigated is 97900 hectares. Out of which 66900 hectares is by the canals and 31000 hectares is by tube well irrigation. The total farming families in the district are 89975 and their holdings are categorized as given below in the table:-

Size group wise number of operation holding in District Rohtak

Size Group (Hect)	2000-2001		2005-2006	
	Number	Area	Number	Area
0-0.5	15569	4322	38232	8978
0.5-1.0	11071	8594	16514	13282
1.0-2.0	12740	18025	14628	20162
2.0-3.0	7594	16791	7473	17386
3.0-4.0	4435	14827	4295	14853
4.0-5.0	3060	13127	2836	12790
5.0-7.5	3866	21935	3021	18929
7.5-10.0	1841	14882	1464	12518
10.0-20.0	322	17866	1280	16543
20.0-30.0	1615	9617	231	6026
30.0-40.0	-	-	-	-
40.0-50.0	-	-	-	-
>50.0	-	-	-	-
	62113	139986	89974	141467

1. Location : Rohtak District is located in central part of Haryana and falls between Latitude 28° 40' 30" to 29° 05' 35" north and longitude 76° 13' 22" to 76° 51' 20" east covering an area of 1668 sq. km. The Distt. Rohtak falls in Survey of India Top. Sheet No. 53 C and 53 D. It is bordered by Sonipat in the north and North-east, Jind Distt. in the North Jhajjar Distt. in the South, Hisar Distt. in the North-East and

Bhiwani in the West. The District Head- Quarter is Rohtak. Due to the Proximity to Delhi, the Developmental activities are taking place very rapidly.

2. Climate and Rainfall

The climate of the district is sub-tropical, semi-arid, continental and monsoon type. It has hot summers, cool winters and small rainy season. The winter season starts towards the later half of November and extends till middle of March followed by Summer, which continues till end of June. The maximum temperature reaches up to 45° C in Summer and it falls up to 3°C in the month of January. Sand dust cyclones are common in summer season. The rainy season (monsoon) remains between July to September. The post-monsoon months October and November constitute a transitional period from monsoon to winter season. The agricultural based economy of the State depends on the annual rhythm of rainfall received differently over space as well time. The elements of basin hydrological system like ground water infiltration, seepage, surface storage etc. are activated only by precipitation. The average rainfall in the district from the year 1989 to 2009 is 431.5 mm. Maximum rainfall observed is 1004 mm in the year 1995 and minimum 231 in the year 1999. The details of the rainfall from the year 1989 to 2009 and the frequency of Annual Rainfall from 1967 to 2009 are detailed in the tables below:-

Statement Showing The Annual Rainfall at Various Rain Gauge Stations in Distt. Rohtak Period 1989-2009

Year	Rohtak	Meham	Average
1989	378	190	284
1990	541	368	454.5
1991	415	369	392.0

1992	525	210	367.5
1993	566	375	470.5
1994	422	393	407.5
1995	1138	870	1004
1996	666	327	496.5
1997	661	398	529.5
1998	604	335	469.5
1999	282	180	231
2000	429	264	346.5
2001	526	465	495.5
2002	347	145	246
2003	570	242	406
2004	403	142	273.5
2005	579	252	415.5
2006	387	135	261
2007	405	155	280
2008	566	358	462
2009	420	213	316.5
Average	515.70	304.95	410.33

Frequency of Annual Rainfall (1967-2009)

Range in mm	Numbers of Years
101-200	-
201-300	2

301-400	9
401-500	7
501-600	12
601-700	5
701-800	2
801-900	4
901-1000	1
1001-1100	1
1101-1200	-

4. Topography :

Plain and Undulating sandy alluvial plains(Older) mark the overall topography of the area. The average plain elevation of the Distt. is 220 mtr above mean sea level. There is a gentle slope of about 19 cm/ km from North-East to south-west in the distt. The Northern and North-western part of the distt. slope towards south to central part of the Distt. The thickness of alluvium has observed up to 297 mtr. At Kalanaur. The alluvial plain of unit covers 1544 sq. km. area of the Distt. whereas the sand dune area which has almost become stabilize is 124 sq. km.

5. Irrigation and Drainage:-

Jawahar Lal Nehru feeder and Bhalaut Sub. Branch are the two main canals which make the passage through more of the distt. and spreading a network of sub-branches, minors and distributries. Bhalaut Sub Branch (BSB) enters in the distt. at village Rithal covering mainly the area of Rohtak, Kalanaur and Sampla Block. JLN feeder flows almost parallel to Bhalaut Sub Branch. It enters in the District at village Rithal

following parallel to BSB and enters in the district Jhajjar along with BSB. Besides this, Bhiwani Sub Branch and Kalanaur distributaries feeds the area of Kalanaur, Meham and Lakhan Majra Blocks. Net Irrigated area is given below in a table:

Table
Net Area Irrigated

Year	Net area Irrigated (in Thousand Hect.)	% age of Net area sown
1991-92	222	77.7
1992-93	206	69
1993-94	209	70
1994-95	209	69.4
1995-96	206	68.6
1996-97	213	70
1997-98	94	67.6
1998-99	178	78
1999-2000	200	73
2000-01	201	75
2001-02	202	77
2002-03	132	87
2003-04	132	87
2004-05	132	82
2005-06	132	84
2006-07	111	89
2007-08	112	70
2008-09	97	69

The ground water quality in the Distt. is not good. Only in 8% of the area the quality of ground water is fresh. 43 % is marginal whereas rest is not fit for agriculture irrigation. Out of total irrigated area of 97900 Hect., 66900 Hect. is irrigated by canals and 31000 Hect. is irrigated by Tube-wells. The total number of M.I.Units in the District is 20045, out of which 3106 are electric motor driven and 16939 are Diesel engine units. The Block wise detail of M.I. Units is given in the below table:

S.N.	Name of Block	Diesel Units	Electric Units	Total
1	Kalanaur	2207	867	3074
2	Lakhan Majra	1886	426	2312
3	Meham	3808	194	4002
4	Rohtak	6171	1534	7705
5	Sampla	2867	85	2952
	Total	16939	3106	20045

Rohtak District is a part of inland alluvium. The topography of the District is saucer shaped. Therefore Rain water creates flood problems during monsoon season. In order to avoid floods , drains have been dug out in the District. The main source of draining flood water is Drain No. 8 . Two minor drains have been dug to drain off water of Meham, L.Majra and kalanaur area into drain No. 8. One is Meham drain which is 42 Km long passing through Kalanur and Meham Blocks covering 33 villages and second is L.Majra drain which is 33 Km long covers 23 villages of Meham and L.Majra Blocks. These two drains enter into the drain no 8 at village Kahanur ultimately going to river Yamuna.

6. Land Use

The land use of an area depicts the total land used in various activities while land cover depicts the land covered by the natural features like hills, forests, rivers etc. The land use/land cover classes identified in the district are described below and the aerial extent given below in the table.

Table No. Areal Extent of land use/land cover classes.

Land use/land cover categories	Area (km²)	Percentage
Agriculture Plantation	4.11	0.25
Current Fallow	2.31	0.13
Degraded grazing land	62.90	3.80
Land with open scrub	5.04	0.30
Open Forest	0.15	0.01
Kharif only	1.36	0.08
Rabi only	267.92	16.13
Kharif & Rabi (double crop)	1221.92	73.13
Mining/Industrial waste	1.00	0.06
Salt affected land	6.43	0.39
Sandy Desert Land	10.65	0.64
Canal	4.60	0.28
Lakes/Ponds	6.24	0.38
Water logged	0.86	0.05
Settlement	73.00	4.37
Total	1668.00	100.00

The area which is under cultivation in the season is called double cropped area. The area which is cultivated during Rabi and remains fallow during Kharif is classified as Rabi only and the area which is cultivated during kharif and remains fallow during Rabi season is classified as Kharif only. The land not cultivated during Rabi and Kharif due to any reason is called current fallow. The forest area which has less than 40% canopy area is called open forest area. The land which is generally prone to deterioration due to erosion and may or may not have scrub cover. Such land occupies relatively high topographic locations. Water logged land is that where the water is at or above the surface level for most of the year and is not cultivated in both the seasons. Sandy desert land is that area which have stabilised accumulation of sand, in coastal, revering or inland area. Land that has adverse effect on growth of most plants due to excessive salt is salt affected land. All those grazing lands in non forest areas around the village whether or not they are permanent pastures or meadows, which have become degraded due to lack of proper soil conservation and drainage measures fall under degraded

grazing land category. The land being used for mining is kept under Mining/Industrial wastes land.

7. SOILS

Physiographically the district is divided into two major physiographic units i.e. old Alluvium and Fluvio-aeolian plain. The brief description of these is as below.

A Older Alluvial Plains

This land form is formed due to deposition of alluvial material brought out by rivers. It is again sub divided into Dunal ridges/ Interdunal plains, Plains and depressions. Dunal ridges/ interdunal plains are found in Western and South-western part of Rohtak District. The plains are nearly level to gently slopping and occupy mainly the Northern and Central part of the district. The plains are nearly level to gently sloping and occupy mainly the Northern and Central part. The depressions are local depressions with fine texture soils.

B) Fluvio-aeolian Plain

The fluvio-aeolian land farms are formed due to the deposition of Aeolian sandy material over older alluvium and occupied mainly the Southern and South-western part of the district. This land farm is further sub-divided into sand dunes, slightly undulating aeolian Plains and depression. Sand dunes occupy mainly the South-western part of the District and are marked by east-west linear and stabilized sand dunes. Slightly undulating Aeolian plains occupies mainly the South-Central and south-western part of the District and the slope variations are less than one percent. Depressions are low lying areas with concave slope.

The sediments consist of sand, silt, clay and kankar etc. The soil texture varies from sandy to clayey having a heterogeneous composition with frequent calcium carbonate layers and shallow depth. The soil is coarse to fine loam in texture in most of the area. About 10 % of total area is affected by salinity and alkalinity problem due to poor drainage, brackish water and compact kankar layer below root zone.

The soil health of the district is of low fertility. As per soil indices, 85% of the soils are low in organic carbon 50 %, low in Phosphorus, while 20 % are deficient in Potash

indicating that soils are low in organic carbon, low to medium in Phosphorus and medium to high Potash.

Geo Hydrological Conditions

Geology:

The area forms a part of Indo-gangetic alluvial plain ranging from Pleistocene to recent in age. Aeolian deposits of sub-recent age cap the plains. The sediments comprise of clay, sand, and kankar mixed in different proportions. No exposure of hard rock forming the basement is seen in the area. Geological succession of the area is as under:-

<u>Age</u>	<u>System</u>	<u>Formation</u>
Pleistocene to recent	Recent to Sub recent	Alluvial Aeolian sand

Hydrology and Litho logical Conditions:-

In the district Ground water occurs in semi-confined to unconfined aquifers. The unconfined aquifers are tapped by dug wells while the semi-confined aquifers are tapped by shallow tube wells for irrigation purposes depending upon the nature of the aquifers. In the district Rohtak 20045 no. of M.I.Units are used for irrigation purposes. Ground water occurs mainly in the alluvial formations. The alluvial sediments consist of fine to medium sand, clay and kankar. Depth of shallow tube wells varies between 8 metres to 50 meters below ground level depending upon the aquifers characteristics.

Depth to Water:

Total geographical area of the district is 166777 hectares. About 98.09 % of the total area of the district lies within 10 metres of depth to water table below ground level during pre-monsoon period (June 2009). Out of this 42.61 % area which is about 71060 hectares falls under water logged conditions i.e. water level ranges from 0 to 3 meters bgl. During October 2009 about 98.37 % area of the district comes within 10 meters depth to water level range bgl. Water logged area has increased from 42.61% in June 2009 to 71.08 % in October 2009. Critical water logged area i.e. area under 0-1.5 mts. depth, also increased from 4.03 % in June 2009 to 40.91 % in Oct, 2009. It is due to shallow water table, good rainfall and sufficient

supply of canal water. In whole of the District water table is upto 10 metres depth bgl. except in some areas of Rohtak and L.Majra blocks.

The shallowest water table observed was 0.90 metres in village kanheli of Rohtak block and deepest is 12.80 metres bgl. In village Khidwali of Rohtak block during June 2009. In western and northern part of the district water table is some what deep.

Statement Showing Block Wise Area Falling Under Different Depth to Water Level Zones During Pre-Monsoon Period, June 2009 in Distt. Rohtak

S.N.	Block	Area in Hect.	Depth To Water					Remarks
			0-1.5	1.5-3.0	3-10	10-20	20-30	
1	Kalanaur	29277	647	6794	21836	0	-	
2	Lakhan Majra	16653	1214	8327	6418	694	-	
3	Meham	41952	548	20976	20428	0	-	
4	Rohtak	56236	4313	23058	26376	2489	-	
5	Sampla	22659	0	5183	17476	0	-	
6	Total	166777	6722	64338	92534	3183	-	
7	%age		4.03	38.58	55.48	1.91		

Statement Showing Block Wise Area Falling Under Different Depth to Water Level Zones During Post-Monsoon Period, June 2009 in Distt. Rohtak

S.N.	Block	Area in Hect.	Depth To Water				Remarks
			0-1.5	1.5-3.0	3-10	10-20	
1	Kalanaur	29277	9036	10663	9578	0	

1	Rohtak	2.57	3.26	3.79	4.43	3.11	4.50	3.87
2	Sampla	4.31	3.31	4.35	5.13	3.91	5.01	4.16
3	Kalanaur	4.68	4.49	6.02	6.30	3.71	4.86	3.93
4	Meham	12.07	10.15	9.27	8.14	4.60	5.38	4.58
5	L.Majra	4.03	4.01	4.74	5.71	3.67	5.68	4.43
6	Avarage	5.53	5.24	5.63	5.94	3.80	5.09	4.19
Fluctuation In Metres								
		1979-84	1979-89	1979-94	1979- 1999	1979- 2004	1979- 2009	Avg. Fluctuation per annum in Metres
1	Rohtak	-0.69	-1.22	-1.86	-0.54	-1.93	-1.30	-0.43
2	Sampla	+1.0	-0.04	-0.82	+0.40	-0.70	0.15	0.005
3	Kalanaur	-0.81	-1.34	-1.62	0.97	-0.89	0.75	0.025
4	Meham	1.92	2.80	3.93	7.47	6.69	7.49	0.25
5	L.Majra	0.02	0.71	-1.68	0.36	-1.65	-0.40	-0.013
6	Avarage	0.29	-0.10	-0.41	1.73	0.44	1.33	0.044
Average Fluctuation of the Distt. (June 1979-2009) =1.33								
Average Annual Fluctuation (June 1979-2009)= 0.044								

**Statement Showing Block Wise Historical Water Table Fluctuation From
October 1979 to October 2009 in District Rohtak**

S.N.	Block	Depth to Water Table For the Month of June						
		In the Years						
		1979	1984	1989	1994	1999	2004	2009
1	Rohtak	3.03	1.81	3.71	2.79	3.13	3.67	2.71

2	Sampla	5.28	1.72	2.20	3.84	3.94	4.13	3.22
3	Kalanaur	5.27	4.27	4.11	5.92	3.55	4.14	2.88
4	Meham	11.17	9.33	9.13	8.43	4.38	5.02	3.69
5	L.Majra	4.17	2.62	4.80	4.27	4.45	4.91	5.37
6	Avarage	5.78	3.95	4.79	5.05	3.89	4.37	3.18
Fluctuation In Metres								
		1979-84	1979-89	1979-94	1979- 1999	1979- 2004	1979- 2009	Avg. Fluctuation per annum in Metres
1	Rohtak	1.22	-0.68	0.24	-0.10	-0.64	0.32	0.010
2	Sampla	3.56	3.08	1.44	1.34	1.15	2.06	0.07
3	Kalanaur	1.00	1.16	-0.65	1.72	1.13	2.39	0.078
4	Meham	1.84	2.04	2.74	6.79	6.15	7.48	0.25
5	L.Majra	1.55	-0.63	-0.10	-0.28	-0.74	-1.20	-0.04
6	Avarage	1.83	0.99	0.73	1.89	1.41	3.07	0.10
Average Fluctuation of the Distt. (Oct 1979-2009) = 3.07								
Average Annual Fluctuation (Oct 1979-2009)= 0.102								

Characteristics of existing M.I.Units:-

The total Nos. of M.I.Units in District Rohtak as on 31.03.2009 is 20045 out of which 16939 (84%) are driven by diesel engines and the rest 3106 (16 %) are electric motor driven sets. Average density of Tube wells per sq. Km. in the district is 12.

a. Depth of Tube wells

The total depth of shallow tube wells range from 8 metres to 50 metres. Bgl. In the majority(80 %) of cases the depth is up to 20 metres. 15 % area comes under range of 20-30 metres. In 5 % cases only the depth exceeds 30 metres.

b. Discharge of Tube wells:

The discharge of shallow tube wells varies from 6 lps to 12 lps where as in majority of cases it is in between 7-9 lps.

Ground Water Quality

In general the ground water quality for irrigation purpose on the basis of electrical conductivity is classified into four categories as shown below:-

Water quality	Range of electrical conductivity in micro mhos/cm
Fresh	0-2000
Marginal fresh	2001-4000
Marginal	4001-6000
Saline	above 6000

In June 2009, in shallow ground water zone about 33431 hect. (20.05 %) area of the district comes under fresh category, 64422 hect. (39.83%) under marginal fresh and 42011 hect. (25.19 %) is under marginal quality of shallow ground water zone. The area falls under saline zone is 14.93 % i.e. 24913 Hect. The fresh water is mainly available at shallow depth due to reason that it floats over the saline water being of low density. The quality of shallow ground water is saline in southern , and western part of the district. In western part of the district at some places and in some villages of block Rohtak like Sunderpur, Singhpura, Bahu Jamalpur, Sasroli, Chamaria and Khidwali quality of ground water is fresh at moderate depth. In overall the quality of ground water deteriorates with depth. In shallow aquifers ground water is available from fresh to marginal between 8 to 50 metres depth of Tube wells . The details of category wise area on the basis of quality for the period June 2009 and Oct 2009 are depicted in tables.

Statement Showing Block Wise Area Falling Under Various Quality Zones of Ground Water On the Basis of E.C. Values in District Rohtak during June 2009.

S.N.	Block	Total area	E.C. Range in Micromhos/ cm	Remarks
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		in Hect.					
			0-2000	2000-4000	4000-6000	Above 6000	
1	Kalanaur	29277	3753	10960	9459	5105	
2	Lakhan Majra	16653	3719	3557	2910	6467	
3	Meham	41952	8421	19495	12708	1378	
4	Rohtak	56536	8985	25407	13633	8211	
5	Sampla	22659	8553	7053	3301	3752	
6	Total	166777	33431	64422	42011	24913	
	% age		20.05	39.83	25.19	14.93	

Staement Showing Block Wise Area Falling Under Various Quality Zones of Ground Water On the Basis of E.C. Values in District Rohtak during October 2009.

S.N.	Block	Total area in Hect.	E.C. Range in Micromhos/ cm				Remarks
			0-2000	2000-4000	4000-6000	Above 6000	
1	Kalanaur	29277	8462	15231	3723	1861	
2	Lakhan Majra	16653	4663	4996	1665	5329	
3	Meham	41952	12088	22931	5688	1245	
4	Rohtak	56536	21132	23926	8323	2795	
5	Sampla	22659	10058	3568	2319	714	
6	Total	166777	62403	70652	21778	11944	
	% age		37.42	42.36	13.06	7.16	

Ground Water Balance :-

The latest ground water assessment report worked out by agriculture department and CGWB as on 31.03.2004 is appended in below table. It reveals that out of five blocks, 4 blocks falls under Safe category whereas block Sampla comes under over exploitation category.

The stage of ground water development varies between minimum 47 % in block Lakhan Majra to maximum 101 % in block Sampla. In overall the entire district comes under safe category and still there is further scope of ground water development in the District.

S.N.	Name of Block	District	Net Recharge in HAM	Net Draft in HAM	Ground Water Balance in HAM	%age of development	Categorisation
1	Kalanaur	Rohtak	4046	2645	1401	65	Safe
2	Lakhan Majra	Rohtak	2496	1189	1307	47	Safe
3	Meham	Rohtak	5185	2721	2464	52	Safe
4	Rohtak	Rohtak	9888	6554	3334	66	Safe
5	Sampla	Rohtak	3698	3750	-52	101	Over exploited
6	Total		25313	16859	8456	66	Safe

Cropping Pattern

Kharif Cropping Pattern

In Rohtak district Bajra/ Jawar/ Guar, Paddy, Cotton and sugarcane are the major crops in kharif season. Bajra/ Jawar and Guar are distributed evenly in the sandy part while the paddy is mostly concentrated in eastern and western parts. Sugarcane and Cotton are concentrated in western part of the district. It is estimated that Bajra/ Jawar /Guar/ Paddy, Cotton and Sugarcane occupies 33.64 % , 11.96 % , 11.26 % and 9.03% area of total agricultural area of the District, respectively. Other crops grown in kharif season occupies 14.40 % are of total agriculture area in the District. Other crops in the kharif season include kharif pulses, vegetables and fodder crops which cover an area of 14.40 % whereas 19.71 % area was fallow during kharif.

Area Extent Under kharif Season Cropping Pattern of the District

Kharif Crop	Percentage Total Agricultural Area
Bajra/ Jawar/ Guar	33.64
Paddy	11.96
Cotton	11.26
Sugarcane	09.03
Other Crops	14.40
Fallow	19.71
Total	100

The area and production of kharif crops given below:

Area = 000 Hect.

Production = 000 M.T.

Crop	2005-06		2006-07		2007-08		2008-09		2009-10	
	A	P	A	P	A	P	A	P	A	P
Rice	18	36	20	37	23	52	38	48	35	50
Bajra	14	20	17	36	19	43	21	36	20	31
Jawar	23	06	24	07	23	10	21	10	21	10.5
Pulses	11	11	11	11	9.3	10.1	10.8	11.9	08	6.4
Sugarcane	12	62	13	84	12	85	07	38	04	23
Cotton	13	23	09	25	08	21	07	16	08	17

Rabi Cropping Pattern

Wheat, Mustard and Sugarcane are the major crops during Rabi season followed by other crops. Wheat crops in evenly spread throughout the district but more in the eastern part of the District and occupies 61.06% of the total agricultural area. Mustard is scattered in whole

district and occupies 20.17 % area of the total agricultural area. Sugarcane is concentrated in western part of the District and occupies 09.05% of the total agricultural area. The crops grown in the District are Barley, gram and other rabi pulses and vegetables which cover an area of 3.85 % of the total agricultural area of the District.

Areal Extent Under Rabi Season Cropping Pattern in the District

Rabi Crops	Percentage Total Agricultural Area
Wheat	61.06
Mustard	20.17
Sugarcane	09.05
Other Crops	03.85
Fallow	05.87
Total	100

The area and production of Rabi Crop given below:

Area = 000 Hect.

Production = 000 M.T.

Crop	2005-06		2006-07		2007-08		2008-09		2009-10	
	A	P	A	P	A	P	A	P	A	P
Wheat	88	303	95	376	99	347	103	448	104	422
Gram	02	02	02	02	01	01	01	01	01	01
Barley	01	02	01	02	01	03	01	02	01	03
Oil seed	29	27	19	27	14	14	14	23	14	22

Farm Mechanization

Modern Agriculture technology and machinery are very important in effective management of inputs and timely completion of agriculture operation. This importance coupled with increasing agriculture wages/ rates have compelled farmers to resort to farm mechanization. Govt. of India

is committed to take the food grains production to 300 million tonnes by 2011-12 from present level at around 210 million tones. This can be possible only by increasing the pace of mechanization and productivity of land.

Farm mechanization has been helpful in improving productivity of different crops, time saving, reducing drudgery, timely farm operations, resource conservation and protection from natural calamities. The timely sowing of Wheat due to zero tillage seed cum fertilizer drills has improved the productivity of wheat during recent years which is remarkable achievement in wheat production. placement of fertilizers by drill, during sowing, results in higher nutrient use efficiency and likewise higher irrigation efficiency under bed planting and laser levelling technologies. Use of crop harvesting machines ensures early completion of harvesting and threshing works which escapes the untimely rainfall and storms hazards particularly in wheat, rice and potato crops. At present, there are 12390 tractors, 298 zero till seed cum fertilizer drills. 6279 threshers, 564 rotavators, 299 straw reapers, 18 post hole diggers, 4 potato diggers and 7 power tiller, 13037 sprayers, 29 hand dusters, 847 seed cum fertilizers in the district. There is need to create more awareness among farmers for proper use of farm machineries for high efficiency, saving human and energy resources etc.

Horticulture Development

The importance of fruits and vegetables crops in improving the nutritional status and farm economy needs no elaboration. It offers excellent alternative for diversification in agriculture by ensuring balanced use of land, water and other resources for promoting sustainable agriculture besides increasing income of the farmers. Agro-climatic conditions, soil and water availability, marketing opportunities in and around the district make it suitable for growing a wide variety of fruits like ber, guava, aonla, papaya, jamun etc. all major vegetables including exotic and high value, spice crops like methi, chillies, garlic and flowers like chrysanthemum, gladiolus marigold(jafri), rose. With National Horticulture Mission(NHM) under process and financial and technical helps available from both NHB, State Government and other institutions there is great potential for area expansion under all horticultural crops especially vegetable crops. Floriculture, mushroom and bee keeping. The existing marketing, cold storage, post harvest and

processing facilities are being strengthened in the district which will provide much more opportunities for expansion of this sector through extending market reach, value addition and post harvest management.

The total area and production of fruits and vegetables given below:

	<u>Area</u>	<u>Production</u>
Fruits	1104 Hect	9486 M.T.
Vegetables	11460 Hect	1118205 M.T.

Organic farming is another promising area for some enterprising farmers as with increasing awareness the market for organic agri-produce is increasing. Some of the growers have taken up organic farming on a commercial scale. They and others who are willing to opt organic farming need to be assisted with proper registration and certification with national/ international agencies. Keeping in view, the future expansion of trade in organic products, the marketing as well as technical and certification services are needed to be strengthened. There are wide gaps in average yields and attainable yields (on progressive farmer's fields) due to variety of reasons which needs to be rectified. The first being the quality and availability of seeds which is not of desired level. The present seed replacement rate for several crops (other than hybrids) is also quite low. Other important aspects affecting the quality and yields with a bearing on land and water are related to fertilizer nutrient management and chemical management in vegetative cultivation. The farmers, invariably use imbalance fertilizers with quite higher doses of nitrogenous fertilizers and nil or quite low (except potato) doses of potassic fertilizers without any application of other essential micro nutrients, the deficiency of which are being reported with loss of yield and quality. Similar or rather more harmful is the impact of non-judicious chemical usage by farmers for control of economics which again are resulting into increased cost of cultivation, declining factor productivity, deteriorating soil and ground water health, increased cost of cultivation, decline factor productivity, deteriorating soil and ground water health, increased incidences of resistance and lower yield with lower profits.

The productivity proposed in the plan are designed to be focussed on the issues having direct bearing on the development of this sector. The specific extension activities

of capacity building, skill up gradation and entrepreneurship development for farmers are meant for developing professional attitude, exploring markets, go for value additional or associated themselves (individually or in groups) with organised trade. The extension activities pertaining to cultivation aspects are directed towards quality seed production, INM and IPM.

Promotion of Scientific Agriculture

The Scientists of Haryana Agriculture University Hisar with its Krishi Vigyan Kendra at Rohtak and the extension Agriculture Officers of the department are working together for the promotion of Scientific Agriculture with the purpose to get maximum yield with minimum investment and labour. Following are the aspects on which these are working.

1. Introduction of new Varieties:

<u>Crop</u>	<u>Variety</u>
1. Wheat	PB-343, WH-542, WH-711, PBW-502, PBW-550, HD-2687 HD-2329, RAJ-3765, UP-2338
2. Paddy	Coarse Rice-HKR-126, HKR-127, Basmati-CSR-30, PB-I, HBC-19, PUSA-1121, Sarbati, Sabnam, Rh-10, Pepsi, Pusa- 1401
3. Pulses	Arhar, Manak, Paras, UPAS-120.
4. Cotton	BT Cotton -RCH-134, MRCH-6301, MRCH-6304, American Cotton -HD-1226 Desi Cotton-HD-123, AAH-1
5. Sugarcane	COH-119, COH-110, COS-8436, Co-767, CO-99, COH-92, COH-64, Co-56, CO-7717
6. Oil Seed/Raya	RH-30, RH-8812, T-59
7. Kharif Fodder /Jower	HC-136, HC-171, HC-260, Sweet Sundan Grass-59-3, HC-308

8. Rabi Fodder/ Barseem MASCAVE

2. Seed Replacement Ratio:-

Seed Replacement Ratio in the Distt, is given below:-

Crop	Seed Replacement ratio
Rice	38 %
Bajra	95%
Cotton	95%
Pulses/Arhar	20%
Kharif Fodder	10 %
Wheat	28%
Gram	10%
Barley	25%
Raya	75%
Rabi Fodder	80%

3) New Technologies

Under this Programme the following points have been taken up.

a) Seed Treatment:

Agriculture Department and K.V.K. Scientists jointly decided that before sowing any crop the seed must be treated first. Efforts are being

made by the department through vigorous campaigning in all the villages to educate the farmers to achieve the cent percent results. So far till now 50-55% achievements have been made.

b) **Integrated Nutrients Management:-**

Under this programme every year ten thousands soil samples of different farmers are collected from their farms.

These are analysed in the Laboratory and their report is sent to farmers in the form of Soil Health card. On this basis the recommendation of Fertilisers to be used by the farmers are made to adopt the INM. The norms are recommended by the HAU Hisar.

c) **Integrated Pest management:-**

Integrated pest management is carried out in Kharif in Cotton and rice crops and in rabi in Wheat and Raya. For this Farmers Field Schools are organised at farmers fields. In this programme 30 farmers are selected and their class is taken every week which continues for 12-20 weeks depending upon the crop. The disease and the attack of insect/Pest is detected at the spot and shown to the farmer and advised their control.

d) **Weed Management:**

Weed is a major hurdle in the proper production of any crop. Every crop is affected by different type of weed. Farmers are advised to control the weeds for which they are told different kinds of weedicides.

e) Use of Bio agent in Sugarcane

The crop of sugarcane, when it grows completely then the length of sugarcane increases. In those conditions it is difficult to make spray of insecticides or pesticides. In alternative to that Bio-agents like Trichoderma, Verticilium Lecani and Bavaria Bassina are used to control the effect of Insect/Pest at the time of sowing itself.

f) Rehabilitation of Soil Problem

The soils in the District are affected by alkalinity due to one or other reason a) due to repetition of crops the main nutrients in the soil are imbalanced. To neutralize the effect of alkalinity farmer is recommended the use of Gypsum and to make balance of Nutrients farmers are encouraged for green manuring crops like Dhaincha, Guar etc. They are also advised that before using they should level the lands by using laser leveller. The use of Laser leveller for levelling land is very useful in saving the water being used for irrigation.

g) Transfer of Technology:

By the following methods the agriculture technology is being transferred to the farmers:

- 1) Demonstration
- 2) Front line demonstration

- 3) On farm Trials
- 4) Farmers Field School
- 5) Kisan Gosthi
- 6) Mini-Kisan Melas
- 7) Through News paper , Radio and other Media modes.

Table

Agriculture Operation

Area in 000 Hect.

Year	Net area sown	Cultivable area	Area sown more than one	Total cropped area
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1991-92	304	319	76	380
1992-93	298	313	109	407
1993-94	300	315	99	399
1994-95	301	316	106	407
1995-96	300	315	124	424
1996-97	304	319	118	422
1997-98	139	161	54	193
1998-99	139	161	74	213
1999-2000	141	161	72	213
2000-01	141	161	74	215
2001-02	142	161	80	221
2002-03	139	161	76	215
2003-04	143	161	77	220
2004-05	142	161	80	222
2005-06	142	160	81	223
2006-07	142	161	77	219
2007-08	142	161	79	221
2008-09	142	161	93	235

Table
Damage to Crops

Year	Pest/ Disease	Rats (Tonnes)	Flood (Tonnes)	Hails (Tonnes)	Total (Tonnes)
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	(Tonnes)				
1994-95	-	-	-	869	869
1995-96	-	-	11655	-	11655
1996-97	-	-	-	-	-
1997-98	-	-	-	-	--
1998-99	-	-	-	-	-
1999-2000	-	-	-	-	-
2000-01	-	-	-	-	-
2001-02	-	-	-	-	-
2002-03	-	-	-	-	-
2003-04	-	-	-	-	-
2004-05	-	-	-	-	-
2005-06	-	-	--	10280	10280
2006-07	-	-	-	-	-
2007-08	-	-	--	2767	2767
2008-09	1975	-	11973	-	13948
2009-10	-	-	-	-	-

Special Projects/ Programmes on going in the District

The following Special Projects are on going in the District.

- a) Agriculture Technology Management Agency (ATMA) programme is being implemented since 2007-08 to strengthen the present extension system.

- b) Since 2004-05 the integrated scheme of oilseeds, pulses, oil palm and maize (ISOPOM) is being implemented in the district.
- c) Since 2006-07 the Macro Management Mode of Agriculture is also being implemented to strengthen the mechanization in agriculture in the district.
- d) A small scheme viz front line demonstration on oilseed and pulses, and cotton is being implemented through ICAR in Krishi Vigyan Kendra, Rohtak.
- e) National Horticulture Mission.