

DRAFT PLAN

**COMPREHENSIVE
DISTRICT AGRICULTURE PLAN
(C-DAP)**

**DISTRICT GURGAON
HARYANA**

**COMPREHENSIVE DISTRICT AGRICULTURE PLAN (C-DAP)
FOR RASHTRIYA KRISHI VIKAS YOJANA
OF XITH FIVE YEAR PLAN**

CONTRIBUTORS

**DR. V. K. YADAV (AGRONOMY), DR. RAMESH SHARMA (SOIL SCIENCE),
DR. NEERAJ PAWAR (AGRI. ECONOMICS), DR. INDERJEET ANTIL (ANI. HUSBANDRY),
DR. SURENDER SINGH DAHIYA, AGRONOMY, SH. ASHOK KUMAR (SEED TECH.),
DR. ANIL KUMAR RATHEE, (AGRI. ECONOMICS)**

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DISTRICT'S OFFICERS OF LINE DEPARTMENT

**DISTRICT GURGAON
HARYANA**

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INTRODUCTION

The economic reforms commenced in 1991 have successfully put the economy in a higher growth orbit with more than 8 percent growth rate in total Gross Domestic Product (GDP) especially during the recent years. However, the agriculture sector which accounted for more than 30 percent of total GDP at the beginning of reforms, failed to maintain its pre-reform growth. On the contrary, it witnessed a deceleration in growth after the mid 1990s, as the per annum growth in agriculture sector dropped to 1.9 percent during 1996-97 to 2001-2002 from 3.2 percent in the period 1980-81 to 1995-1996. This happened despite the fact that agricultural productivity in most of the states was quite low, as it were, and the potential for the growth of agriculture was high. The 10th five year plan target of growth of 4 percent per annum in agriculture and allied sectors, set to reverse the sharp deceleration of 1996-1997 to 2001-2002 has not been achieved. The approach paper to the 11th plan also emphasized that reversal of the deceleration in agricultural growth witnessed after 1996, is a pre requisite for the success of this plan. A sustained and wide spread agricultural growth is a pre-condition of (rural) development in India, as more than 50 percent of country's work force still depends upon agriculture for its livelihood. This slow growth in agriculture (including allied sectors) can be of great strain for the economy, as agriculture is not only an important driver of macro- economic performance; it also is an essential element of the strategy to make growth more inclusive. Concerned over this pace of growth in agriculture and allied sectors, the National Development Council (NDC), in its meeting held on 29th May, 2007 resolved that a special Additional Central Assistance Scheme i.e. National Agriculture Development Programme/ Rastriya Krishi Vikas Yojana (RKVY) be launched with following main objectives.

- ❖ To incentivize the States for increasing public investment in agriculture and allied sectors
- ❖ To ensure that agricultural plans of Districts/States are prepared and are based on agro- climatic conditions, availability of technology and natural resources.
- ❖ To reduce the yield gap in important crops and increase production and productivity in agriculture and allied sectors through focused and holistic initiatives.
- ❖ To ensure that local needs/crops/priorities are better reflected in the agricultural plans of the Districts/States.
- ❖ To provide flexibility and autonomy to States in planning and implementation of agriculture and allied sector schemes.
- ❖ To maximize income of farmers in agriculture and allied sectors.

The eligibility for assistance from the Centre under the scheme would depend upon the State Government providing amounts in the Plan Budget of the State for agriculture and allied sectors over the baseline expenditure.

As per the NDC resolution, Government of India introduced a new Additional Central Assistance Scheme to incentivize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology

into account, and integrating livestock, poultry and fisheries as a farming system approach. This involves a new scheme for Additional Central Assistance (ACA) to State Plans, administered by the Union Ministry of Agriculture over and above its existing centrally sponsored schemes, to supplement the state-specific strategies. In order to rejuvenate the agriculture during XIth plan, a growth rate of 4 percent per annum has to be achieved (as per NDC commitment) by reorienting development strategies that meet the needs of the farmers. The agriculture growth being essential element of the strategy of making growth more inclusive, the NDC advised the State Governments on preparation of Comprehensive District Agriculture Plans (C-DAP), which includes allied agriculture sectors with full and efficient utilization of available resources.

The concept of integrated local area plans to raise living standard in rural area and overcome food shortage based on specific endowments and needs of each area was initially mooted in 1st Five year plan in 1951, which could not be materialized in true sense as only sporadic efforts and isolated cases of such planning were practically attempted. For success of local area or District level plans, the underlying constraints needed to be identified. The required infrastructural investment, extension (and research system) revamping and market reach with the system's conduct and performance have to be synchronized through a holistic policy approach. The Agriculture in the district can't possibly achieve same growth as in the past without recognizing the role of farmers' participatory approach for formulating strategies and finding solutions to new and emerging problems. The emerging trend of globalization in general and expansion of urbanization in and around Gurgaon in particular will boost the trade in agriculture. The farmers of the district are poised for reaping the benefits of these changes by shifting from traditional farming towards growing enterprises having market potential and by becoming secondary producers of agri-commodities. Reforms based on globalization can now pave the way for commercial dairies and subsidiary occupations. The demographic changes due to fast urbanization and slow down in the population will bring greater prosperity in the middle class families. This will lead to some diversification in food habits leading to more animals and requirement of more cereals for animals. Food demand will go up, not purely because of population rise, but also because of more requirement of cereals as animal feed. Although in district like Gurgaon land used for agriculture will decrease, but still there is no reason to believe that agriculture productivity can't be raised with the opportunities being offered by new science like GM crops and new approaches like resource conserving technologies.

Keeping this in view, the C-DAP of district Gurgaon is prepared on the basis of primary and secondary data of the district for achieving sustainable agricultural growth with improved farmers' income through participatory process involving stakeholders and various organizations. By establishing strong linkages with required institutional support services, the plan will ensure optimum utilization of scarce natural, physical and financial resources.

Methodology

The C-DAP was prepared as per the process and methodology suggested by the Planning Commission, Government of India. The approach followed in preparation of the document was necessarily of Participatory Rural Appraisal mode. CCS Haryana Agricultural University, Hisar, Haryana was identified as Technical Support Institute (TSI). The TSI, under the guidance of Director, Extension Education, provided all necessary technical help to

planning units and support groups for preparation of this plan through participatory bottom-up process. The TSI trained the Planning Units/ Groups in Participatory Rural Appraisal techniques, designed formats for data collection, guided in data collection and analysis and conducted regular workshops and meetings and did hand holding, wherever and whenever needed for plan preparation.

The responsibility of preparing C-DAP of Gurgaon district was given to Dr. V.K.Yadav, Sr. E.S.(Agronomy) Krishi Vigyan Kendra, Bawal, and Dr. Anil Rathee, Dr. Ramesh Sharma and Dr. S.S.Dahiya of Krishi Vigyan Kendra, Sonipat The KVK team, after receiving proper training from TSI held wide consultations with District/ Block/ Village Agriculture Planning Units of the District. The TSI conducted two days orientation workshop-cum-training programme on 30.3.08 and 31.8.08 at CCSHAU, Hisar. The following specific aspects were covered in the programme.

- Issues and challenges in Agriculture Sector
- Planning concepts and District Planning
- Basic features and planning process of RKVY
- Vision, methodology and process of preparing C-DAP
- Participatory Rural Appraisal
- Farming system approach
- Farming situation based extension
- Integrated nutrient management (INM), Integrated pest management (IPM), Natural resource management (NRM), Human resource development (HRD), Marketing and other important aspects.

Data collection and consultation:

The KVK team, after receiving proper training from TSI, held wide consultations with District/ Block/ Village Agriculture Planning Units of the district (different bodies / institutional arrangements under ATMA Scheme). Formal and informal meetings with Agriculture and line department staff and Panchayati Raj Institution's member and farmers were conducted at different levels. Secondary data and related statistics needed for planning from different departments and other sources, were collected

Primary Data:

For in-depth farm/ village level study covering important aspects of agriculture and allied fields, the district was divided into two distinctively Agro-eco-situations (AESs) as was done for SREP preparation under ATMA Scheme. From each AES one representative village (Hazipur for AES-I and Khentawas for AES-II), was selected for collecting required information on modified semi-structured schedules through PRA. The important inputs were received from data collected by ATMA Gurgaon Team for preparation of SREP of Gurgaon district.

Con-current review and verification of data:

The primary as well as secondary data collected, was cross-checked through triangulations and verified from information available with different government departments and PRA based exercises (earlier conducted by KVK and other agencies). The District Plan (draft), SREP and PLP of Gurgaon district and other related documents/reports of different departments were consulted for preparing the C-DAP.

Holding farmer meetings at villages selected for representing AESs in the district

PRA was conducted covering the whole gamut of activities ranging from pre-sowing to post-harvesting and marketing related to agriculture and allied activities being undertaken by the villagers.

Work plan and activities before the preparation of plan-

- ❖ Meeting of resource team of KVK with line departments heads and officers and PRI's representative
- ❖ Discussed the farmer participation evaluation, time frame, activities and responsibilities of all involved in the plan.
- ❖ Discussed the plan and expected output from five year plan in progress.. **Gaps that exist in achieving the targeted productivity growth across the farmers categories were identified through participatory process.** This provided sound basis for developing Comprehensive District Agriculture Plan (C-DAP).

Following discussion were held

The current priorities were discussed with farmers. The promising new practices were identified and agreed upon with them. Responsibilities of all stake holders and surveyors were elaborated with staff.

Before meeting

The PRA schedule based on the past experiences and data required regarding the farmers' need, was prepared.

Important points for discussion containing proposed change in the practices (of management, varieties, site specific nutrient management, IPM, seed, soil health and allied activities) were included and the proforma for Gram Panchayat given in C-DAP manual was modified accordingly. The schedule was made simple and comprehensible.

During meeting-

The meetings were ensured to be informal. The farmers were encouraged to participate, interact and make their own fair appraisals in the meeting. Lecture type meeting was avoided. Farmers were informed about the objective of the meeting. The dialogue was started; the gap analysis and current scenario regarding productivity, profitability and risks associated with cultivation of different crops and other enterprises were discussed.

The possible changes targeted in the management practices were:

- ❖ Field preparation-zero tillage, bed planter, laser leveler, ridger seeder
- ❖ Crop establishment-plant population, seed rate etc.
- ❖ Nutrient management-N and P rate, time, source, use of organic manure, basal and top dressing of fertilizer, application of K and micronutrients.
- ❖ Important pests based on economic importance including insects, diseases nematodes and weeds.

Measures, which improve the efficiency of inputs including water (through improved water productivity), energy (through reduced energy intensity like less fuel and less electricity) and labour (mechanization). It has to be a campaigning tool and also a guide to policy.

To improve both productivity and profits, and to generate rural employment, another option might be to reset the system approaches from a commodity approach to cropping system approach (Bajra-wheat cropping system rather than bajra or wheat as a separate commodity) and from cropping system approach to a integrated farming system approach i.e. Arable Farming +Buffalo, instead of farming or buffalo husbandry as separate systems.

Farmers and scientist arrived at general agreement on what to do, to fill the gaps on crops and allied activities.

Discussed about the proposed design, trials, Front Line Demonstration (FLDs) and other activities in a farming system approach, keeping in view the following points

- (i) Profitability of cropping system and the rate of return.
- (ii) Market infrastructure and marketing opportunities, custom hire services and some of the policy issues related to subsidy.
- (iii) Farmers' inability to invest in the productivity improvement, as majority of the farmers belong to resource poor category.
- (iv) Work plan and activities for landless and resource poor farmers.
- (v) Collected and discussed the feed back regarding On-Farm and Off-Farm activities.
- (vi) Crop insurance and cyclical assistance.
- (vii) Action Plan

CHAPTER II

GENERAL DESCRIPTION OF THE DISTRICT

2.1. Introduction

Legend has it that Gurgaon is the ancestral village of Guru Dronacharya, the teacher of the Pandavas and Kauravas in the Indian epic, Mahabharata. In the ancient times, the name Gurgaon was originally said to be "Guru-Gram". In the original Sanskrit language, Guru means "teacher", which in this case refers to (Guru Dronacharya) and Gram means a (village). The village was gifted by the Pandavas and Kauravas to their Guru (Dronacharya), and was therefore known as *Guru - Gram*, (Village of the Guru). The sanskritised "gram" was over a period of time rounded off to a colloquial "gaon" and hence the name to Gurgaon.

2.1.1. Location and Geographical units:

The present Gurgaon district comprising four blocks Pataudi, Sohna, Gurgaon & Farrukhnagar was created on 15 August,1979. It is the southern-most district of Haryana. The district lies between 27 degree 39' and 28 degree 32' 25" latitude, and 76 degree 39' 30" and 77 degree 20' 45" longitude. On its north, it is bounded by the district of Rohtak and the Union Territory of Delhi. Faridabad district lies to its east. On its south, the distt. shares boundaries with the states of Uttar Pradesh and Rajasthan. To its west lies the district of Rewari and the State of Rajasthan..Gurgaon town is about 32 kms away from New Delhi, the National Capital of India (Table 2.1).

Table 2.1: General features of the district

Name of the block	Geographical area (ha)	No. of Revenue villages
Gurgaon	34543	79
Farrukh Nagar	29681	52
Pataudi	27552	81
Sohna	33686	74
Entire district	125462	286

Source: DDA, Gurgaon

2.1.2. Demographic profile

According to 2001 census, out of total population of 870539, 470504 were males and 400035 females. According to worker classification 128000 were cultivators, 44000 agricultural labourers, 26000 workers in H.H. Industries and 161000 other workers.

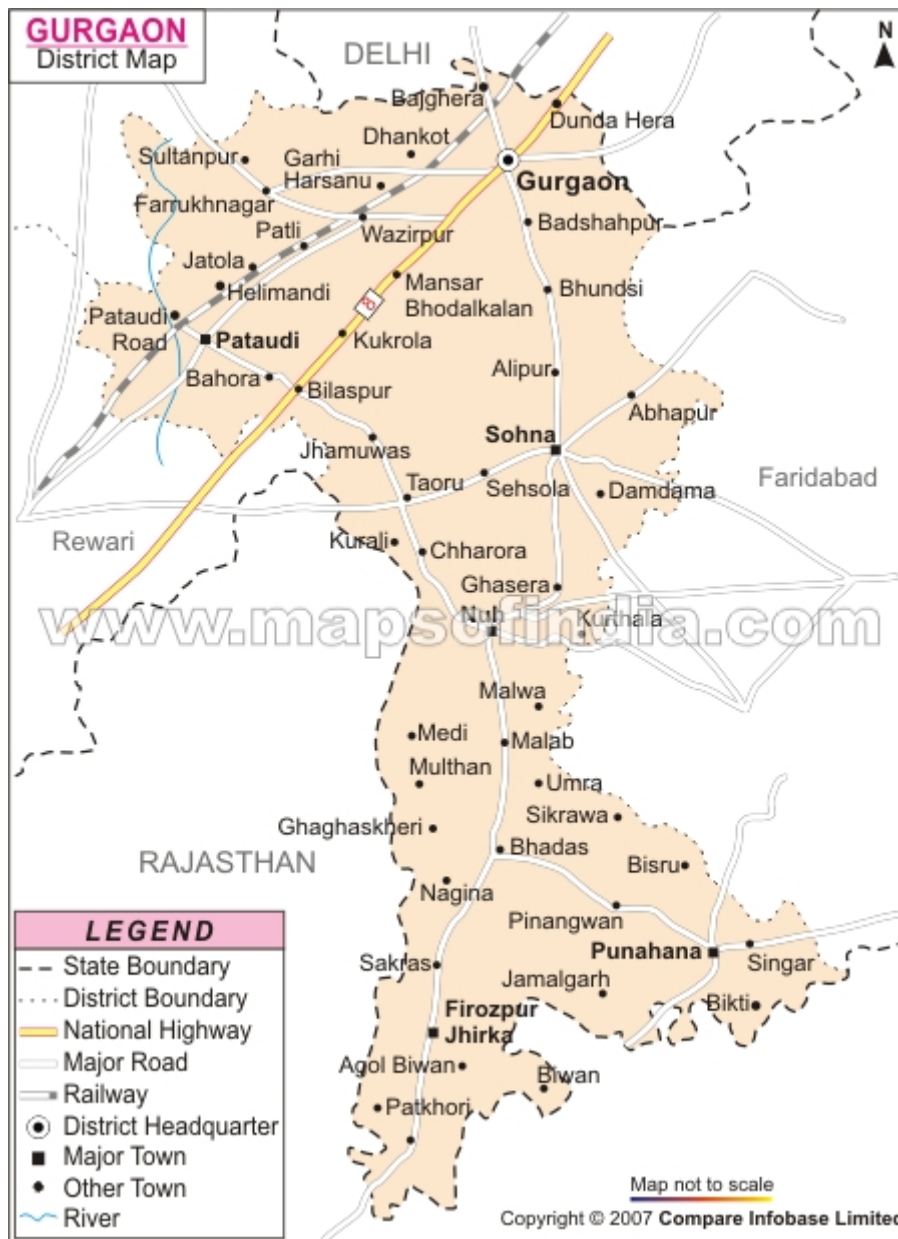


Fig. 1. Map of district Gurgaon

2.2 District at a Glance (as on 31st march 2007)

1		Geographical Area (ha)	125307	
	a	No. of Community Development blocks	4	
	b	No. of villages(inhabited+ uninhabited)	262+22=289	
	c	No. of villages electrified	262	
	d	No. of villages connected by roads	262	
	e	No. villages having supply of potable water	262	
2		Demographic Profile		
	a	Population (2001 census)	870539	
	b	Male	470504	
	c	Female	400035	
3		Classification of Workers		
	a	Cultivators	128000	
	b	Agricultural labourers	44000	
	c	House hold industries	26000	
	d	Other workers	161000	
4		Agro- climatic Zone	Hot and Semi Arid	
5		Rainfall (average in mm) 2006	560	
6		Land utilization (preceding 3 years average)		
	a	Geographical area (ha)	125307	
	b	Net area sown (ha)	78280	
	c	Percentage of net area sown to total Geographical area	62.5	
	d	Forest (ha)	2600	
	e	Percentage of forest area to total Geographical area	2.1	
	f	Fallow land (ha)	-	
	g	Pasture land (ha)	100	
	h	Land under non agriculture use (ha)	44327	
	i	Cropping intensity (%)	154.3	
7		Size of holdings	Nos	Area
			(%)	(%)

	a	Less than 1 ha	29224 (47.6)	25181 (29.6)
	b	1-2 ha	22808 (37.2)	32603 (38.4)
	c	2-4 ha	5692 (9.3)	18123 (21.3)
	d	4 -10 ha	1624 (2.6)	9054 (10.7)
	e	Above 10 ha	-	-
	f	Total	61348	84961
	g	Average size of holding (ha)	1.38	
8		Irrigation Facilities (ha)		
	a	Net irrigated area	72352	
	b	By canal	1318	
	c	By Tube well	70534	
	d	Other sources (sewage water)	1500	
	d	Percentage of net irrigated to net sown area	92.4	
9		Consumption of chemical fertilizers(kg/ha)		
10		Agricultural Support Facilities		
	a	Seed, fertilizers and pesticides depots (Nos.)	46	
	b	Agriculture produce markets/ mandies (Nos.) (main + sub yards)	7	
	c	Cold storage a Numbers b Capacity(tonnes)		
11		Animal Husbandry		
	A	Dairy animals (as per 2007 census)		
	i.	Cows	31178	
	ii.	Buffaloes	131964	
	B	Sheep/ goats/ pigs	6490/14207/6364	

	C	Poultry	921000
12		Mushroom (White button)	
	A	No. of trays	80000
	B	Total production (in tons)	368.0 (Av. Yield= 4.6kg/tray)
13		Predominant Economic Activities Prevalent in the District: -Agriculture and allied -Industrial	
14		Major Food/ Commercial crops of the District: Wheat, mustard, bajra , paddy, guar Cole crops, cucurbits, radish, carrot, bhindi, brinjal, guava, ber and mushroom	

Note: Variation in data is due to different sources. Where ever discrepancy is recorded in the data, it was cross-checked and the most reliable data/ figure/ source is quoted/ used.

2.2. AGRICULTURE SCENARIO OF THE DISTRICT

2.2.1. Topography and agro-climatic characteristics

The soil of the district is sandy to loamy sand and also separated by Aravali hills. The land is also undulated and the slope is very high towards hills. In view of undulating topography there is scope for watershed development programs to increase production and productivity of the crops.

2.2.2. Climate

The climate, except during the monsoon, is characterized by the dryness in air, a hot summer and a cold winter. The year may be broadly divided into four seasons, viz. winter, summer, monsoon and the post monsoon or the transit period. The winter starts late in November and continues upto the beginning of March. The summer is from March till the end of June. The period from July to mid September is the south west monsoon season. Mid September to end of November constitutes the post monsoon or the transition period.

The district represents extreme arid to semi-arid climate, characterized by hot-dry and windy summers, cold winters and humid-warm monsoon months. The district receives an annual average rainfall of 550 mm. The rainfall in the district increases from the west towards the east. About 77% of the annual rainfall in the district is received during the south-west monsoon months. In addition to low quantum, the erratic occurrence of rainfall, aggravates

the problem to much higher degree. Though monsoon withdraws in early September, prevalence of high temperature (35°C) from mid-September to mid-October, results in delayed sowing of winter crops. About 77 per cent of total annual rainfall is brought about by South-western rain, which is spread over July to September. Weather remains almost dry between October and March, except few occasional light showers. Thereafter, it remains quite dry till June with high temperature and peak evaporative demand for water. The mean maximum and minimum temperatures, show wide range of fluctuations during summer and winter seasons. During December and January, the average minimum temperature is recorded around 4°C which, at times, reaches as low as 0°C.

The air is generally dry during the greater part of the year. Humidity is high in the south-west monsoon season. April and May are the driest months when the relative humidity in the morning is about 30 per cent and in the afternoon less than 20 per cent.

In the south-west during the monsoon season and for brief spells of a day or two in winters in association with passing western disturbances, heavily clouded or overcast skies generally prevail. The skies are mostly clear or lightly clouded during rest of the year.

Winds are generally light but gain force in the summer and monsoon seasons.

2.2.3. Soils

The district forms a part of Indo-gangetic plains. The soils of this region, being structureless, are prone to wind caving and crust formation and thus, germination of small seeded crops is adversely affected, even if a little rain follows sowing. The soil-texture of the district varies from sandy to loamy sand. The district has predominately loamy sand texture of soil. Being coarse textured, the soils are poor in water as well as in nutrient retention. Almost all the soils of the district are low in organic carbon and phosphorus.

Table 2.3 : Land utilization statistics (Area in ha)

Geographical Area	125307
Irrigated area	84461
Forest Area	2600
Land under non agricultural use	44327
Permanent pastures	100
Net sown area	78280
Gross cropped area	120822
Cropping intensity (%)	154.3

2.2.4. Cropping pattern /production system:

The predominate farming system in Gurgaon district is Agriculture integrated with Animal Husbandry. The major cropping systems under the existing farming system are bajra-wheat, bajra-mustard guar-wheat and guar-mustard. Buffalo is the main component under animal husbandry. Wheat and Mustard are the main crops in *rabi*, which occupy 49,833 ha and 21,967 ha, respectively with an average productivity of 36.80 and 12.40 q/ha. In *kharif*, bajra is the major crop occupying 32,833 ha with the productivity of 14.25 q/ha.

Table 2.4. : Area, production and productivity of major crops

Crop	2004-05-2006-07		
	Area(ha)	Prod (tons)	Productivity (Kg/ha)
Wheat	49833	183592.5	36.80
Mustard	21967	27246.2	12.40
Bajra	32833	46801.6	14.25
Paddy	2100	6484.5	30.88

Deputy Director Agriculture, Gurgaon

2.2.5. Land use pattern and Land holdings

2.2.5.1. Land utilization:

The district stretches over 1.25 lakh hectares geographical area of which 78280 ha (2.5 %) area is under cultivation. Forests cover 2,600 hectares constituting merely 2.1 % of the total geographical area in the district. Block Gurgaon is the largest in terms of geographical area, while block Pataudi is the smallest.

2.2.5.2 Size of Land Holdings:

The district has total 61348 land holdings with an area 84961 hectares, out of which 47.6 % fall in the category of < 1 ha, 37.2% in 1-2 ha, 9.2% in 2-4 ha and 2.6% in 4-10 ha.

2.2.6: Block wise scene of agriculture:

Table 2.5: Information on land use pattern

Sr. No	Name of the block	Geographical area (ha)	Net sown area (ha)	Gross cropped area (ha)
1.	Gurgaon	34543	12800	18242
2.	Farrukh Nagar	29681	23000	30550
3.	Pataudi	27552	23827	36830
4.	Sohna	33531	18653	35200
Entire district		125307	78280	120822

Table 2.6 : Block-wise annual rainfall (mm) in district Gurgaon

Year	Blocks			
	Gurgaon	Farrukh Nagar	Sohna	Pataudi
1997	900	330	622	471
1998	1224	331	630	552
1999	572	314	453	326
2000	856	200	392	424
2001	569	188	475	314
2002	443	82	432	409
2003	782	466	751	785
2004	491	259	243	698
2005	491	259	243	698

2006	283	113	171	545
2007	452	290	249	363
Average	653.6	297	487.7	510.4

Source: GWC, Gurgaon & DDA, Gurgaon

2.2.7. : Infrastructure facilities

- i. **Transport:** The district has good transport facilities. Besides broad and meter gauge railway transport facilities, the district has one National Highway No. 8, which connects the district headquarter to national capital Delhi and Jaipur in Rajasthan
- ii. **Marketing:** There is intra and inter connection of all the villages by pucca roads, with all towns and cities in the district. The district has 4 regulated markets for marketing the produce of the farmers. The vicinity to Delhi (around 30 km from the district headquarter) offers vast potential for marketing of high value crops. The district has 5 rural godowns having capacity of 50,000 tonnes grain

2.2.8. Irrigation and Ground water

2.2.8.1. Irrigation:

In the district 92.4% of the net sown area is irrigated. The main source of the irrigation is tube-well, which irrigate about 96.8 % of the total irrigated area (Table 2.7). Indiscriminate use of underground water has depleted the ground water to the level of over-exploited category.

Table 2.7 : Source of irrigation in Gurgaon district: 2006-07

Sources	Area (ha)	Per cent coverage
Govt. canals	1200	1.42
Private canals	0	0
Tanks	0	0
Tube wells	81761	96.80
Sewages	1500	1.77
Total	84461	

Source: DDA, Gurgaon

2.2.8.2 : Underground water

Table 2.8: Block-wise trend of long term water level fluctuation during pre-monsoon (June) in district Gurgaon (1974-2006)

Block	Depth to water below ground level (metres)							Fluctuation (metres)							Average Annual Fluctuation (metres)
	1974	1979	1984	1989	1994	1999	2004	1974-79	1974-84	1974-89	1974-94	1974-99	1974-04	1974-07	
Gurgaon	11.51	10.48	12.75	15.81	18.72	17.67	19.09	+1.03	-1.24	-4.30	-7.21	-6.16	-7.58	-13.29	-0.40
F. Nagar	4.50	4.54	7.83	10.29	11.41	11.57	13.93	-0.04	-3.33	-5.38	-6.91	-7.07	-9.43	-11.50	-0.35
Pataudi	4.87	5.23	8.88	14.28	18.81	18.87	22.65	-0.36	-4.01	-9.41	-13.94	-15.00	-17.78	-11.48	-0.65
Sohna	5.67	4.70	8.79	10.24	11.91	11.78	15.16	+0.97	-3.12	-4.57	-6.24	-6.11	-9.49	-13.81	-0.42
Distt Mea	6.63	6.23	9.56	12.65	15.21	15.22	17.70	+0.40	-2.92	-6.01	-8.57	-8.58	-11.07	-15.03	-0.46

Source: GWC, Gurgaon

Table 2.9: Block-wise trend of long term water level fluctuation during pre-monsoon (June) in district Gurgaon (1994-2007)

Sr. No.	Block	Water level in metres		Fluctuation (metres)	Average annual Fluctuation (metres)
		June 1994	June 2007		
1	Gurgaon	11.51	24.80	-13.29	-0.40
2	F. Nagar	4.50	16.00	-11.50	-0.35
3	Pataudi	4.87	26.35	-21.48	-0.65
4	Sohna	5.67	19.48	-13.81	-0.42
District Mean		6.63	21.66	15.03	-0.46

Source: GWC, Gurgaon

The report on ground water assessment prepared and recommended by NABARD, shows that there is no scope for further development by installation of tube-wells, as the district falls under over-exploited category.

Table 2.10: Block-wise area under different ranges of water table depth in district Rewari during June 2007

Block	Total geographical area (sq. km)	Hilly area (sq. km)	Area (sq. km)					
			Depth of water (in metres)					
			0-3	3-10	10-20	20-30	30-40	>40
Gurgaon	354.62	12.88	1.70	26.58	129.10	150.0	32.37	2.09
F. Nagar	280.09	0.31	--	22.72	164.37	90.93	1.75	--
Pataudi	275.61	0.45	--	--	47.85	218.86	8.45	--
Sohna	339.01	24.25	--	82.70	131.94	100.12	--	--

District Mean	1249.33	37.89	--	132.01	473.26	559.91	42.47	2.09
Percentage	100	3	1.70	11	38	45	3	--

Source: GWC, Gurgaon

2.2.8.3. : Ground water balance

The ground water balance scenario shows that on March 2004, the net ground water available in the district was lesser than the total draft. The development of water was highest (311 %) in Gurgaon block followed by Pataudi (222 %), Sohna (155 %) and F. Nagar (148 %); and all blocks of the district are categorised as over-exploited zones.

Table 2.11: Ground water balance in district Gurgaon as on 31.3.2004

Sr. No.	Name of block	Net ground water available (mcm)	Net draft in (mcm)	Future allocation of industrial and domestic draft (mcm)	Ground water balance (mcm)	Percent development	Category
1	Gurgaon	59.85	84.42	10.51	-35.08	311	Over-exploited
2	F. Nagar	39.90	58.09	8.21	-26.40	148	Over-exploited
3	Pataudi	53.23	80.80	4.34	-31.91	155	Over-exploited
4	Sohna	49.18	107.24	3.25	-61.31	222	Over-exploited
District Total		202.16	234.03	26.31	-58.18	209	Over-exploited

Source: GWC, Gurgaon

Note: mcm – million cubic meters

2.2.9. District income from agriculture and allied sectors:

The gross district from agriculture and allied sector is given in Table 2.12. It indicates that Animal Husbandry (49.7%) and Agriculture Sector (45%) maximum contribute 94.7 % to the district income whereas; Horticulture (2.7%) and other subsidiary enterprises (2.5 %) contribute only a small fraction.

Table 2.12. District income from agriculture and allied sectors

Crop / Commodity	Production (tons)	Rate (Rs. /ton)	Value of Produce (Rs. in lacs)
Field Crops			
Wheat Grain	207952	10,000/ton	20795
Byproduct	207952	1,000/ton	2079
Mustard	26421	20,000/ton	5284 550 (byproduct)
Paddy	7447	20,000/ton	1117
Bajra	59663	6,000/ton	3579
	119326	1,000/ton	1193
Total			34597 (45.0%)

Horticulture			
Total	20696	10000/ton	2070(2.7%)
Subsidiary enterprises			
Honey	200	1,00,000/ton	200
Mushroom	368	35,000/ton	129
Fish	3671	45,000/ton	1651
Total			1980 (2.6%)
Animal products			
Milk	160308	20,000/ton	32061
Dung	8,50,000	150/ton	1275
Egg (Lacs, No.)	863	2.5/Egg	2157
Broiler	5249	50000/ton	2624
Total			38117 (49.7%)
Grand Total			76764

Figures in parenthesis denote percent of grand total

2.2.10. Intra district growth differentials

Gurgaon is a small district having 1.25 lac ha geographical area. The effect of intra district resource variation is inflicted on the agricultural growth of the district. The annual rainfall received in F. Nagar block (297 mm) is almost half of that received in Gurgaon Block (653 mm). The rate of decline of water table in Pataudi block is as high as 0.65 metres /annum against the lowest 35 cm /annum in F. Nagar block. The soils of the district as a whole, are low in organic carbon and phosphorus, but there is acute deficiency of micro nutrient Zn in the district. Highest cropping intensity is in Siohna block (188 %), whereas lowest intensity is in F. Nagar block having lowest rainfall. Productivity of Bajra and mustard is highest in Gurgaon block, whereas wheat productivity is highest in F. Nagar block (Table 2.13).

Table 2.13: Block wise cropping intensity in Gurgaon district

Sr. No	Name of the block	Cropping Intensity (%)
1.	Gurgaon	142.5
2.	F. Nagar	132.8
3.	Pataudi	154.5
4.	Sohna	188.7
Entire district		154.3

Table 2.14: Block wise variation in productivity of major crops during 2006-07

Main crops	Yield (kg/ha)				
	Blocks				District Average
	Gurgaon	F.Nagar	Pataudi	Sohna	
Rabi					
Wheat	40.95	44.79	35.90	36.80	39.61
Mustard	14.78	14.50	13.68	10.95	13.48
Kharif					
Bajra	24.91	17.85	20.90	9.98	18.18
Rice	32.38	32.38	32.38	32.38	32.38
Fishery					
Fish (t /ha)	37	38	40	42	
Units	20	22	40	50	

2.3 Vision

Gurgaon district has witnessed substantial shifts in acreage under wheat and high level of crop intensification due to adoption of high yielding varieties of wheat and hybrid of bajra and maize with the advent of Green revolution. This was the period, when a large number of tube wells for irrigation in the district mushroomed with the advent of rural electrification. The significant increases in the productivity of wheat and mustard was brought about by technological improvements/ interventions backed by effective price support and public stocking policies. These developments put the region's agriculture on high growth path resulting into fast increase in the area under wheat crop. However, in the recent past the economic and ecological sustainability of the existing farming system of the district is in doldrums. There are wide concerns about the depletion of ground water level, degradation in soil fertility, rising problems of insect-pest and disease complex, decline in bio-diversity, stagnation in yields, rising costs and diminishing economic returns, decline in factor productivity, fragmented small holdings and narrow economic base of the farmers.

Considering the unique situation of small fragmented holdings, lack of capital investment, necessity of recycling, year round employment, risk avoidance and concerns mentioned above, the farmers of the district started attempting, especially during mid eighties, to broad-base the concept of crops and animal husbandry (being practiced by them since long) by incorporating poultry, fish, vermi-culture, bee-keeping, vegetable growing, horticulture and floriculture. Sporadic success was achieved by relatively small number of farmers, as the approach of crop enterprise concentration moved towards integration of some other enterprises. Notables are instances of integration of vegetable, floriculture, horticulture, where farmers have achieved commendable success, otherwise, majority of the farmers are

experiencing low productivity and profitability. Lack of knowledge, inefficient integration without farming system technologies, which include modern farm management skills that enable farmers to improve the efficiency, increase cropping intensity, and to integrate and diversify into more high value commodities/enterprises in conformity with market trends are the factors behind it.

For vast majority of small holdings prevailing in the district, integrated farming system approach, especially with multiple crop husbandry in integration with one or two allied enterprise with market potential, is the sure way for optimum utilization of limited resources with sustainable income. Instead of single enterprise, the co-existence of multiple enterprises (crops and allied) in an integrated way makes optimum utilization within crop husbandry. The plank necessarily be the increased efficiency especially of water, fertilizers and nutrients, human labour and machinery, coupled with cost reduction measures elaborated in plan document. The scientific integration of certain enterprises is eco-friendly, and imparts sustainability to the system with increased income and employment generation.

The ever increasing cost of production and dependency on purchased inputs can effectively be controlled by adopting this approach through enhanced use efficiency of different critical inputs in crop enterprises with judicious combination of one or more allied enterprises complimenting each other through effective recycling of residues, wastes, byproducts or the products itself. The allied enterprises are important part of the farming systems. Both price and income elasticity of demand for most of these enterprises' products are high. There is wide chasm between demand and supply of these products. There exists high potential for increasing the yield rates of these enterprises, as the gap between present productivity (in the district) and the achievable yield and potential yield is quite large. The prevailing infrastructural facilities, easy access to big markets and up-coming processing facilities in and around the district are added advantage for the farmers of this district.

VISION STATEMENT

To meet the productivity targets of agriculture and allied activities by rebalancing these as per market demand. The emphasis would be on conserving the natural resources in an integrated diversified system with the aim of sustaining farm income at an increased level.

Priority Setting

- Safe use of brackish water
- Drip irrigation in fruit plants and vegetable crops
- INM and accelerated adoption of vermi-composting
- Promotion of high value vegetables and floriculture
- Promotion of less water requiring crops including ber, aonla, onion, barley, guar etc.
- Bridging yield gaps of crops, animals and other enterprises

- Conservation Agriculture including improvement in water productivity and surface maintained residue
- Popularizing mineral mixture in animal ration
- Income generating activities for rural masses.

To attain the objectives of output expansion, employment generation and natural resources sustainability, agricultural diversification has emerged as an important strategy. The studies conducted in developing countries as well as in India indicated agricultural diversification as a major tool for economic growth. Different studies on diversification have also shown that at micro level, a shift towards high value crops had benefited not only the farmers/grower, but the poor also, by directly raising agricultural productivity and generating additional employment. The pace of diversification in a district/region, however, depends upon the opportunities for diversification and responsiveness of the farmers to these opportunities.

In Gurgaon district during 1970s and 1980s the green revolution technologies provided strong motivation to diversify crop sector in favor of high yielding cultivars of wheat, pearl millet and mustard. Now the average profits of farmers of Gurgaon district can be increased by adoption of less water requiring crops such as Sikar onion in vegetable crops, fenugreek in spices, barley, clusterbean in field crops, flowers, mushroom cultivation, bee keeping etc. at an increased level. Intensification of mustard + chicory (for seed), Intercropping of mustard with potato on beds, and multiple cropping with Karonda interspersed with Bael at boundary of field crops / horticultural crops can prove economic cropping system

CHAPTER III

SWOT ANALYSIS OF THE DISTRICT

3.1: Introduction

Analysis of SWOT is a basic and straightforward tool that gives direction and serves as a basis for the development of an enterprise. It accomplishes this by assessing an enterprise Strengths (what an enterprise can do) and Weaknesses (what an enterprise can not do) in addition to Opportunities (potential favorable conditions for an enterprise) and Threats (potential unfavorable conditions for an enterprise). The role of SWOT analysis is to take the information from the concerned agencies and separate it into internal issues (strengths and weaknesses) and external issues (opportunities and threats).

In applying the SWOT analysis in agriculture, it is necessary to minimize both weaknesses and threats. Weaknesses should be looked at in order to convert them into strengths. Likewise, threats should be converted into opportunities. The strengths and opportunities should be matched to optimize the potential production. Applying SWOT in this fashion can generate income for the farmers in sustainable manner.

3.2. SWOT analysis of the Farming System in the District

Farming System

Strengths

- Soil are quick to reach Field Capacity after irrigation or rain, facilitating timely sowing of the crops
- Around 92.4 per cent area under cultivation is irrigated
- Good transport facilities through rail and road
- Dairy as an integral component of farming system
- Well developed grain and vegetable markets in the district /adjoining areas
- Assured input availability network.
- Sufficient financial help through banks available
- Major farm machineries available at subsidized rates
- A good network of extension services

Weaknesses

- Low rainfall with erratic distribution
- No availability of canal water
- Depleting water table (receding @ 45 cm/annum)
- Light textured soils with poor retention of water and nutrients
- Poor fertility soils, low in organic carbon and phosphorus (100%).
- Increasing deficiency of micronutrients Zn in soils
- Supra optimal use P fertilizer, irrigation water and plant density in mustard
- Infestations of non-cropped area with carrot weed is a potential danger to animal and human health as well as bio-diversity.
- Poor management of cow dung and crop residues.

- Poor breeding, feeding and management of livestock practices
- Technological gaps in practices of some crops
- Lack of water harvesting and management practices
- Being NCR region, rapid diversion of cultivated lands for non agriculture uses
- Unavailability of labour during peak period of farm operations.

Opportunities:

- Suitable agro-climatic and edaphic conditions congenial for mustard and bajra.
- Crop residues and by-product available in abundance which can be recycled as compost/ vermi-compost for improving soil health
- Network of co-operatives
- Good marketing infrastructure
- Good information and communication system
- Excellent rail and road connectivity
- Rising demand for milk and milk products, vegetables, flowers

Threats:

- Non-judicious use of water leading towards water bankruptcy
- Indiscriminate use of brackish water impregnating the soil with salinity/sodicity
- Excessive use of pesticides in vegetables
- Intensive cropping without INM impairing soil health
- New weeds, insects and diseases
- Decreasing availability of green fodder

A. Management of Agricultural Crops

Strengths:

- Light soils easy and quick to work.
- More than 92.8 % of cultivated area is irrigated
- Suitable climate for production of wheat, mustard, guar and bajra
- The proximity to the huge market of National Capital of Delhi with well established connectivity of roads and railway track.
- Fairly well established and upcoming infrastructural facilities in and around the district.
- Improved varieties and well developed packages for most of the crops

Weaknesses

- Inadequate soils health management practices
- Light textured soils with poor retention of water and nutrients
- Poor fertility soils, low in O.C. and phosphorus
- Increasing deficiency of micronutrients Zn in soils
- brackish underground water
- soils affected with varying degree of salinity /sodicity
- Improper and inefficient water management

- Critical technological gaps in specific areas of crop production viz. seed treatment, balance fertilization and insect pest and disease management.
- Poor adoption level of FYM, green manuring and vermi-composting and crop /farm residue management

Opportunities

- Immense scope for mixed / multiple cropping with higher income and employment generations.
- Vast opportunities for profitable diversification of existing cropping pattern and farming system
- Technologies available for sustaining natural resources with increased efficiency
- Established and upcoming marketing agro-processing and warehousing /godown facilities in and around the district.

Threats

- Degrading soil fertility especially with declining status of organic carbon, phosphorus and micronutrients.
- Alarming depletion of ground water
- Declining factor productivity and rising cost of cultivation
- Increasing farmers' inability to invest in agricultural production system (majority being marginal and small land holders and resource poor)
- Rising problem of insect-pest and disease complex.
- Weeds and insects thriving on common lands and government lands

B. Management of Horticulture and Vegetable Production

Strengths

- Favourable climate for production of different quality fruit (especially ber, guava, aonla) and vegetable crops.
- The proximity to the huge market of National Capital of Delhi with road and rail connectivity.

Weaknesses

- Poor quality brackish water
- Light soils with poor fertility
- Lesser availability of quality seeds and planting material in time
- Non-availability of sufficient labour especially at crucial stages
- Lack of proper knowledge of farmers of modern production techniques, post harvest handling and marketing practices
- High transportation cost
- Lack of cold storage facilities

Opportunities

- Excellent marketing opportunities to the national and inter-national markets.
- Increasing urbanization and changing food habits with preferences towards fruits and vegetables and agro products.

- Scope for organic farming

Threats

- Inefficient and less transparent marketing with monopoly of traders and multiple level of intermediation.
- Weaker post harvest management, modern marketing facilities like cold storages /chains, pre-cooling and waxing centers.
- Wide fluctuation in prices

C. Management of Natural Resources

Strengths

- Abundance of solar and wind energy round the year
- Light soils, easy to work
- Rich bio-diversity
- Climate and soils suitable for growing quality crops

Weaknesses

- Coarse textured soils with poor nutrient and water retention capacities
- Degradation of soil fertility due to continuous cropping without adequate soil health management practices
- Saline, sodic soils
- Depleting water table
- Infestation of weeds, insect-pest and disease complex
- Lack of integrated approach on NRM, INM and IPM by the farmers

Opportunities

- Untapped solar and wind energy for agriculture use
- Unexplored bio-diversity with respect to vegetables and other crops
- Biomass available from livestock, crop and farm residue for maintaining proper soil health.
- RCTs available for increased yields and productivity with enhanced efficiency of natural resources and other inputs.
- Immense scope exists to tackle resources degradation through integrated approaches of NRM, INM & IPM.

Threats

- Indiscriminate usage of irrigation water leading to alarming decline of water table and secondary salinization of soil
- Imbalanced fertilizer use creating soil health problem and decrease in productivity

D) Management of Animal Husbandry

Strengths

- i) Traditional expertise in cattle rearing with almost every farm house hold possessing milch animals in varying numbers.

- ii) Presence of viable milk marketing network through co-operative societies, private agencies and individual milk traders.
- iii) Ample marketing avenues of animal based products and by products in and around the district.
- iv) Government backed disease management and breed up-gradation services.
- v) Expanding poultry enterprise with promising income generation.
- vi) Sheep, goat and pig rearing a popular enterprise among landless and poor sections of society.

Weakness

- i) Poor stock with high mortality and poor growth in calves.
- ii) Infertility and delayed calving
- iii) Repeat breeding and long calving interval
- iv) Low milk yield in buffalo and cows.
- v) Lack of proper management and feeding practices.
- vi) Low availability of quality fodder
- vii) High costs of feed, medicines/vaccines and chicks
- viii) Wide fluctuations in selling prices of eggs and broilers.

Opportunity

- i) Scope exists for bridging yield gaps
- ii) Growing demand for milk and other animal based products offers ready markets with higher returns and additional employment generation.
- iii) Upcoming processing and exporting firms to provide additional fillip to various

animal based allied activities.

- iv) Scope to raise on farm employment, income and increased availability of organic manure by substituting area under field crops in favour of fodder crops and there by raising dairy on same area.

Threats

- i) Non descript poor graded bulls used for natural insemination.
- ii) Increasing urbanization and high population pressure on land leads to less acreage under fodder production.
- iii) Shrinking pasture lands
- iv) Frequent occurrence of diseases in sheep and goat
- v) Disease outbreak (even in far off places) causes the panic in consumers and producers suffer on account of crash in markets especially of poultry.
- vi) Poultry industry growth dependent on availability of maize and soya and their competitive prices as feed cost is nearly 70% of total cost with 80% of raw material comprises of these two crops.

E) Management of Fisheries

Strengths

- i) Overall fish production, productivity and acreage increasing steadily over years
- ii) Vast unfulfilled demand for fish with easy market accessibility
- iii) Technical, financial and marketing assistance by Government agencies for promotion of this sector.
- iv) Greater people participation and generation of employment opportunities especially for landless and marginal farmers.

Weakness

- i) Weak infrastructure for fish seed production and genetic up gradation.
- ii) Lack of farmer oriented activities e.g. trainings, demonstrations, exposure visits, awareness camps etc. to update farmers' practices of fish production and management.
- iii) Inadequate quality seed availability of high yielding fresh water prawn.
- iv) Poor maintenance of common or panchayat pond.

Opportunity

- i) Immense scope for fish seed (fingerlings) production to cater to the needs of fish farmers of the state
- ii) Ample scope for mobilizing untapped water resources such as water logged area, saline water and soil for aquaculture.
- iii) High cattle population releasing organic manures in pounds help in growth of natural food for fish.
- iv) Greater opportunities for diversification of traditional fish culture and agriculture to culture of high value fish species such as magur, soil, singhora, ornamental fish and prawn.
- v) Provision of financial assistance for popularizing integrated fish farming with agriculture, horticulture, dairing, poultry, piggery and duckery.

Threats

- i) High mortality in juvenile and adult fish
- ii) Absence of any reputed centre/source of fish feed, fisheries management institute.
- iii) Lack of value addition and post harvest management practices by farmers
- iv) Poor facilities for soil and water sample testing, disease diagnosis and post harvest

infrastructures.

- v) High canal water charges (increased from Rs. 40/2500 per cubic feet to Rs 250/2500 per cubic feet)
- vi) Recent amendments in Panchayat Act related to reducing lease period of 10 years to 3 years (as no long term investment of worth would be feasible for lease holder).

3.3. Reasons far backwardness and issues impeding growth:

The major obstacles affecting the progress and productivity of different crops and enterprises of the district as identified by participatory approach are listed hereunder.

Wheat

- Prevalence of high temperature at maturity
- Poor adoption of seed treatment
- Increasing infestation of wild oat and *Phalaris*
- Imbalanced fertilizer use

Mustard

- Poor adoption of S fertilization
- Painted bug attack
- Rising problem of stem-rot
- Prone to frost injury
- Problems of sufficiency
 - Supra optimal application of P fertilizer
 - Over-use of irrigation
 - Higher planting density at narrow spacing

Bajra

- Problem of repeat sowing by burial of germinating seedling in furrow by sliding sand due to rains
- Poor adoption of P fertilizer
- Infestation of *Cyperus*

Guar

- Poor adoption of P fertilizer
- BLB and aphid attack

Horticultural Crops

- Poor planting material for fruits crops
- Non availability of hybrids from public sector
- Poor marketing infrastructure
- Fluctuating market prices

- Prone to frost during winter

Animals

Cows

- Cattle population is decreasing in the district
- Local cows are not preferred by the farmers due to poor milk yield
- High age at first calving and longer inter-calving period
- Repeat breeding in crossbred cows due to poor nutrition and uterine infection. Poor results of artificial insemination of lack of quality/proven bulls for natural service resulting in services by non-descript bulls
- Poor supplementation of mineral mixture and balanced ration
- Mechanization of agriculture led to poor demand of male calves
- Inadequate green fodder supply throughout the year.

Buffaloes

- Longer calving interval
- Anoestrus and silent heat problems
- Supply of imbalanced ration and poor supplementation of mineral mixture
- Inadequate green fodder availability

Sheep/goat

- Indiscriminate breeding practices led to poor weight gain and low production.
- Non-availability of graded bucks for natural services
- Shrinking pastures / grazing lands or natural habitat
- Lack of good quality feed and fodder
- Kid mortality due to lack of knowledge in farmers
- Unhygienic housing management.

CHAPTER IV

DEVELOPMENT OF AGRICULTURE SECTOR

4.1: Introduction

Agriculture is a predominant activity of Gurgaon district. The soils of the district are coarse in texture, alkaline in reaction and low in O.C. and Phosphorus. The main source of irrigation in the district is underground water, which is largely brackish in nature. The desperate use of these waters has caused secondary salinisation and sodification. After the introduction of sprinkler irrigation system, the irrigation for the uneven fields has become very easy and the district has done remarkable progress in agriculture production. The agricultural growth of the district can be increased further by diversifying the farming system in favor of vegetables and fruits and efficient management of inputs.

4.2: Land Use

Out of the total geographical area of 1,25,307 hectares in the district, 78280 ha area was sown during 2006-07. The district has only 2600 ha area under forest, 100ha area under permanent pastures and 39,724 ha under non-agricultural use. At present, the cropping intensity is 154.3 % and can be increased by better water use.

4.3: Soil Health

All the soils of the district are low in O.C and phosphorus. The deficiency of micronutrient Zinc is increasing day by day. On the other hand, the increasing trend of burning mustard-residue in brick kiln is posing a serious threat to soil environmental health. Hence green manuring and utilizing mustard residue and animal shed waste for composting will help in restoration of soil health. Moreover, site specific nutrient management, particularly in micronutrient nutrition of the crops adopting zero tillage, laser leveling and rain water harvesting is an utmost priority.

4.4: Water Resource Management

The surface and ground water resources are very poor in the district. The irrigation water is very scarce input and has become a major hurdle in the growth of agriculture. The major source of irrigation is tube wells thereby ground water has been overexploited during recent years. The normal rainfall in the district is also low (550 mm) and not able to recharge the depleted ground water level. Therefore, it is essential to manage ground water efficiently by adopting drip irrigation system particularly in horticultural and vegetable crops. Specific extension activities are being proposed on this important aspects in the plan.

4.5: Major Crops and Varieties in the District

The major field crops cultivated in *kharif* season are bajra and rice. Likewise, the major crops grown in *rabi* season are wheat and mustard. The Ber, Aonla, Guava and Bael are the best suited horticultural crops to the agro-climatic conditions of the district. The vegetable crops namely cucurbits, okra, carrot, radish cauliflower, chilli, brinjal, pea, leafy vegetables, tomato, onion, etc are also grown in the district. There is need to evaluate and monitor the performance of released varieties and hybrids of field crops and vegetables. Therefore the project is proposed in Chapter VI.

Table 4.1: Major crops and their varieties cultivated in Rewari district

Crops	Varieties
Bajra	HHB 50, HHB 60, HHB 67 (Improved), HHB 67, HHB , HHB 94, HHB 117 and Hybrids of private companies mainly, Pioneer, Proagro, Dev Seeds, Shriram, J.K.
Guar	HG 365 and HG 563
Moong	Asha, Muskan
Fodder Bajri	Local, Pvt companies
Cotton	HD 123, H 1098, H 1117, RG-8, Dhan Laxmi, Bt. Rasi 134
Raya	R.H. 30, T-59, Laxmi, RB 9901, Jadia, Pusa Jai Kihan and varieties of private companies mainly, Pioneer, Proagro, Dev Seeds
Wheat	PBW-343, WH-711, PBW-502, Raj-3765, WH 283, C-306
Barley	BH-393 and Local
Gram	HC-1, C-235

4.6: Farm Mechanization/Farm Equipments

The district has sufficient number of harrows (4834), cultivators (4032), threshers (1480) and tractors (5883) to carry out the agriculture operations. To cope with the problem of unavailability of labour in peak harvesting season, 8 reaper-cum-binders, 56 straw reapers and 9 combine harvester are available in the district. There are 8 ZT machines in the district and need to introduce laser leveling. To accelerate the adoption of RCTs, it is proposed to supply ZT machines and Laser Leveler to the farmers on subsidised rates as proposed in Chapter VI.

4.7: Input Management

Besides improved seeds, the integrated nutrient, weed and pest management is essential to accelerate agricultural growth. At present, there exists a gap between the actual productivity and the attainable /achievable / potential productivity of the crops grown in the district. The proper and timely management of following inputs for crops is essential to fill this gap.

4.7.1. Good quality seed

Good quality seed is the most critical input in crop production. The government agencies are trying their level best for assured supply of good quality seeds, but the demand usually falls short of supply. Therefore, the reputed private seed companies should be involved for making assured availability of good quality seed.

4.7.2. Fertilizers

Next to irrigation, fertilizer is second most important input for the cultivation of high yielding varieties. The farmers are not aware of the balanced feeding of different crops. They are concentrating mainly on application of nitrogen, There is under use of P in guar and

bajra, but its over use is noticed in mustard. The crops suffer from the deficiency of micro-nutrients Zn affecting the productivity of crops in the district. Therefore, location specific integrated nutrient management, use of bio-fertilizers, FYM and vermi-composting are required to be popularized for wider adoption.

Table 4.2 : Planning of Fertiliser Requirement

Fertiliser Grade	Use of fertiliser (tons) during 2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Urea	2500	7610	8720	8830	8940	9050
DAP	1850	1885	1920	1955	1990	2025
MOP	185	220	255	290	325	360
SSP	43	83	133	163	203	143

4.7.3 Site specific nutrient management

Fertilizer application will be based on the principles of SSNM which includes yield gap analysis, guidelines for regional protocol etc. Higher nutrient use efficiency can be achieved through inoculation with biofertilizers of bajra, guar, wheat and mustard seeds. Therefore, location specific integrated nutrient management is required to be popularized for wider adoption.

4.7.4. Green manuring

To improve crops productivity and soil health, it is essential to bring significant area under green manuring of dhaincha in the plan period. The project on this important aspect is planned for and the details are given herein.

4.7.5. Plant protection chemicals

The crop diseases, pests and weeds are other major problems in realizing optimum yield for all the crops in the district. The improper management of these control measures often results into increased cost of cultivation without much benefit in yield. In vegetables, the farmers are depending mainly on chemical control with higher doses of chemicals. Hence, integrated measures for control of insect/pests, diseases and weeds control, which are required to be adopted for sustainability and profitability of crops. Amongst the plant protection chemicals, the major proportion is contributed by insecticides. Fungicide consumption is the lowest. Weedicides are used mainly in wheat and bajra. To insulate the crops against diseases, termite attack and weeds, projects are proposed in Chapter VI.

4.8. Integrated Weed Management (IWM)

It is observed that farmers are using poor spraying techniques thereby low efficiency of applied herbicides is achieved. Hence, it is proposed to train farmers by organizing trainings on spraying techniques and integrated weed management techniques as proposed in this chapter.

4.8.1 Timely seeding of crops

It is proposed to organize demonstrations and field schools each year during the plan period on timely seeding of various crops with an objective to educate and sensitise the farmers regarding the benefits of sowing of crops at an optimum time.

4.9 : Special Projects / Programmes on-going in the district

The following special projects are on going in the district.

Table 4.3: Special schemes going on in the district

Sr. No.	Name of Scheme	State / Centre Sponsored
AGRICULTURE DEPARTMENT		
1.	District Work (DW)Scheme for Agriculture Demonstration and Propaganda	State
2.	HVP Scheme for High Yielding Varieties Programme	State
3.	O.S.P. Scheme for Sugarcane Development in Haryana	State
4.	O.S.T. Scheme for development of Oilseeds in Chronically Drought Affected Area in Haryana State	State
5.	W.B.Scheme for Agriculture Extension Training Services to the farmers	State
6.	Q.C.I Scheme for quality Control in Agricultural Input	State
7.	ISOPOM Integrated Scheme of Oilseed, Pulses, Oil Palm and Maize	Centre
8.	MMM Scheme for the Macro Management Mode of Agriculture	Centre
9.	Agriculture Technology Management Agency (ATMA)	Centre

4.10 : Constraint Analysis

The reasons for the yield gaps are identified and the requisite interventions are planned using participatory processes involving stakeholders. The natural factors of production including soil and water in Gurgaon district are slowly degrading and retarding the growth of agriculture production. The soil health is deteriorating and ground water level is declining at a rate of 45 cm /annum. Moreover, the quality of ground water is brackish and its indiscriminate use is causing secondary salinisation / sodification of soils. The poor availability of nutrients in soils is having a direct bearing on crop growth and finally on the quality of produce as grains, fruits, vegetables, fodder etc. It has recently been documented that nutrients deficiency in food and fodder has an adverse affect on the health of human beings and animal. The major reasons of gaps in yield of crops are poor and uncertain availability of water for irrigation, poor status of major, secondary and micro-nutrients, low carbon content in the soil, brackish ground water, increasing soil salinity and environmental stresses during the growth period of crops etc. The analysis of sustainability issues and reasons for gaps in the productivity of major crops grown in the district are presented in following pages.

Constraints in Agricultural Progress

The major obstacles affecting the progress and productivity of the district, as identified by participatory approach are listed hereunder.

- Depleting soil fertility
 - i. Soils low in organic carbon
 - ii. Less use of organic manure
 - iii. Burning of crop residue particularly mustard byproduct in Brick Kilns
- Declining water table
- Salinity and sodicity problems
- Non-judicious use of fertilizers
- Stagnation in crop yields
- Rising cost of cultivation and diminishing economic returns
- Rising problems of insect-pest, disease complex and weed flora.
- Decline in factor productivity
- Shift in weed flora
- Inadequate availability of quality seeds, particularly vegetables and fodders
- Inadequate availability of quality fodder
- Fragmented small holdings
- Narrow economic base
- Slow pace of diversification
- Farmers inability to invest
- Personal and social outlook
- Lack of orientation in developmental department
- Lack of farm finance and marketing awareness

Table 4.4 : Sustainability issues and gap analysis of productivity of different crops and resources

S. No.	Activity-crop /gap	Factors/ constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
Land Management						
1.	Management of salinity & sodicity	Indiscriminate use of brackish water	Avoid irrigation with brackish water in summer and drought years, because it leads to secondary salinization, wherever available make conjunctive use of water. Tolerance of current and improved varieties to salinity and sodicity needs further investigations. Work is also needed to adopt agronomic practices, especially the timing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and yield.	Bajra-wheat, guar-wheat, pulses-wheat in SW Haryana should be studied for long-term salinity and sodicity build-up due to water management in kharif season.	Soil with ----- ha area (--- %) are affected with sodicity /salinity, ----- % underground water is brackish	Long-term productivity of crops will sustain by proper water management in the system as a whole
2	Water management					
1.	Reduced water use efficiency	Poor rain and irrigation water management, poor land leveling, low power tariff,	Introduction of zero tillage, bed planting, (in vegetables) laser land levelling and green manuring,	Demonstrations, development and research	Entire district	Savings in water, improved water use efficiency, better water-nutrient interactions

		power supply dependent irrigation system	introduction of micro-irrigation, water harvesting, introduction of watersheds, improvement in power supply schedules			
3	<i>Integrated Pest Management</i>					
a	Weed management in wheat	Complex weed flora	Accelerated adoption of zero tillage, mechanized weeding more competitive varieties	Release of competitive varieties, monitoring of resistance development	Entire district	Sustained productivity of wheat, reduction in herbicide use, better use of natural resources
b	Orobanche in mustard	The monoculture of Indian mustard	Introduction of barley	Research on two-row barley, research on longevity of Orobanche	About ----- ha can be diverted to barley	Oilseed sustainability can be ensured through long-term approach leading to reduction in seed bank of <i>Orobanche</i>
c	Emergence of new pests Aphid in wheat, barley, BLB in guar Blister beetle in cowpea and moong	Availability of monoculture systems and intensive cropping	Intensive research on crop ecology and biological control, research on bio-technology	Basic research on ecology, biological control	Entire district	Prevent emergence of new pest problems and reduction in pesticide use
4	Weed management	Complex weed flora predominately <i>Chenopodium</i> seriously affects wheat yield in the district Wild oat and <i>Phalaris</i> are intruding with a	Improve the efficiency of existing herbicides. Introduce new herbicides. Capacity building for spraying techniques.	Capacity building of extension agencies and farmers for appropriate spraying techniques. On farm demonstrations of new herbicides	The entire wheat growing area of the district	Anticipated economic benefits are increased profitability, increased yield and increased food security.

		rapid pace	Ecological approaches including zero-tillage crop rotation.			
5.	Nutrient mining & increased incidence of multiple nutrient deficiencies	Coarse texture of soil leading to poor retention of nutrients The soils of the district are low in O.C. and P. Poor residue retention	Introduce more organic manures, more residue retention on surface, use of site specific micro-nutrient, use of N in three splits and use of first split before 1 st irrigation, integrate conjunctive use of organic and inorganic sources of nutrients generate fertilizer recommendations based on the principle of site specific nutrient management. The optimal use of existing (indigenous) nutrients coming from soil, organic amendments, crop residue and irrigation water. Apply fertilizer to fill the deficit between crop needs and indigenous supply. Management of pest diseases and weed problems	Experimental research to work out fertilizer requirement of major cropping system in the district viz. Bajra-wheat, guar-wheat Bajra-mustard guar-mustard etc, re-look at soil test values, change in the recommendation of practice	The entire area under wheat	The residue retention will help improving soil productivity, improved water permeability, decreased losses of nutrients

			through more appropriate nutrient management.			
6	Variety improvement	No wheat variety is tolerant to terminal heat, short duration varieties produce less yield	Varieties with stay-green character near maturity, long duration varieties, varieties which can fit early sowing starting from 15 th Oct. to manage terminal heat at maturity	Pre-breeding, work on hybrid wheat. Improvement in the grain size of WH 542	At least 75% area should be covered with varieties which can yield equal or more than WH 542 and PBW 343	Enhanced use of natural resources
7.	<i>Diversification</i>					
1.	Reduced bio-diversity due to large area under mono-cultures without legumes	Brackish water, saline, sodic soils High risk associated with legume crops, more insect-pest problems in pulses, Non-availability of high yielding varieties of crops other than pulses	Develop alternate strategy to intensify cultivation of guar and moong in kharif and gram in rabi in parts of the district having limited but good quality water	Demonstrations		Improvement in soil health and savings in water
			Intensification of barley cultivation Intercropping of Chicory with mustard	Research Extension. and Developmental Agencies should join hands for the promotion of barley through varietal improvement and demonstration		Savings in water Increasing income and crop productivity

	Intercropping of guar with castor	Lack of mechanized crop establishment and threshing of castor	Use of bed planters for castor sowing	Farmers' participatory approach	Twenty five per cent guar area can be sown with castor as an intercrop	More conservation of resources, multiple land use, getting more with less
8	Field Crops					
a	Mustard					
	Less use of sulphur, No management of <i>Orobanchae</i> Supra optimal use of phosphorus, irrigation, high population density at closer spacing	Lack of knowledge	Balanced use of fertilizer, efficient irrigation management/ Maintaining proper plant density	Research on integrated nutrient management specially when farmers are using more Phosphorus than recommendation, Research on management of <i>Orobanchae</i> Need to relook the irrigation and spacing requirement Demonstrations on the use S, recommended P application and irrigation on critical stages	The entire district	Improvement in yield on sustainable basis.
b	Wheat					
i	Seeding time	Unavailability of irrigation, Delayed harvesting of guar, cotton	Zero tillage, short duration varieties of guar and cotton, regulation of electric power supply for	Research, extension and development agencies should jointly approach in a farmers' participatory	All area under wheat 22,000 ha need to be sown by 10 th Nov.	Zero tillage benefits: a) Improving soil health b) Improved environment c) Less use of water

			irrigation	<p>approach for each of possible solution. Evaluating and refining the technology for a range of stubbles, developing guidelines for achieving good establishment with residue retention, efficient use of N fertilizer.</p> <p>The technology need to be further developed for other cropping systems and other crops.</p> <p>Testing of novel seeders in preparation for its commercialization e.g. Happy seeders.</p>		<p>d) Higher productivity</p> <p>e) Less problem of weeds & decreased use of herbicides</p> <p>f) Reduced cost of cultivation</p> <p>g) Facilitates sowing under high soil moisture conditions</p>
ii	Seed treatment	Termites, fungal diseases like loose smut, flag smut and Karnal bunt	Seed treatment with insecticides, fungicides and bio-fertilizers. Seed priming, if sowing is delayed	Awareness of farmers regarding importance of seed treatment by the University and the State Department of Agriculture	Whole area (22,000 ha) under wheat in the district	Productivity growth on sustainable basis
C	Bajra					
1.	Major thrust to consolidate the development of bajra hybrids with high yield potential	New hybrids from private sector have been introduced with unknown consequences leading to disease incidence	Main streaming of private sector and developing MOUs with private sector	Pre-breeding research at experimental stations	The entire district	Will meet the requirement of feed and fodder at the cost of less resources

	Crop establishment	Risk in crop establishment due to crust formation	Use of ridger-seeder	Necessary modification in the machine for easy adoption	The entire district	Will lead to yield increase and improved soil health
	Non adoption of basal P and N fertilization	Lack of awareness Uncertainty in crop establishment	Demonstration on P fertilization	Training and demonstrations Farmers' participatory approach	The entire district	Increase in yield and P and protein content in fodder as well as grain
d	Guar					
	Poor or no fertilizer BLB and Aphid problem	Lack of awareness	Use of Phosphatic fertilizer, Seed treatment and spray against disease and insect	Training and demonstration -do-	The entire district -do-	Will lead to yield increase and improved soil health Controlling disease and insects at reduced cost & chemical use.

Table 4.5 : Closing the gaps for realizing the vision - Agriculture Sector

Sr. No.	Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach	Refer
1	Seed Production	i. Seed planning	Participatory selection of improved varieties of crops at farmers' field.	DDA	40 ha per year will be undertaken	Table 4.6,4.7,4.8,4.9
			Motivating farmers to produce the seed of best varieties.	DDA	Monitoring	P 4.11.2.9
			Surveying the yield performance of varieties/hybrids in each crop. Presenting data of best performed variety.	KVK		P 4.11.2.12
		ii. Best quality seed	Deleting varieties/ hybrids with low yields in any current season.	KVK	Demonstrations	P 4.11.2.12
			Mandatory testing of new variety hybrids through KVK's.	KVK	Demonstrations	Table 4.6,4.7
		ii. Seed treatment	Chemical and non-chemical treatment	KVK DDA	Demonstrations	Table 4.6,4.7,4.8,4.9
			Capacity building resource persons/extension agencies/seed companies/farmers	(Data for all the above activities will be presented in the AOs workshop)	Training Exposure visits	Table 4.6,4.7
02	Wheat seed replacement	Low productivity/ production of wheat due to	To motivate farmers to purchase seed of high yielding varieties	KVK	Farmers' Trainings	Table 4.6,4.7

		sowing of low yielding varieties in larger areas	<p>HSDC should make the availability of good quality seed of high yielding wheat varieties.</p> <p>DDA will develop strong linkages with private seed companies for the assured supply of good quality seed of high yielding varieties.</p> <p>DDA will ensure for the replacement of wheat seed in about 15 thousand hectare area during the plan period</p>	HSDC		
03	Reclamation of saline/sodic soils	Significant area is affected by salinity/ sodicity. Low productivity of crops in saline/ sodic soils	For sodic soil reclamation will be done by farmers in about 10 thousand hectare area by gypsum to be purchased on 50% subsidy through co-operatives. DDA will make necessary arrangements/ linkages with gypsum supplying agencies for timely availability of gypsum in co-operatives etc.	DDA	Reclamation of sodicity affecting soil	P 4.11.2.6 Table 4.7,4.11

		Salinity reclamation	For reclamation of salinity laser leveling, bunding and ponding o rainwater will be done. Landing will be done at 50% subsidy	KVK	Reclamation of saline area	P 4.11.2.6 Table 4.7,4.11
			KVK will provide technical guidance to farmers by organizing trainings and field demonstrations	KVK	Trainings Demonstrations	T 4.7,4.11
04	Laser leveling (canal irrigated areas)	Poor crop yields and inefficient water use in unlevelled fields.	DDAs will lay out demonstrations on bajra, mustard and wheat in each block. DDAs will also record data on water saving and yield penalty if any will also be recorded while recording data on yield. DDAs will organize and monitor the distribution of laser leveler specially on custom hire services. (The data will be discussed in joint meeting of KVK and DDAs. The presentation of final data will be made by DDA).	DDA DDA	Demonstrations 50 units	P 4.11.2.3 T 4.8, 4.11

			<p>DDA will also ensure the exposure visit of farmers on sites already demonstrated by KVKs.</p> <p>(Two way subsidy to farmers who are using custom hire services, may be given subsidy on the charges on hour basis. The service provider can be given subsidy, if it is passed on to the user farmers).</p>	DDA	Training	T 4.6,4.7,4.8
05	Green manuring	Low organic carbon content of soil, poor soils with depleted fertility	DDA will ensure the timely availability of <i>dhaincha</i> seed at 75% subsidy.	HSDC / DDA / HAFED / HLRDC	50,000 ha area will be covered during the plan period	P 4.11.2.6 A T 4.11

06	Water management	Poor adoption of in-situ rain water harvesting techniques	Popularization of in-situ rain water harvesting through broad beds and furrows method etc Developing of community ponds for drip irrigation system	DDA/KVK	Demonstrations	Table 4.11
		Non judicious utilization of brackish water for irrigation	Popularization of judicious use of brackish water through demonstrations on alternate use of brackish water and tolerant crops and varieties	KVK	Demonstrations	Table 4.11
		Over irrigation in mustard	Irrigating the crop at critical stages	KVK will monitor the incidence of diseases and pests where water is over used.	Demonstrations	Table 4.11
07	Site specific nutrient management		Fertilizer application will be based on the principles of SSNM which includes yield gap analysis, guidelines for regional protocol etc.	DDA / KVK	Demonstrations	Table 4.10,4.11

		Bio-fertilizers	Efficient use of inoculant bio-fertilizers. Higher nutrient use efficiency through inoculation with bio-fertilizers of bajra, guar, wheat and gram seeds.	DDA / KVK	Demonstrations	Table 4.10
		Soil application of zinc in wheat and mustard		DDA/KVK		P4.11.2.6 Table 4.10
		Fertilizer use on soil test basis		DDA/KVK		P4.11.2.6 Table 4.10
		P fertilizer in bajra and guar		DDA/KVK		P4.11.2.6 Table 4.10
08	Integrated Pest Management (IPM)	Poor management of insect-pests and diseases in mustard, bajra, guar and vegetables. Management of stem root and white rust in mustard Management of molya disease in wheat Management of	Monitoring of resistance development. Sowing at proper density and avoiding over use of water Strengthening of chemical control and agronomic management. Resistant varieties	DDA/KVK KVK DDA /KVK	Demonstrations Demonstrations	T 4.10 P 4.11.2.7

		BLB in guar Quantification, characterization and management of resistance of key pests against insecticides in vegetables.	Popularization of seed treatment and spray techniques Plant clinic labs for KVK	KVK		
09	IWM					
a	Efficient herbicide use	Poor spraying techniques and low efficiency of herbicides	Improving spraying techniques for increasing efficiency of herbicides through survey & demonstrations	DDA / concerned departments in consultation with KVK	Training	Table 4.7,4.8
b	Wild oat and <i>phalaris</i> in wheat	Multiplication of seed bank in soil, seed contaminated with weeds	DDA will enforce quarantine of the weed entry through contaminated seed	DDA in consultation with KVK, demonstrate the released herbicides for their control.	Wild oat affected area will be controlled mechanically or chemically	P 4.11.2.9 T 4.7,4.8
		Monitoring of herbicide resistance	Survey & Demonstrations	DDA/KVK/	Demonstrations ()	P 4.11.2.9 T 4.7,4.12
10	Timely seeding of crops	Erratic distribution of rains, irregular	Survey & Demonstrations	DDA /KVK / HSEB /Canal department	Training	T 4.8,4.9

		supply of electricity for tubewells, irregular schedule of canals	Research, extension, development agencies and DHBVNL and Canal department should jointly work in a farmers' participatory approach for possible solutions.	DDA/KVK	FFS	T 4.10
11	Intercropping					
	Intercropping of mustard + Kasni	To increase cropping intensity, use efficiency of water and nutrients and higher production per unit area.	Popularization of agro-technology of mustard + Kasni intercropping for adoption by the farmers	DDA /KVK	Demonstrations	P 4.11.2.7 T 4.8,4.12
	Intercropping of mustard + potato	To increase cropping intensity, use efficiency of water and nutrients and higher production per unit area.	Popularization of agro-technology of mustard + potato intercropping for adoption by the farmers	DDA/KVK	Training	P 4.11.2.7 T 4.8,4.12
12	Zero-tillage in bajra and guar	Increasing cost of cultivation of	DDA/KVK will motivate farmers for the adoption of	DDA / KVK	Technology will be	P 4.11.2.2 T 4.8,4.11

	based cropping systems	crops, depleting water table and deterioration in soil fertility and physical conditions.	zero tillage technology through participatory research/demonstrations on bajra and guar based cropping systems for the saving tillage cost, irrigation water, diesel		accelerated for ZT in wheat with farmer participatory approach	
13	Fodder Production (Napier grass) with drip irrigation	Non availability of green fodder for animals. Scarcity of irrigation water for fodder production.	DDA will monitor the subsidy (50%) on drip irrigation system and also arrange the source and supply of fodder seed and Napier grass root cuttings for planting under drip. Popularization of technology of napier grass cultivation for adoption by the farmers	DDA and DDAH KVK / DDA	Napier with Drip irrigation	T 4.8,4.9
	Bajri + cowpea	Non availability of green fodder for animals.	DDA and DDAH will arrange the seed of fodder crops and layout demonstration in consultation with KVKs	DDA and DDAH and KVK	Demonstration on bajri + cowpea	Table 4.8,4.9
		Scarcity of irrigation water for fodder production.	Popularization of technology of napier grass cultivation for adoption by the farmers	DDA and DDAH and KVK	Demonstration on bajri + cowpea	Table 4.8,4.9
	Oat	Non availability of green fodder for animals.	DDA and DDAH will arrange the seed of fodder crops and layout demonstration in	DDA and DDAH and KVK	Demonstration on bajri + cowpea	P 4.11.2.9 Table 4.8,4.9

		Scarcity of irrigation water for fodder production.	consultation with KVKs			
14	Sulphur nutrition in mustard	Application of sulphur through gypsum in 70 thousand hectare area of mustard during the plan period.	To create awareness among the farmers for timely application of gypsum for higher oil and seed yields of mustard.	DDA/KVK/HLR DC to ensure gypsum supply at 50% subsidy	Training Demonstrations	T 4.10 P 4.11.2.6
15	Orobanchae in mustard	Mono cultivation of mustard	DDA will ensure for the introduction of castor and barley in rotation KVK and research scientists will study the effects of castor hybrids and two-row barley on longevity of Orobanchae Mustard area affected with Orobanche will be diverted to barley	DDA KVK	Monitoring Mustard area affected with Orobanche will be diverted to barley	P 4.11.6 B T 4.9,4.10

16	Ground water recharging	Depletion of groundwater due to over exploitation	Recharging of groundwater by constructing structures in villages and educational institutes over the non-cropped catchment area	DRDA, ASCO, AAE and development agencies will ensure construction of 500 rainwater harvesting structures (at least one in each village) during plan period DDA/AAE will monitor the performance of these structures	Construction of 500 ground water recharging units	P 4.11.2.1 T 4.8,4.11
17	Parthenium eradication programme	Environmental pollution causing allergy of skin respiratory system and eyes	The weed grown on the leveled area will be controlled by ploughing over hoeing. Undulating areas, small premises will be manage through chemical spray	KVK, Agronomy department, residents of colonies, district administration, DDA, education department, gram-panchayats	Carrot weed eradication program will be taken up	P 4.11.2.9 T 4.8,4.11

				<p>will join hand and launch campaigns to target 10000 non-cropped area each year.</p> <p>DDA and KVK will monitor the time and its re-emergence as nodal officer DDA will coordinate the campaign</p>		
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4.11. Recommended interventions for the district, with detailed Action Plan with costs.

The preceding study of crop husbandry in Gurgaon District in relation to the resource utilization, input management and constraints analyses paves the way for recommending interventions for the development of agriculture sector. The suggested interventions will result into increased production, productivity, profitability and income generation on a sustainable basis. The recommendations for the farmers (for whom they ultimately matters) come down to the specific usage, manner and management of resources, inputs and cultural practices, which are being suggested hereunder. The farmers as well as the staff of agriculture and allied staff needs constant skill up-gradation and capacity building. The number and nature of training programmes, demonstrations, RCTs, FFSs, group formation etc. are recommended to be adopted by the farmers on large scale for educating the farmers so that the targets of the 11th plan can be achieved.

4.11.1 . Extension activities (Stream II) for development of agriculture sector

**Table 4.6 : Training Proposal for Capacity Building of Agriculture Staff (at District level)
(Phy-No. of trainees, Fin. – Rs in lacs)**

Name of the Department	Year wise no. of staff to be trained											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agriculture	400	2.4	400	2.4	400	2.4	400	2.4	400	2.4	2000	12.0
Cooperative & NGOs	200	1.2	200	1.2	200	1.2	200	1.2	200	1.2	1000	6.0
PRI Staff & Others	100	0.6	100	0.6	100	0.6	100	0.6	100	0.6	500	3.0
Total	700	4.2	700	4.2	700	4.2	700	4.2	700	4.2	3500	21.0

Cost norms – Rs 600/ trainee/day

**Table 4.7 : Training Proposal for Capacity Building of Farmers at district level on different technologies
Phy- No. , Fin. – Rs in lacs**

Name of technology to be transferred	Year wise no. of farmers to be trained											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
INM	1000	4.0	1000	4.0	1000	4.0	1000	4.0	1000	4.0	5000	20.0
NRM	500	2.00	500	2.00	500	2.00	500	2.00	500	2.00	2500	10.0
IPM	500	2.00	500	2.00	500	2.00	500	2.00	500	2.00	2500	10.0
RCTs	1000	4.0	1000	4.0	1000	4.0	1000	4.0	1000	4.0	5000	20.0
Water management	1000	4.0	1000	4.0	1000	4.0	1000	4.0	1000	4.0	5000	20.0

Efficient Spray techniques	500	2.00	500	2.00	500	2.00	500	2.00	500	2.00	2500	10.0
Credit & marketing	600	2.40	600	2.40	600	2.40	600	2.40	600	2.40	3000	12.0
Seed Production	600	2.40	600	2.40	600	2.40	600	2.40	600	2.40	3000	12.0
Farm waste and crop residue management	1000	4.0	1000	4.0	1000	4.0	1000	4.0	1000	4.0	5000	20.0
Vermi-composting	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.00
Renewable energy	100	.40	100	.40	100	.40	100	.40	100	.40	100	0.40
Total	6900	29.6	6900	29.6	6900	29.6	6900	29.6	6900	29.6	34500	148

Table 4.8 : Training Proposal for Capacity Building of Farmers at block level

Phy- No. , Fin. – Rs in lacs

Name of the Block	Year wise no. of farmers to be trained during plan period											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Pataudi	500	1.0	500	1.0	500	1.0	500	1.0	500	1.0	2500	5.0
F.Nagar	500	1.0	500	1.0	500	1.0	500	1.0	500	1.0	2500	5.0
Sohna	500	1.0	500	1.0	500	1.0	500	1.0	500	1.0	2500	5.0
Gurgaon	500	1.0	500	1.0	500	1.0	500	1.0	500	1.0	2500	5.0
TOTAL	2000	4.0	2000	4.0	2000	4.0	2000	4.0	2000	4.0	10000	20.0

@ Rs 200/- per farmer

Table 4.9 : Varietal Demonstration in Next Five Years**(Area covered in ha, Fin – Rs. in lacs)**

Crop	Area under demonstration (ha)	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy.	Fin
Wheat	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Barley	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Mustard	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Gram	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Bajra	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Guar	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Castor	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Til	0.4	50	2.5	50	2.5	50	2.5	50	2.5	50	2.5	250	12.5
Moong	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Total	--	1250	60	1250	60	1250	60	1250	60	1250	60	6250	312.5

Table 4.10 : INM/SSNM/IPM Demonstrations to be conducted during plan period

(Phy - Area covered in ha, Fin – Rs. in lacs)

Crop	Area under each demon.	INM Demonstrations Projection											
		2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Wheat	0.4	500	25	500	25	500	25	500	25	500	25	2500	125
Barley	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Mustard	0.4	500	25	500	25	500	25	500	25	500	25	2500	125
Gram	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Bajra	0.4	500	25	500	25	500	25	500	25	500	25	2500	125
Guar	0.4	200	10	200	10	200	10	200	10	200	10	1000	50
Moong	0.4	100	5	100	5	100	5	100	5	100	5	500	25
Total		2100	105	2100	105	2100	105	2100	105	2100	105	10500	525

Table 4.11 : Demonsrations on Resource Conservation Technologies

(Phy - Area covered in ha) Fin – Rs. In lakh)

Technologies	Area under each demon	RCTs Demonstrations Projection											
		2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Laser leveling	0.4	500	25	500	25	500	25	500	25	500	25	2500	125
Zero Tillage	0.4	1000	50	1000	50	1000	50	1000	50	1000	50	5000	250
Green manuring	0.4	500	25	500	25	500	25	500	25	500	25	2500	125
Total		2000	100	2000	100	2000	100	2000	100	2000	100	10000	500

Table 4.12 : Farmer Field Schools covering identified critical technologies in Next Five Years

(Phy – No. of field school, Fin – Rs. in lacs)

Crop	Farmer Field Schhols Projection											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Wheat	15	3.0	15	3.0	15	3.0	15	3.0	15	3.0	75	15.0
Mustard	15	3.0	15	3.0	15	3.0	15	3.0	15	3.0	75	15.0
Barley	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10.0
Gram	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4	10	2.0
Bajra	15	3.0	15	3.0	15	3.0	15	3.0	15	3.0	75	15.0
Guar	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10.0
Moong	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4	10	2.0
Castor	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4	10	2.0
Total	71	14.2	71	14.2	71	14.2	71	14.2	71	14.2	355	71

Table4.13 Group formation /Commodity interest groups formation for specific activities

(Phy – No. of groups to be formed, Fin – Rs. in lacs)

Interest Group(s)	Group Formation Projection Plan									
	2007-08		2008-09		2009-10		2010-11		2011-12	
	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Seed production	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0
Water user	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0
Organic Farming	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4
Value addition	5	1.0	5	1.0	5	1.0	5	1.0	5	1.0
Specific Crop Group	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0
Total	57	11.4	57	11.4	57	11.4	57	11.4	57	11.4

Cost norms- Rs.0.20 lacs/group (for capacity building, input assistance, marketing and group specific activities)

4.11.2 . Special project (Stream I) for development of agriculture sector

4.11.2.1 : Project on Rain water harvesting for ground water recharge

The annual rain fall of the district is nearly 550 mm However, this rainfall occurs during short spell of high intensity. Because of such intensities and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly, leaving very little for the recharge of ground water. This highlights the need to implement measure to ensure that the rain falling over a region is tapped as fully as possible through water harvesting, either by recharging it into the groundwater aquifers or storing it for direct use.

Now it becomes imperative for the farmers not only to adopt techniques for efficient water use but also pay attention towards rain water harvesting and its recharging. Water recharging has to be taken up on community level. Out of several methods of water harvesting open well method is more appropriate under the circumstances. This proposed recharge scheme will not only check decline in water level, but will result into rise of water level. It will also bring additional land under irrigation.

Potential area for water recharge structures

Area identified for artificial recharge	50, 000 ha
Proposed recharging structures (1-2 in each village, Public places, Educational institutes, Office premises, Residential sites)	500

Budget proposal for construction of water recharging structures

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of structures to be constructed	100	100	100	100	100	500
Cost in lacs @ 1 lac / structure	100	100	100	100	100	500

4.11.2.2: Promotion of ZT in Gurgaon district

The increase in energy cost has accrued the cultivation cost leaving the farming least paying or unprofitable. About 25% of the total variable cost of wheat production is incurred on the tillage operations. Therefore, in the present era of globalization, it has become obligatory to reduce the cost of cultivation to make farm produce competitive in the international market Experiences on zero tillage (ZT) and its success in rice-wheat sequence have established that there is no need of preparatory tillage for wheat sowing, and Rs. 2000-2500 per hectare can be saved through ZT, simply by cutting the cost of cultivation. Moreover, continuous use of heavy machineries used during conventional tillage causes mechanical compaction and deterioration of soil structure, whereas ZT improved physical and biological health of soil. The technology, besides being socio-economic and eco-friendly, has multifarious benefits in terms of saving fuels, energy, labour, water, wear and tear / maintenance cost etc. It controls environmental

pollution by reducing 125 Kg CO₂/ha (assuming 2.6 kg CO₂ production / litres of diesel burnt), which is one of the major causes of global warming. The results of preliminary studies on Zero Tillage Technology with farmers, participatory mode in Southern Haryana are quite encouraging, wherein zero-tilled wheat in rotation with rice and other traditional crops viz., clusterbean, pearl millet and cotton, as well as zero tilled barley after rice and pearl millet proved better or equivalent to CT.

Trials on farmers' field were also conducted during 2005-06 in south-western Haryana to validate the feasibility of zero-tillage technology in wheat grown in rotation with the prevalent kharif crops like pearl millet, clusterbean, groundnut, arhar and cotton. Based on multi-location trials in different districts (Mahendergarh, Gurgaon and Rewari) of SW Haryana, it was realized that on an average the grain yields of wheat under ZT were comparable to CT

Comparison of ZT vis a vis CT

Description	Conventional Tillage (CT)	Zero tillage (ZT)	Saving with ZT over CT
Tillage operations (nos)	2	0	
-Dry harrowing before pre-sowing irrigation			
-Harrowing + cultivator after pre sowing irrigation	2	0	5 tillage + 2 Planking
-Drilling Fertilizer	1	0	
-Planking	2	0	
-Sowing	1	1	
Total tillage cost (Rs/ha): @ Rs. 500 /ha / run of cultivator / harrow / drill, and Rs.250/-/planking	3500	500	3000/ha
Consumption of diesel (litres/ha): @ 6.25 L/h/run of cultivator harrow /drill, and 3.125 L/Planking	55	7.5	47.5/ha
Cost of diesel (Rs./ha) @ Rs. 31 per litre	1815	247.5	1567.5/ha
CO ₂ Emission (Kg) @ 2. 6 Kg / litre of diesel burnt	143	19.5	123.5

Yield performance of wheat under ZT as compared to CT during 2006-07

District	No. of village	No. of Trials	Grain yield of wheat (q/ha)	
			ZT	CT
Rewari	6	18	46.95	44.83
Mahendergarh	7	65	50.77	49.79
Gurgaon	1	1	42.00	42.00
Mean			46.57	45.54

Therefore, for sustainable growth of agriculture in this region, Zero Tillage technology which is resource conserving, cost effective and environmentally safe need to be promoted for adoption at the farmers' field in the district. The glaring success of this technology through numbers of field demonstration with farmers' participatory approach in southern Haryana during 2007-08, speak of its accelerated promotion for wheat sowing.

Proposal for Zero Tillage Machine

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Zero tillage machines required	50	50	50	50	50	250
Cost @ 50,000 (Rs. In lac)	25	25	25	25	25	125
Subsidy required @ 50 % (Rs. In lac)	12.5	12.5	12.5	12.5	12.5	62.5

4.11.2.3 : Resource conservation through laser leveling

Shrinking water resources due to over exploitation of ground water in Gurgaon district threaten the maintenance of agricultural productivity. To arrest this dangerous trend of ground water exploitation, there is an urgent need to conserve irrigation water through various on-farm water conservation practices. Leveling the fields through laser leveler is one of the proven technologies that are highly useful in conservation of irrigation water. In Gurgaon district, due to mismanaged practices, a large amount of water is lost during its application at farm due to poor farm designing and unevenness of fields. The fields that are not leveled have uneven crop stands, due to water scarcity on one side, and excess water problem in other side. Moreover, the traditional methods of leveling are cumbersome, time consuming, expensive, less efficient and unreliable. Whereas laser leveling leads to optimum water use efficiency, improved crop yield and reduces the application time of irrigation.

Benefits of the laser leveling

- Saves water 25-30 %
- Improves crops establishment
- Uniform maturity of crop

- Decreases the time of irrigation application
- Reduces the amount of water required for irrigation
- Farm operations are made easy
- Saving of diesel/ electricity

Budget for land leveling through laser leveler

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Machines required (no.)	10	10	10	10	10	50
Cost @ 3.6 Lac / machine	36	36	36	36	36	180
Subsidy required @ 50% per leveler	18	18	18	18	18	90

4.11.2.4 : Soil reclamation through gypsum

Background:

In Gurgaon district, the main source of irrigation is tubewell covering ---- % of the irrigated area. The over-exploitation of good quality water for irrigation available only in scattered pockets, is depleting at an alarming rate. In district Gurgaon, the waters are predominantly sodic in nature. The continuous and indiscriminate use of these waters by the farmers causes deleterious effect on physico-chemical properties of the soil and results in secondary sodification of soil, which ultimately renders the soil unfit for cultivation. Consequently, 82,961 ha of soil are affected with varying degree of salinity or sodicity. So far, 2000 ha area is treated with gypsum and reclaimed. During the plan period, 40,000 ha area needs to be treated with Gypsum.

The sodic waters can be harnessed successfully for irrigation purpose, provided they are used judiciously, keeping in consideration the interacting influence of the amount and type of the salt present in the available water, the type of the soil to be irrigated, nature of the crop to be grown, frequency and intensity of rainfall, and other climatic factors of the area. Long term field studies conducted at Regional Research Station, Bawal since last more than 2 decades has revealed that sodic ground water can be effectively and successfully harnessed as a supplemental source of irrigation provided these are used judiciously for right crop under right condition with right management. Application of gypsum has been frequently recommended for neutralization of sodicity of water. The Haryana government is providing subsidy on gypsum to attract the farmers to practice it on the farm. The technology regarding use of gypsum and other management practices for safe use of sodic water has been perfected at Research Station Bawal. This technology needs to be demonstrated and fine-tuned on the farmers' field with active farmers' participation, so that it may percolate to the masses.

Proposal for soil reclamation through gypsum

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be reclaimed (ha)	2000	2000	2000	2000	2000	10000
Gypsum required (MT)	4000	4000	4000	4000	4000	20000

Present Cost @ 1800 / tons (Lacs)	72	72	72	72	72	360
Subsidy Required @ 50 % (lacs)	36	36	36	36	36	180

Proposal for salinity reclamation

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be reclaimed (ha)	2000	2000	2000	2000	2000	10000
Laser leveling on 50 % subsidy (Rs in lacs)	50	50	50	50	50	250

4.11.2.5 : Carrot weed control for environmental safety and bio-resource conservation

Carrot weed is infesting ruthlessly millions of hectares of land along highways, railway tracks, commercial lands, orchards, pastures, waste lands, compounds of schools, colleges, stadiums, playgrounds, canals, water courses, office premises, and residential areas. It has become a menace weed of fallow land in urban, sub urban and even rural areas posing a serious threat to human as well as animal health and existence of our natural bio-resources.

There is urgent need to control this weed, which is infesting the 50,000 ha non-cropped area of the district. It is advisable to plough the infested area at least twice by harrowing before flowering of weed. It can be done on large-sized ground / compounds with even topography. However, undulating infested areas along the roads, railway tracks, canals can be treated with chemical.

Budget proposal for the control of Parthenium:

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
2 tractor harrowings in 10000 ha @ 750/ha/ ploughing (Cost in Lakhs)	150	150	150	150	150	750
5L glyphosate / ha in 5000 ha @ Rs 300/L (cost in Lakhs)	75	75	75	75	75	225
Total	225	225	225	225	225	1175

4.11.2.6 Soil Health Maintenance

A. Green Manuring

The soils of Gurgaon district are low in organic carbon, available phosphorus and most essential micronutrients. Being coarse textured, the soils are poor in nutrient retention. On the other hand, the physical condition of the soils is deteriorated due to continuous and indiscriminate use of underlain brackish water. Therefore to retain the soil health and regain crop productivity, it is necessary to adopt the concept of green manuring.

Budget proposal for green manuring

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be covered (ha)	10000	10000	10000	10000	10000	50000
Seed requirement (tons)	250	250	250	250	250	1250
Cost of seed (Rs in lakh)	50	50	50	50	50	250
At 75 % subsidy (Rs in lakh)	37.5	37.5	37.5	37.5	37.5	187.5

B. Mustard residue management to maintain soil health and environmental safety

The organic content of the soils in Rewari district has fallen below 0.2% due to high temperature of soil and removal of above ground plant parts of wheat, and pearl millet to meet the fodder requirements. Secondly, Indian mustard, is the major rabi crop of this district, grown over an area of 22,000 hectares. Its residue in the form of stalk and bhushi, which is about four times of its seed yield, presently goes waste, as its stalk is largely burnt as poor quality fuel in the household, and bhushi is sold for burning as fuel in brick kiln industry. This mal-practice is increasing environmental pollution by releasing CO₂, thus leading to global warming, which is already threatening sustainability. Under this situation, the organic matter content and fertility levels of the light textured soils of Rewari district can be maintained by effectively harnessing it through incorporating either directly into the soil or after turning it into compost or vermi-compost with the animal shed waste and enriching with rock phosphate.

Thus, 3.27 lakh tons of residue obtained from mustard crop grown over 22,000 ha, and 5.5 lakh tons of dung received from 1,31,964 buffaloes and 31,178 cattle in the district, combined together gives 8.77 lakh tons of biomass. If all of this is recycled and enriched through composting / vermi-composting and applied to field @ 15 tons / ha, it can meet the manurial requirement of 58,500 ha land, which accounts for 75 % of the cultivated area in the district. It will restore soil fertility and improve soil, crop and environmental health.

Budget estimate for the projected 20,000 vermi-composting units in the district at the pace of 4000 units per annum (Rs in Lakhs)

Critical inputs	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Earthworms cost @ Rs. 200 / unit	8	8	8	8	8	40
0.08 lakh ton Rock phosphate @ Rs 5000 / ton, to treat 0.8 lakh ton biomass at 50 % subsidy	300	300	300	300	300	1500
Total	308	308	308	308	308	1540

C. Increasing Productivity of Field Crops

Seed treatment in field crops

Seed treatment of wheat in rabi is of greater significance. The main strategic issue bridging yield gap in wheat is seed treatment with insecticide against termite, and with fungicide against diseases and with biofertilizers Azotobacter and Phosphorus Solubilising Bacteria (PSB) to increase fertilizer use efficiency. Therefore entire area of wheat (22,000ha) will be covered under seed treatment for all the years during plan so that farmers are fully sensitized for future adoption of the technology.

Table 6.12: Budget requirement for seed treatment of wheat and guar

Seed treatment	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Wheat (area, ha)	20000	20000	20000	20000	20000	100000
Cost (Rs. Lakh) at 50 % subsidy	65	65	65	65	65	325

Cost of seed treatment for 1 ha seed (1q) with Azotobacter, PSB, Chlorpyrifos and Bavistin/Raxil =Rs 650

4.11.2.7 : Popularizing mustard-chicory intercropping for higher profitability

With the diversification in agriculture much emphasis is laid on the cultivation of medicinal plants. But small holding size is one of the constraints hindering cultivation of these crops in pure stand. Therefore, raising these crops in association with field crops or horticultural / forest trees, depending upon their compatibility, seems an apt and remunerative option. Chicory or kasni (*Chicorium intybus*) popularly known for its medicinal use as liver tonic is well adapted in southern Haryana. The farmer of the district are growing in association with mustard and are getting an additional yield of 3-4 q/ha of *kasni* without any yield loss to mustard, as the growth of kasni starts after harvest of mustard in mid march. Therefore, there is need to popularize this system of cropping only in the areas having sweet water with moderate water availability. Otherwise the kasni crop, which matures in May, requiring 3-4 irrigations, will be taxing in brackish-water and deep water-table areas.

Budget estimate of the projected area (20,000 ha)

Critical input	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Kasni seed (@ 7.5 kg/ha)	30	30	30	30	30	150
Cost (Rs.in Lakhs)						

4.11.2.8 : Popularizing barley in the salinity prone mustard areas

There is a steady decline in the area of barley in the last 2 decades and it has lowered to around 1200 ha in the year 2007. The major toll in barley area is taken by the competitive crop mustard, which proved more economical with the similar input requirement. Traditional barley varieties were prone to lodging and were poor yielder. The recently released varieties of barley are high yielding & non-lodging. In the current year, barley crop showed excellent yield performance (60 q/ha) and fetched better price in the market. Therefore, the crops has potential for intensification in those areas which are salt affected.

Budget estimate for area expansion under barley (Rs. In lacs)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area under crop(in ha)	2000	2500	3000	3500	4000	
Seed Cost (Rs. in Lakh)	26.25	32.81	39.37	45.93	52.5	196.76
Seed treatment cost (Rs. in lakh)	8	10	12	14	16	60
Total	34.25	42.81	51.37	59.93	68.5	256.76
Subsidy required @ 50 %	17.12	21.4	25.7	30	34.25	128.38

4.11.2.9 : Watch and catch Wild oat and *Phalaris* in wheat

In Gurgaon district, the prevailing dominant weeds are broad-leaved weeds mainly Chenopodium, Jangli palak and Hiran khuri. But wild oat and *Phalaris*, which were alien to this region in recent past, are increasing every year and have registered their presence in a number of wheat fields.

Initially the farmers take it casually and leave it for harvesting as animal fodder in phased manner. But ultimately the weed is not controlled by wheat maturity and goes on adding its seed, and has become a big problem in some of the fields. Therefore, to arrest its infestation and spread to another fields, it is required to educate the farmers, before time, regarding its yield damage, and manage it through mechanized or chemical ways. Therefore, it is planned to cover 10,000 ha area each year to complete 50,000 in period through recommended herbicidal spray to manage these in the beginning, so that they may not become a nuisance in the future.

Budget estimate for control of wild oat and *Phalaris* (Rs in lacs)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be covered	10000	10000	10000	10000	10000	50000
Cost of herbicide at 50 % subsidy	25	25	25	25	25	25
Cost of flat fan nozzle with boom	10	10	10	10	10	50
Total	35	35	35	35	35	175

4.11.2.10 :Installation of Solar Photovoltaic Pumps (SPV) for popularising non-conventional energy usage in farming

The cost of pumping irrigation water is becoming costlier day by day. The rising cost of diesel, and rationalizing of power tariffs and accelerated recession of water level has further aggravated the problem. Moreover, the use of diesel is unsafe for environment causing global warming. To overcome such situation, and to improve the efficiency of water use, the only viable solution left with the farmers seems to switch towards harnessing renewable energy i.e solar energy through SPV pumps for pumping out the irrigation water. The technology is available for

converting the abundant sunshine into electricity for farm and home usage. With slight addition / modification the system can produce and operate even during non sunshine hours.

Advantages of SPV water pump

- Cutting cost of on diesel and electricity, as it operates on abundantly available solar energy
- Negligible operational and maintenance cost
- Environmentally safe and pollution free
- Un-interrupted supply, no fear of power cut.

Proposals for XI plan for SPV installation

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Units	40	40	40	40	40	200
Cost @ Rs 5.5 lakh /unit	220	220	220	220	220	1100
Subsidy @ 90 % (Rs in lacs)	198	198	198	198	198	990

4.11.2.11 : Establishment of biogas units

At present, in district Gurgaon, the dung is either burnt in the form of dung cakes for cooking food or used as FYM. But the FYM, being not properly decomposed, is of very poor quality. Due to partial decomposition, when applied to soil, it invites termite problem in the field as well as horticultural crops. Biogas is an important alternate source of energy which converts the dung into enriched manure. The end-product is well decomposed and free from viable weed seeds. In addition to this, it gives out gas, which used for cooking in the household. In District Gurgaon, 3.27 lakh tons of residue obtained from mustard crop grown over 22,000 ha, and 5.5 lakh tons of dung received from 1,31,964 buffaloes and 31,178 cattle in the district, combined together gives 8.77 lakh tons of biomass. If all of this is recycled and enriched through composting / vermi-composting and applied to field @ 15 tons / ha, it can meet the manurial requirement of 58,500 ha land, which accounts for 75 % of the cultivated area in the district. It will restore soil fertility and improve soil, crop and environmental health.

Benefits of biogas:

- Renewable source of energy
- Environmentally safe, pollution free
- Rich in nutrients
- Well decomposed, free of weedseeds and termite problem

Proposals for XI plan for Biogas establishment

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Units	500	500	500	500	500	2500
Cost @ Rs .20 lakh /unit	100	100	100	100	100	500
Subsidy @ 50 % (Rs in Lakh)	50	50	50	50	50	250

4.11.2.12 : Proposal for establishment of Weather Watch and Forecasting System

The farmers of the district are prone to vagaries of nature. The crop damage due hailstorms, chilling temperature, high temperature, stormy winds has become a common features in the recent past. The crop insurance schemes are unrealistic and compensation on damage is taxing on the state. To avoid the financial loss and decrease in production, there is a strong need for Weather Watch and Forecasting System, so that farmers can save their crops or minimize the loss by manipulating / modifying the farm operations as per need. It is therefore proposed to establish a Weather Watch and Forecasting System at district headquarter

Cost of project on Weather Watch and Forecasting System

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Weather watch stations (Nos.)	1.0	--	--	--	--	1.0
Cost (in lakhs)	100.0	--	--	--	--	100.0

4.12 Projected Outcome and Growth Rate during the Plan Period:

Table: 4.14: Area, Production and Productivity Trend of Main Crops in the District

S. No.	Name of Crop	Area			Production		
		2004-05	2005-06	2006-07	2004-05	2005-06	2006-07
1.	Wheat	49400	47600	52500	1779388	1648864	2079525
2.	Mustard	22600	23700	19600	257640	295539	264208
3.	Paddy	1800	2200	2300	52938	67122	74474
4.	Bajra	33100	32600	32800	465117	342300	596632

Name of Crop	2007-08 (Projected)			2008-09 (Projected)			2009-10 (Projected)			2010-11 (Projected)	
	A	P	Y	A	P	Y	A	P	Y	A	P
Wheat	52580	2166296	41.2	55660	2382248	42.8	55740	2480430	44.5	55820	2584466
Mustard	19680	275520	14.0	19760	296408	15.0	19840	312480	15.75	19920	326688
Paddy	2420	81554	33.7	2540	88900	35.0	2660	97090	36.5	2780	105640
Bajra	32880	624720	19.0	32960	650960	19.75	33040	677320	20.5	33120	705456

(Area – ha, Production – q, productivity – q/ha)

4.13 : Researchable Issues

Research, extension and development agencies should jointly approach in a farmers' participatory approach for each of the following issues for possible solution.

1. Water management in relation to Drip System and Zero Tillage
2. Reclamation of saline/sodic soils
3. Green manuring effect on soil health
4. Orobanchae problem in mustard
5. Stem rot in mustard.
6. Integrated Pest Management (IPM)
7. Integrated Weed Management (IWM)
8. Site specific nutrient management with special reference to micronutrients
9. Zero-tillage in bajra, guar and cotton based cropping system
10. Fodder Production (Napier grass) with drip irrigation

CHAPTER V

ALLIED AGRICULTURAL SECTORS

5.1: Introduction

The allied sectors of agriculture continue to occupy a significant slot in the district economy. The allied sectors which is a blend of different activities like horticulture, animal husbandry, fisheries, watershed development, social forestry, food processing, agro-based industries, agricultural marketing, agricultural credit etc., contributes significantly in the economy of the district. There is ample scope of developing allied sectors for enhancing its contribution to over all economy of the district. With rising incomes and changing diet patterns, the consumption and demand for these products is increasing. The farmers of this district must come forward to seize this opportunity of raising farm productivity and income as well as employment generation.

5.2: Horticulture

The farmers are inclined to fruit cultivation in the recent years. In the district, 38, 881 ha area has been brought under fruit cultivation with the production of 3,83,721 tons and productivity of 10t/ha. In addition to this, vegetables like brinjal, tomato, chillies and cucurbits are grown. The existing marketing, cold storage, post harvest and processing facilities need strengthening in the district which will provide much more opportunities for expansion of this sector through extending market reach, value addition and post harvest management.

5.3. Forests

The district is almost bereft of vegetation, as the area under forests in the district is merely 2600 hectares. There is 2.1 % of total geographical area of district under forest cover. Mostly the xeric species dominates in the district. Tree species found are Prosopis, Acacia, Salvedora, Shisham, Albizia, Neem etc.

5.4 Animal husbandry /livestock health:

Arable farming in combination with animal husbandry or alone animal husbandry is the main farming system in the district. Dairying has been recognized as an important activity due to its contribution in the form of gainful occupation, socio-economic acceptability, relatively simple management skill and high nutritional value. But the animals face multifarious nutrition related health problems due to unavailability or less unavailability of green fodder and/or deficiency of essential micronutrients. The district is having 18 civil veterinary hospitals and 41 dispensaries, one Mobile Veterinary Centre, one PEC and one Diagnostic Lab to provide animal health cover, breed improvement and vaccination against disease prevention.

Livestock is an integral part of farming systems in Gurgaon district. Good entrepreneurship qualities in farmers of this district particularly land less farmers are basic factors for the development of animal husbandry. The Department of Animal Husbandry caters to the treatment, vaccination, de-worming, milk recording, sheep breeding, poultry, piggery, self-employment for youth and other extension services. The animal population in the district is

1,31,964 buffaloes, 31,178 cows, 6490 sheep, and 14,207 goats (Table 5.3). Total Veterinary Hospitals and Dispensaries in the district are only 111 which needs strengthening.

5.5: Poultry farming

At present, there are 9,21,000 poultry birds in Gurgaon district. The poultry scenario in Gurgaon district has changed dramatically during the recent years. Today poultry farming has transformed itself into an organized occupation. It plays a major role in the fight against malnutrition and poverty among the rural masses of the district. The importance of poultry sector in solving the problems of unemployment and under-employment is well conceived by planners in the developmental programmes. Among the livestock vocations, poultry farming requires less capital investment and ensures quick returns.

Table 5.1 : Livestock Information

Block	Cattle (Nos.)			Buffaloes (Nos)			Sheep(No.)			Goats(No.)			Poultry (Nos)		
	Cross Bred	Indigenous	Total	Improved	Indigenous	Total	Improved	Indigenous	Total	Improved	Indigenous	Total	Broiler	Layer	Total
Pataudi	3091	2516	5607	33967	5781	39148	-	1645	1645	1065	2910	3975	183600	136500	320100
F.Nagar	2281	3881	6162	22746	6046	28792	185	2126	2311	792	888	1680	193700	109300	303000
Gurgaon	5247	5521	10768	26075	5996	32068	-	1281	1281	691	2330	3021	136200	7000	143200
Sohna	2683	5958	8641	19941	12015	31956	244	1009	1253	1477	4054	5531	69700	85000	154700
Total	13302	17876	31178	102726	29238	131964	429	6061	6490	4025	10182	14207	583200	337800	921000

Source: DD (AH)

5.6 : Fisheries:

Fish is rich source of protein food which is available at comparatively lesser price. In view of limited availability of land on the one side and the need to meet the food demands of the increasing population on the other side, calls for the role of hitherto neglected source like fish culture. In addition to meet our food demand, it will contribute towards national income, provide rural employment and supplement the farmers' income.

The district is situated in the foothills of Aravali Range and has water resource in the foothills, village ponds, lakes, drains and some portions of canal and have total water area of about 223 ha. The fish farming scenario in the district is given in following table. Due emphasis has been given to these sectors in CDAP with specific extension activities and special projects suggested at the end of chapter.

Table 5.2 : Block-wise production and productivity of fish in district Gurgaon

Details	Sohna	Pataudi	F.Nagar	Gurgaon
No. of units	50	40	22	20
Average yield (kg/ha)	4200	4000	3800	3700
Expected yield (kg/ha)	4500	4400	4200	4300
Gap in yield (kg/ha)	300	400	400	600

5.7 : Beekeeping

Honeybees can be used as an important input in order to maximise agricultural production. About 85 per cent crop plants are cross-pollinated, as they need to receive pollen from other plants of the same species with the help of external agents. One of the most important external agents is the honeybee. A few colonies of honeybees are placed in the field, when the crop is in flowering stage. When pressed in to service, they would make several thousand forages for pollination. The abundance of pollinators helps in early setting of seeds resulting in early and more uniform crop yield. Honeybees also produce honey, bee wax and royal jelly thus giving additional benefits to the farmers. Majority of crops grown in the district are bee foraging crops like mustard, vegetables and fruits. Therefore, it is required to encourage farmers for the adoption of bee-keeping enterprise along with cultivation of crops.

5.8 Mushroom cultivation

Presently only 5 units of mushroom are functioning with an area of 80,000 trays. However, farmers of the district are interested to adopt mushroom farming as a subsidiary occupation for additional income generation. Therefore, it is proposed to start 50 units of mushroom farming during the plan period in this plan document.

5.9 : Agro and Food Processing

Post harvest technology management and food processing have a crucial role in value addition to agriculture. In consonance with central government policies Haryana state has also given thrust to agro and food processing with a number of policy initiations.

The establishment of Food Parks and efforts made towards Contract Farming are other such steps towards popularising agro/ food processing sector. In addition to the huge domestic market, the WTO agreement and opening up of international markets , the agro food processing has assumed significance and has thrown open new opportunities and challenges. Among others the big corporate like Reliance, Bharti, Pepsi, NDDDB, ITC etc. are keenly exploring the present scenario to seize these new opportunities in the rural sector. The state of Haryana with its production capabilities, infrastructure and large consumer base provides a unique opportunity to industries in food processing sector.

5.10 : Agricultural credit

The details of number of credit institutions spread over the district are given in Table5.3 The total loan distributed by these credit institutions to farmers and others during 2006-07 is given in tables 5.3 ,5.4 and 5.5.

Table 5.3 : Details of Credit Institutions in the District

Name of Block	No. of institutions					Total
	Commercial Banks	RRBs	Cooperative	PACS	Others	
Gurgaon	147	10	6	1	1	165
Pataudi	4	6	3	1	-	14
F. Nagar	2	6	3	-	-	11
Sohna	7	7	3	1	-	18
Total	160	29	15	3	1	208

Source: LDM Gurgaon

Table 5.4 : Crop Loan Disbursement in District (short term credit) (Rs in lacs)

Block	Loan disbursed in 2006-07					
	Coop. Banks		Commercial Banks		RRBs	
	No. of loans	Amount	No. of loans	Amount	No. of loans	Amount
Gurgaon	1532	645	235	250	1201	578
Pataudi	44597	1937	848	750	1922	924
F. Nagar	2299	968	471	374	1682	809
Sohna	3065	1292	565	500	2163	1039
Total	11493	4842	2119	1874	6968	3350

Source:- LDM Gurgaon

Table 5.5 : Loan Disbursement for investment credit during XI Five Year Plan (Rs. in lacs)

Sr. No.	Block	Loan disbursed during 2006-07	Loan disbursement target	
			2007-08	2008-09
1	Gurgaon	27920	33144	
2	Pataudi	11328	8643	
3	F. Nagar	6980	6116	
4	Sohna	9612	7803	
5	Total	55840	55706	

Source:- LDM

.11: Farmers organizations

At present about 1445 Lead Bank and 130 DRDA group organisation working in the district. There is one Kisan Club and no Krishi Vigyan Mandals and Community Groups functioning in the district.

5.12 : Service Centers

The Public, Private and Cooperative sector centers are providing service to the farmers in the field of Agriculture and its' allied fields. There are 46 seed /fertilizer /pesticides depots in the district.

5.13 : Special projects /Programmes on-going in the district

Table 5.6: Description of ongoing extension and developmental activities in Rewari

Sr. No.	Name of Scheme	State / Centre Sponsored
A HORTICULTURE		
1	Scheme for Integrated Development of Tropical , Arid Zone and Temperate zone Fruits under MMM	Centre
2.	Scheme for Integrated Programme of Development of Spices under MMM	Centre
3.	Scheme for Promotion of use of Plastic in Horticulture under MMM	Centre
4.	Scheme for Integrated Development of Vegetable crops under MMM	Centre
5.	Scheme for Popularisation of Commercial Floriculture under MMM	Centre
6.	Scheme for Promotion of Information Technology under MMM	Centre
7.	Scheme for Development of Medicinal and Aromatic Plants under MMM	Centre
8.	Modernization of Horticulture	Centre
9.	Scheme of maintenance POL for outfits and other contingencies	Centre
10.	Integrated Development of Mushroom	Centre
11.	Scheme for Promotion of Organic Farming System in Horticulture crops	Centre
B. ANIMAL HUSBANDARY		
1.	ASCAD Scheme	State
2.	HS Vaccination	State
3.	ETV Vaccination Scheme	State
4.	Top Quality Incentive Scheme	State
5.	Rinder Pest Outbreak Review (R.P) Scheme	State
6.	Special Breeding Livestock Programme(SLBB)	State
7.	Village Meetings	State
8.	Livestock Monthly Show	State
C FISHERIES		
1.	Intensive Fisheries Development Programme	State
2.	Agriculture Human Resource Development	State
3.	National Fish Seed Programme	state
4.	Development of Fisheries in Marshy Area	Centre
5.	Development of Fisheries in Running water	State
6.	Saline/Alkaline water for fish Culture	State
7.	Development of Waterlogged Area	State
8.	Inland Culture Fisheries	State
9.	Education Training and Extension Programme	State
10.	F.F.D.A.	State

Table 5.7 : Sustainability issues and gap analysis of productivity of allied sectors

S. N.	Gap	Factors / constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	S
<i>I</i>	Vegetables					
	New management strategies among small holders vegetable farmers	Availability of hybrid seeds, cost of hybrid seeds, availability of low water requiring vegetable varieties, intercropping of vegetables and multiple land use, vegetable based cropping system with intervening cultivation of flowers, intercropping of potato with mustard	Supply and quality of hybrid seed, marketing enhancement of vegetables, improved germplasm for garlic and onion, management of apical virus in potato	Improved germplasm research, farmers' participatory research on intercropping, technical and market information from different sources to farmers, relaying of production information from farmers to researchers, physical infrastructure for grading, processing and storage, electricity charges on the basis of agriculture for small unorganized food processors	Vegetable based infrastructure in the district	Wi agr tra int act im an
2	Fruit plants					
a	Planting material	Availability of planting material	Supply and quality of quality, planting material	Establishment of fruit nurseries at block level	Research, extension and development agencies should jointly approach in a farmers participatory approach for each of possible solution, Discouraging sellers of non-descript planting material	Wi agr tra int act im an
b	Water management in vegetables and fruits	Poor availability of irrigation water and non adoption of micro irrigation system.	Supply of drip irrigation system	Demonstrations on drip irrigation		Sa

c	Area expansion of fruit trees	Small holding size Price slump in Aonla	Adopting Agri-horti system of farming by growing karonda-interspersed with Bael on field boundary of field crops/ orchard Agro-processing units for value addition	Demonstration on Agri-horti system Deptt of horticulture and developmental agencies to work in the direction of establishing Agro-processing units for value addition of Aonla for edible and medicinal and other products	Aonla plantation in the district	Mo pro of Efi use Co the bo Inc far
3	Forestry	Only 2.1 % per cent area under forest cover	Afforestation of the denuded land	Massive afforestation and development of social forestry program	Greening of the denuded	He and
4	Animal Husbandry / Buffalo farming					
a	Imbalanced feeding	Lack of green fodder	Cultivation of green fodders	Demonstration, trainings supply of seed of fodder crops to the growers		Be wi
b	Mineral deficiency induced disorders	Poor nutrient /micronutrient status of soil as well as feeds	Mineral mixture supplementation of the animal feed	Supply of mineral mixture to the buffalo /cattle farmers		Be wi
c	Breed	Natural mating with non-descript bull	Strengthening A.I. facility, Community Bulls	Extension and development agencies A.H deptt should jointly approach in a farmers participatory approach		Br En
5	Poultry	Feeding, Housing Disease	Lack of awareness	Impart training		Inc

6	Vermi-composting					
	Poor soil health	Low organic carbon, low P and micro-nutrients	Vermi-composting	Demonstration, trainings and exposure visits on vermin-composting	Mustard residue from 70,000 ha and huge animal wealth to supply biological waste	Im Re po
7	Bee keeping					
	Poor adoption	Lack of awareness Non availability of flora during summer	Scientific bee keeping Shifting to other places	Demonstration, trainings and exposure visits on vermin-composting Development of bee keeping by establishing new units	Mustard grown over an area of 22,000ha is a excellent source of flora to the bees	In mu po Be du co

Table 5.8 : Closing the gaps for realizing the vision

(a) Horticulture and Vegetables						
1	Nursery raising in poly houses/poly tunnels	Insufficient number of nurseries and less area under mother plants to meet the demand of grafts/seedlings of fruit and vegetables in the district	Naturally ventilated poly house/poly tunnel nurseries : DHO will motivate farmers for raising nurseries in naturally ventilated poly houses/poly tunnels of crops/vegetables. DHO will also regulate and monitor 50% subsidies on poly houses/poly tunnels. DHO and lead bank will provide guidance to farmers for seeking loans from credit institutions for poly houses/poly tunnel nurseries KVK will organize farmers' trainings for providing technical guidance and maintenance of nurseries in poly houses/poly tunnels.	DHO DHO DHO/KVK	Establishment of nurseries in poly houses/poly tunnels Trainings Trainings	Project 5.15.1 Table 5.9,5.10, 5.13 T 5.11 T 5.9,5.10
02	Onion (low	The water	DHO/KVK will	DHO	Demonstrations	

	water requiring varieties)	<p>requirement of existing onion varieties is high.</p> <p>Poor availability of irrigation water.</p>	<p>demonstrate low water requiring varieties of onion with drip irrigation to replace existing ones.</p> <p>The DHO will act to cover about 500 hectare area under low water requiring onion with drip irrigation system during the plan period. The subsidies of 50% on drip system in onion will be monitored by DHO.</p> <p>(DHO will also make necessary linkages with public/ private seed agencies for arranging seed of onion with low water requiring varieties).</p>	DHO	Drip irrigation with 50% subsidies	P 5.15.3 T 5.10,5.11 ,5.13, 5.15
03	Fruit plants (Kinnow under drip irrigation)	Low production and less area under fruits plants due to poor availability of irrigation water and non adoption of micro	DHO/KVK will demonstrate and impart trainings for the cultivation of fruit plants with drip irrigation for sustainable production and higher income.	DHO/KV K	Demonstrations	P 5.15.2 T 5.10,5.11 ,5.12, 5.13,5.15

		<p>irrigation system.</p> <p>Poor market rate of aonla and ber due to sufficiency</p>	<p>The DHO will make efforts for covering about 500 hectare area under kinnow fruits under drip irrigation system during the plan period. The subsidies of 50% on drip system in fruits will be regulated/ monitored by DHO.</p> <p>(DHO will make necessary linkages with credit agencies and public/private agencies for arranging saplings of kinnow plants).</p>	DHO	Covering about 500 hectares area under kinnow fruits under drip during plan period	
04	Vegetables (under drip irrigation system)	The production and area under vegetables is very less due to poor availability of irrigation water and non adoption of micro irrigation system.	<p>DHO/KVK will demonstrate and impart trainings for the cultivation of vegetables with drip irrigation for sustainable production and higher income.</p> <p>The DHO will make efforts to cover about 5000 hectare area under vegetables with drip</p>	DHO /KVK DHO	Demonstrations Trainings	P 5.15.3 T 5.10

			<p>irrigation system during the plan period. The subsidies of 50% on drip system in vegetables will be regulated/monitored by DHO.</p> <p>(DHO will also make necessary linkages with credit agencies and public/private seed agencies for arranging high yielding varieties/ hybrids of important vegetables).</p>			
5(a)	Vegetable hybrids (Kharif season)	The production and area under hybrid vegetables in kharif season is very low due to non availability of suitable hybrids.	<p>Participatory selection of kharif season vegetable hybrids at farmers' field.</p> <p>Surveying and monitoring of yield performance of hybrids in important kharif vegetables namely bhindi and bottlegourd.</p> <p>Presenting data of best performed</p>	<p>DHO</p> <p>DHO</p> <p>KVK</p> <p>KVK</p>	<p>Demonstration</p> <p>Monitoring</p> <p>Demonstrations</p>	<p>T 5.10,5.11 ,5.12, 5.13,5.14</p> <p>P 5.15.1</p>

			hybrids. Deleting hybrids with low yields in any current season. Mandatory testing of new hybrids through KVK's	KVK		
5(b)	Vegetable hybrids (Rabi season)	The production and area under hybrid vegetables in rabi season is very low due to non availability of suitable hybrids	Participatory selection of rabi season vegetable hybrids at farmers' field. Surveying the yield performance of hybrids in important rabi season vegetables namely tomato, brinjal and chilli. Presenting data of best performed hybrids. Deleting hybrids with low yields in any current season. Mandatory testing of new hybrids through KVK's	DHO DHO KVK KVK	Demonstration Monitoring Demonstrations Demonstrations	T 5.10,5.11 ,5.12, 5.13,5.14 P 5.15.1, 5.15.9
Forestry						

06	Agro and Social Forestry	Deficiency in natural forest area i.e. only 2.1 % of the total geographical area of Gurgaon district.	Forest Department will make survey to put community, panchayat and other wastelands under tree plantations in order to increase the forest area about 5000 ha during the plan period.	District Forest Officer	Surveys and monitoring	T 5.10,5.14
Subsidiary Occupations						
7	Mushroom farming	Mushroom farming is not adopted as a subsidiary activity due to poor knowledge of farmers about management of spawn laboratory, culture media preparation, spawn planting, quality control etc.	DDA/KVK will provide trainings on layout of a spawn laboratory, equipments required for spawn laboratory, culture preparation and its' storage, preparation of mother and planting spawn, qualities of a good spawn etc. DDA will explore the possibilities of credit facilities for mushroom units, marketing opportunities through private agencies and exposure visits of the farmers.	DDA/KVK DDA	Trainings Exposure visits	T 5.10,5.11 ,5.14
8	Vermicomp	Demand for	DDA/KVK will	DDA/K	Trainings	T 5.10

	osting	vermicompost is increasing but availability of vermicompost is very poor.	<p>provide trainings on the efficient methods of vermicompost preparation.</p> <p>DDA will explore the possibilities of credit facilities for commercial vermicomposting units, marketing opportunities through private agencies and exposure visits of the farmers.</p> <p>DDA, University scientists, gram panchayats will come together to discourage the trend of burning mustard <i>bhusi</i> for brick kiln industry</p> <p>Seventy five percent subsidy on rock phosphate for enriching the vermicomposting and free distribution of earthworms will be ensured by DDA so as to start ----- vermicomposting units during plan period</p>	<p>VK</p> <p>DDA</p> <p>DDA /KVK /Gram Panchayat</p>	<p>Exposure visits</p> <p>4000 units each year for residue management of mustard</p>	
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10	Beekeeping	Farmers are having poor knowledge about the role of honey bees as pollinator in fruit, vegetable and field crops.	DDA/KVK will provide trainings for starting successful units of honey bees. DDA will explore the possibilities of credit facilities for starting honey units, marketing opportunities through private agencies and exposure visits of the farmers.	DDA/KVK DDA	Trainings Exposure visits	T 5.10,5.14
11	Dairy Farming	Lack of farming system units. Need to establish mini dairy farming units along with suitable cropping systems Improving the infrastructure facilities for procurement of milk. Facilities for availability of seed for green fodder production and hay making	DDAHs , lead bank and KVKs will initiate action for establishment of dairies by selecting appropriate sites depending on market strategies. Demonstrations for economical and sustainable fodder production and hay making in	DDAH/ KVK DDAH	Surveys & monitoring Starting mini dairies in the villages Training Exposure visits Green fodder production	T 5.10 P 5.15.4, 5.15.5 T 5.14 T 5.14 P 5.15.6, 5.15.9

		Natural service through community bulls (Private Public Interface)	proposed mini dairies Private Public linkages and synergies be created. Retail outlets may also be associated with productivity improvement through A.I. and natural services.	DDAH DDAH/ KVK	Provision of community bulls to Panchayats	P 5.15.7
		Mineral mixture supplementation of feed	The animal feed will be supplemented with 50 g mineral mixture per day per animal for 300 days. In the plan period 50000 lactating animals will be targeted @ 10000 during each year.	DDAH will ensure supply of mineral mixture at 50% subsidy	10000 lactating animals will be covered each year	P 5.15.5 T 5.10
12	Sheep and goats	Low production due to poor management, slow weight gain, non availability of natural service, lack of ration/feed, reduced area under pastures, high incidence of	DDAH and KVK will organize trainings for better management and higher production. DDAH will make linkages with private	DDAH/ KVK DDAH	Trainings Surveys and Exposure visits	T 5.10 P 5.15.9 T 5.10,5.16

		diseases and poor preventive vaccination programmes.	agencies for starting facilities of marketing and availability of feed through co-operatives.			
13	Poultry	Low production. High incidence of diseases, poor quality of drinking water, non availability of quality feed and healthy chicks, and unorganized marketing.	DDAH and KVK will organize trainings for better management and higher production.	DDAH/KVK	Trainings Exposure visit	T 5.10 T 5.14
14	Fisheries	Low production of fish due to poor technical knowledge of fish farming, poor management of fish farms, poor quality of ground water and unorganized marketing.	DFO/KVK will organize trainings/demonstrations for fisheries development during the plan period	DFO/KVK	Trainings & demonstrations Exposure visits	T 5.10,5.16

5.14. Extension activities (Stream II) for development of allied sectors

Table 5.9: Training Proposed for Capacity Building of Allied sectors Staff on different aspects covered under Plan (at District level)

(Phy- Nos. , Fin. – Rs in lacs)

Name of the Department	Year wise no. of staff to be trained											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Horticulture	50	0.30	50	0.30	50	0.30	50	0.30	50	0.30	250	1.5
Animal husbandry	500	3.0	500	3.0	500	3.0	500	3.0	500	3.0	500	15
Fishery	50	0.30	50	0.30	50	0.30	50	0.30	50	0.30	250	1.5
Credit institutions	100	0.60	100	0.60	100	0.60	100	0.60	100	0.60	500	3.0
Total	700	4.2	700	4.2	700	4.2	700	4.2	700	4.2	3500	21

Cost norms – Rs 600/ trainee/day

Table 5.10 : Planning for Farmers Training for Capacity Building and Skill Upgradation

Name of technology to be transferred	No of farmers to be trained and fund requirement (Rs in lacs)										Total	
	2007-08		2008-09		2009-10		2010-11		2011-12		Phy	Fin
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
Seed Production	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
Green House	50	0.20	50	0.20	50	0.20	50	0.20	50	0.20	250	1.0
Micro Irrigation	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
IPM	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
Fruit tree cultivation	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
Flower cultivation	50	0.20	50	0.20	50	0.20	50	0.20	50	0.20	250	1.0
Credit and marketing management	150	0.60	150	0.60	150	0.60	150	0.60	150	0.60	750	3.0
Renewable energy sources	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
INM	200	0.80	200	0.80	200	0.80	200	0.80	200	0.80	1000	4.0
RCTs	200	0.80	200	0.80	200	0.80	200	0.80	200	0.80	1000	4.0
Weed management	500	2.00	500	2.00	500	2.00	500	2.00	500	2.00	2500	8.0
Bee Keeping	500	2.00	500	2.00	500	2.00	500	2.00	500	2.00	2500	8.0
Modern dairy management aspect	1000	4.00	100 0	4.00	100 0	4.00	1000	4.00	1000	4.00	5000	20.0
Poultry management	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
Sheep, goat and pig rearing	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.0
Total	3350	13.4	3350	13.4	3350	13.4	3350	13.4	3350	13.4	16750	67.0

Related to Allied fields (at district level)

Table 5.11 : IPM Demonstrations in Horticultural crops during Next Five Years

Crop	Area under each demon. (ha)	IPM Demonstrations Projection											
		2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Vegetable crops	0.4	150	7.5	150	7.5	150	7.5	150	7.5	150	7.5	750	37.50
Horticulture	0.4	50	2.25	150	2.25	150	2.25	150	2.25	150	2.25	750	11.25
Total		200	3	200	3	200	3	200	3	200	3	1000	38.75

(Phy - Area covered in ha, Fin – Rs. in lacs)

Table 5.12 : INM Demonstrations in vegetable crops during Next Five Years

(Phy - Area covered in ha, Fin – Rs. in lacs)

Crop	Area under each demon.(ha)	INM Demonstrations Projection											
		2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Bhindi	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Tomato	0.4	30	1.5	30	1.5	30	1.5	30	1.5	30	1.5	150	7.5
Cucurbits	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Onion	0.4	30	1.5	30	1.5	30	1.5	30	1.5	30	1.5	150	7.5
Brinjal	0.4	30	1.5	30	1.5	30	1.5	30	1.5	30	1.5	150	7.5
Chillies	0.4	30	1.5	30	1.5	30	1.5	30	1.5	30	1.5	150	7.5
ColeCrops	0.4	30	1.5	30	1.5	30	1.5	30	1.5	30	1.5	150	7.5
Total		190	9.5	190	9.5	190	9.5	190	9.5	190	9.5	950	47.5

Table 5.13 : Varietal Demonstrations to be conducted in vegetable crops in Next Five Years

(Phy - Area covered in ha, Fin – Rs. in lacs)

Crop	Area under each demon. (ha)	Varietals Demonstrations Projection											
		2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Bhindi	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Tomato	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Brinjal	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Onion	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Cole crops	0.4	20	1.0	20	1.0	20	1.0	20	1.0	20	1.0	100	5
Other veg.	0.4	50	2.5	50	2.5	50	2.5	50	2.5	50	2.5	250	12.5
Total		150	7.5	150	7.5	150	7.5	150	7.5	150	7.5	750	37.5

Table 5.14: Exposure visits on important aspects identified in allied sectors/ enterprises during plan period

(Phy – No. of visits, Fin – Rs. in lacs)

Allied Sectors/ enterprise	Demonstrations Projection											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Dairy	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	40
Poultry (including backyard)	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	20
Mushroom	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	20
Fishery	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	20
Bee keeping	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	20
Vermi- compost	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	40
Total	80	16.0	80	16.0	80	16.0	80	16.0	80	16.0	400	80.0

Table 5.15. : Farmer Field Schools covering identified critical technologies in Next Five Years
(Phy – No. of field schools, Fin – Rs. in lacs)

Fields	Farmer Field Schhols Projection											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin.	Phy.	Fin.	Phy.	Fin	Phy	Fin.	Phy	Fin	Phy	Fin.
Dairy	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	20.0
Poultry (including back yard)	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10.0
Goatry and Piggery	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10.0
Fish Farming	5	1.0	5	1.0	5	1.0	5	1.0	5	1.0	25	5.0
Bee Keeping	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10.0
Vegetable crops	50	10.0	50	10.0	50	10.0	50	10.0	50	10.0	250	50.0
Total	105	21	105	21	105	21	105	21	105	21	525	105.0

Table 5.16: Group formation /Commodity interest groups formation for specific activities

Interest Group(s)	Group Formation Projection Plan											
	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
	Phy	Fin	Phy	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin
Dairy	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	20
Poultry (including backyard)	5	1.0	5	1.0	5	1.0	5	1.0	5	1.0	25	5
Fish Farming	5	1.0	5	1.0	5	1.0	5	1.0	5	1.0	25	5
Bee Keeping	10	2.0	10	2.0	10	2.0	10	2.0	10	2.0	50	10
Vegetable crops	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	20
Horticultural crops	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	20
Floriculture	20	4.0	20	4.0	20	4.0	20	4.0	20	4.0	100	20
Total	100	20	100	20	100	20	100	20	100	20	500	100

Cost norms- Rs.0.20 lacs/group (for capacity building, input assistance, marketing and group specific activities)

5.15 . Special project (Stream I) for development of allied sectors

5.15.1: Nursery raising in Poly houses / Poly tunnels

The basic lacuna in the area expansion under horticultural plantation is unavailability of quality planting material. Similarly, quality seed of most of the vegetables and flowers, according to their seasonal requirement, is not available. Therefore, research, extension and development agencies should take initiative to establish quality fruit and vegetables nurseries to supply requisite quality materials and educate the farms and field functionaries for raising nurseries for healthy plants /seedlings. For capacity building, separate trainings on technical know-how and guidance to farmers for seeking loan from credit institutions, may be organized.

Budget proposal for poly house/tunnel for nursery raising

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of Trainings	10	10	10	10	10	50
Cost/ training (Rs. in Lakh)	25	25	25	25	25	125

5.15.2 : Promotion of Kinnow in Gurgaon district

Fruits and vegetables are important source of human diet for essential vitamins and minerals. These food stuffs have laxative effect on stomach and helps in digestion of other food materials. Intake of fruits and vegetable in human diet is particularly important for the children, pregnant women and sick persons. In the recent past the prices of fruits and vegetables have increased exorbitantly high leading to poor availability to poor man. Availability of good planting material in horticulture and hybrid seed in vegetables production are limiting factor. Scientific demonstration of improved technology with good genetic material is required for introduction of these crops in the production system

Horticultural sector has been identified as a tool of crop diversification, which can provide increased employment opportunities, better return per unit area besides filling the nutritional gaps. Farmers have started cultivating horticulture crops as a separate viable economic activity. The district is ideally placed for exploiting the potential of horticulture production being in close proximity to the national capital region. Currently the district has ---ha area under fruit trees mainly under aonla, ber and guava. There is scope of planting kinnow in the sweat water belt and areas adjoining canal in the district.

Budget proposal for kinnow plantation in district Gurgaon

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be put under kinnow	100	100	100	100	100	500
Cost of saplings at 50 % subsidy (Lacs)	20	20	20	20	20	100
Cost of fencing at 50 % subsidy (Lacs)	250	250	250	250	250	1250
Cost of insecticide against at 50 % subsidy (Lacs)	10	10	10	10	10	50

Cost of drip at 50 % subsidy (Lacs)	20	20	20	20	20	100
Total	300	300	300	300	300	1500

5.15.3 : Promotion of less water requiring onion

There is immense scope of vegetable growing in Gurgaon district due to easy market access in the NCR and excellent connectivity of the district with national capital in vicinity. The Gurgaon district is deficit in water, and the less water requiring technology will prove a boon to the district. Therefore, there is need to demonstrate and promote Sikar onion in the district.

Budget proposal for popularization of onion (Sikar) in district Gurgaon

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be put under onion	100	100	100	100	100	500
Cost of seed @ Rs 5000 /ha (Lakh)	5	5	5	5	5	25
Cost of seed at 50 % subsidy (Lakh)	2.5	2.5	2.5	2.5	2.5	12.5
Cost of drip at 50 % subsidy	25	25	25	25	25	125
Total cost (lakhs)	27.5	27.5	27.5	27.5	27.5	137.5

5.15.4: Development of mini dairy farming in Gurgaon district

In Gurgaon district, size of holding is decreasing day by day and 47.6 farmers hold less than one hectare land. Under such situation, it is difficult to optimize the resources for single enterprise. The farmers mainly practice arable farming, but such system of farming gives low returns as compared to mixed farming or integrated farming along with subsidiary practices. Study conducted at Bawal has shown that arable farming alone is unprofitable, whereas Haryana cow raising has become irrelevant in the age of mechanization, for male calves / oxen are of no use in farming and have become obsolete. Consequently, the cattle population in the state is on the decline since last 2 decades, much in the favour of buffalo population. On the other hand, the continuous price rise of agricultural inputs has increased the cost of production and minimized the profits in farming, thus forcing the farmers to look for alternate options. But the poor financial condition of the farmer does not permit him to plunge into the risk of adopting costly options. Under these circumstances, developing integrated farming system, is the best alternate

As far as diversification away from agriculture is concerned, there is tremendous scope in dairying in Gurgaon district. Animal Husbandry is an integral part of agriculture, but it needs to be promoted further. The promotion of animal husbandry will also serve a great social cause in the sense that this profession is practiced by small and marginal farmers. Therefore, the support to this integrated farming system will go a long way in ameliorating the lot of small and marginal farmers.

In Gurgaon district, there are 61348 farm families of various land holding sizes. More and more number of farmers are coming into the category of marginal and small farmers due to fragmentation of land holdings. Buffalo is the main milch animal in the district. The cost of the good animal has increased more than Rs. 30,000 per animal. Due to the small land holdings and

high cost of animal, it has become very difficult to maintain dairy animals. The demand for milk is continuously increasing from urban areas. The milk prices in the area reaches upto Rs.25-30/- per liter particularly during the lean periods. Milk being an important component of diet is becoming a scarce commodity for the low and middle class families in the urban and rural areas of the district.

Proposal for establishment of mini Dairy Units

Description		2007-08	2008-09	2009-10	2010-11	2011-12	Total
5-buffalo unit @ Rs 30,000/ buffaloe (at 25 % subsidy)	Number	20	20	20	20	20	100
	Cost (Rs. In Lakhs)	22.5	22.5	22.5	22.5	22.5	112.5
10-buffalo unit @ Rs 30,000/ buffaloe (at 25 % subsidy)	Numbers	10	10	10	10	10	50
	Cost (Rs.in Lakhs)	22.5	22.5	22.5	22.5	22.5	112.5
15-buffalo unit @ Rs 30,000/ buffaloe (at 25 % subsidy)	Numbers	10	10	10	10	10	50
	Cost (Rs. in Lakhs)	33.75	33.75	33.75	33.75	33.75	168.75
Total		78.75	78.75	78.75	78.75	78.75	393.75

5.15.5 : Project on Mineral mixture feeding to lactating cattle

The soils of district Gurgaon, being coarse textured are poor in nutrient retention. The soils of the district are low in O.C. and phosphorus. Due to over exploitation of land with extensive cultivation and poor recycling of farm wastes, the soils have become deficient in plant nutrients. Deficiency of nutrients particularly Ca and P. etc. have severely affected the health and breeding efficiency of dairy animals. The deficiency of micronutrient Zn and Fe is increasing in soils. Reproductive problems viz., age at first heat, age at first calving, calving interval, conception rate, abortion and vaginal prolepses and other deficiency syndrome have severely affected the breeding ability of dairy animals. Retarded calf growth and poor animal health are another severe threat associated with mineral deficiency in feeding straw, fodder and other feed stuffs. Encouraging results have been obtained by supplementing 50 grams of quality mineral mixture per day per lactating animals in the ration. Since, milk is the main constituents of human diet in the district, the deficiency of mineral in milk obtained by feeding deficient fodder has become a great cause of concern to human health. To overcome the deficiency problem in dairy animals it is proposed to make provision of mineral mixture to animals.

Proposal for mineral mixture feeding

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Lactating animals	10000	10000	10000	10000	10000	50000
MM req. in tons @ 50g/day/animal /300days	150	150	150	150	150	750

Cost @ Rs. 50,000/ tons (Lacs)	75	75	75	75	75	375
Cost at requisite subsidy of 50 %	37.5	37.5	37.5	37.5	37.5	187.5

5.15.6 : Fodder production

Feed and fodder accounts for 70-75 % of the total cost of milk production. Profitability and viability of any dairy production programme depends on feed and fodder availability and feeding management of dairy animals. Feed and fodder availability is continuously decreasing to livestock due to heavy demands for grain production. The green fodder availability in district Gurgaon is quite low due to less water availability. The separate fodder area for animals very rare in the district and weeds in the crops are harvested for feeding the animals. Since there is no excess fodder in the district, ensiling and hay making is not required.

Keeping above points in view, it is desired to lay out demonstration on Bajra /Jowar and cowpea in kharif and oat and Lucerne in rabi. As a perennial source of fodder Napuer baja hybrid can be sown in wider rows with drip irrigation to economise water

Proposal for fodder productions

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Rabi (Nos.)	50	50	50	50	50	200
Cost @ Rs.5000/ha	2.5	2.5	2.5	2.5	2.5	12.5
Kharif (No.)	50	50	50	50	50	200
Cost @ Rs.5000/ha	2.5	2.5	2.5	2.5	2.5	12.5
Napier with drip	50	50	50	50	50	200
Cost @ Rs.5000/ha	12.5	12.5	12.5	12.5	12.5	62.5
Total cost (lakhs)	17.5	17.5	17.5	17.5	17.5	87.5

5.15.7 Conservation of murrah buffalo breed through Community Bulls

In Gurgaon district one of the reason for poor productivity of the animals is poor quality of animal breed resulting from mating by non-descript bulls. Therefore to increase the productivity through breed improvement, it is proposed to provide community bulls in the villages

Proposal for providing community bulls

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	50	50	50	50	50	250
Cost @ 0.30 lacs / bull	15	15	15	15	15	75
Maintenance cost 0.50 /bull /yr	25	25	25	25	25	125
G. Total	40	40	40	40	40	200

5.15.8 : Proposal for establishment of nutritional gardens around tube wells

Horticulture offers scope for crop diversification, value addition, productivity enhancement, export promotion, assured employment generation in agriculture and rural development. This sector also contributes to the nutritional security. Fruits, also called protective food, are important source of vitamins, proteins, carbohydrates, minerals and fibers. But the small holdings size and other production constraints in the district farmers are arresting the area expansion for establishment of orchard. Therefore, The planting of fruit plants near the tube wells a nutritional garden is the viable alternate to provide the nutritional security, small employment and to inculcate the habit of fruit cultivation. The proposal is to supply 5 fruit plants of same plant species for plantation around tube wells.

Cost of project on nutritional gardening around tube wells

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of locations	4000	4000	4000	4000	4000	20,000
Financial help @Rs. 100 per 5 plants (Rs. in lacs)	4.0	4.0	4.0	4.0	4.0	20.0

Fruit plants will be supplied to farmers free of cost.

5.15.9.: Project for Survey, Monitoring and Evaluation

The constant monitoring and evaluation is the key for setting need based, area specific priorities. The agenda for future extension and research action should compulsorily be based on seasonal assessment of different agricultural phenomena in the district.

The season based performance assessment will result into cost savings, eliminating uneconomical and low performing technologies, practices affecting the productivity.

Budget requirement for survey, monitoring and evaluation

S. No.	Survey, assessment, monitoring and evaluation of	Financial requirement (in lacs)					Total
		2007-08	2008-09	2009-10	2010-11	2011-12	
1	Technologies and practices affecting the productivity	5.0	5.0	5.0	5.0	5.0	25.0
2	Yield performances of crops and varieties	5.0	5.0	5.0	5.0	5.0	25.0
3	Adoption pattern of crucial technologies across the regions and categories of farmers	5.0	5.0	5.0	5.0	5.0	25.0
4	Incidence and occurrence of insect, pest and weeds	5.0	5.0	5.0	5.0	5.0	25.0
5	Resistance development and sustainability issues	5.0	5.0	5.0	5.0	5.0	25.0
6	Ground water quality in	5.0	5.0	5.0	5.0	5.0	25.0

	relation to nitrate and heavy metal contamination						
7	Economics of crops, crop rotations and farming systems	5.0	5.0	5.0	5.0	5.0	25.0
8	Economic and social progression	5.0	5.0	5.0	5.0	5.0	25.0
	TOTAL	40.0	40.0	40.0	40.0	40.0	200.0

CHAPTER VI
DISTRICT PLAN

6.1. Introduction

The proposed district plan includes agriculture, horticulture, animal husbandry, fisheries and innovative as well as miscellaneous schemes as the major activities to be undertaken in the district Rewari. The existing status of these sectors has been discussed in detail in the preceding chapters with the proposed outlays for XI plan.

6.2 Growth drivers

The targets will be achieved using different growth drivers in agriculture and allied sectors as follows:

6.3 : Sectoral / Regional Growth Drivers of the District

(a) **Area Expansion**

- Bring more cultivable area under fruits, vegetables and barley

(b) **Land Improvement.**

- Reclamation of saline and sodic soils

(c) **Maintenance of Soil Health**

- Residue retention for adding organic matter in the soil
- Green manuring

(d) **Irrigation Management**

- Drip irrigation in fruits and vegetables for efficient use of water
- Rainwater harvesting
- Ground water recharge
- Watershed development

(e) **Seed Management**

- Timely availability of quality seeds / seedlings
- Linkages with Private Seed Companies

(f) **Farm Mechanization**

- Availability of farm machinery through indigenous manufacturing

(g) **Animal Husbandry**

- Mineral mixture supplementation
- Value addition and processing
- Production of green fodder

(h) **Marketing and Post-harvest Management**

- Developing rural market, modernizing existing market yards, setting up of private/ terminal markets, commodity specific requirements.
- Post-harvest Management /Value Addition

(i) **Risk Management**

- Coverage and simplification of claims
- Crop insurance scheme be made realistic
- Premium subsidy for oilseeds, fruits, animals etc

(j) **Price Support System**

- Besides MSP, assured procurement of mustard, barley and gram
- (k) Adoption of Agro-technologies**

- Resource conservation technologies
- (l) Institutional Support Services**

Extension

- Public-private partnership in agriculture extension

Credit

- Easy availability of credit
- Location specific investment credit
- Long-term credit policy for farmers

6.3.1 Agriculture

- Increasing area under improved varieties in wheat, mustard and guar
- Accelerated adoption of Zero Tillage Technology for sustaining and improving the productivity levels
- Use of micro irrigation, Laser leveler for increasing water use efficiency.
- Seed treatment and enhancing seed replacement rate.
- IPM, INM, SSNM and IWM.
- Demonstration and capacity building of field functionary and farmers
- Human resource development.
- Safe use of brackish water
- Balance fertilization with micronutrient use
- Use of stress tolerant (water, salinity, temp.) crops and varieties

6.3.2. Horticulture

- Increasing area under fruits and vegetable crops.
- Providing improved planting material of fruit crops.
- IPM and INM
- Encouraging income and employment generation vocations through agro-based vocations.
- Demonstrations and trainings for farmers and field official
- Processing and value addition of fruits

6.3.3 Vegetables:

- Increasing area under vegetables.
- Providing improved planting material of fruit crops.
- IPM and INM
- Processing and value addition of vegetables

6.3.4. Animal Husbandry:

- Mineral mixture feeding
- De-worming
- Breed improvement through A.I and community bull service
- Balanced feeding
- Production of green fodder
- Developing mini and commercial dairy farms

6.3.5 Fisheries:

- Improvement of village ponds
- Making availability of good quality fish seed
- Balanced feeding in ponds
- Capacity building of farmers and field functionary.

6.3.6 Bee Keeping

- Capacity building of beekeepers and field functionary.
- Shifting the place in lean pollen shortage period during summer.

6.4. Innovative Schemes/Projects

To achieve the targeted growth rate in addition to the proposed extension activities the following specific, need based projects are being proposed under the plan. The details about the project have already been discussed in previous chapters. These special projects will provide imputes for increasing productivity by strengthening the other proposed extension activities.

6.4.1 . Special projects (Stream I) for development of agriculture sectors

Project on Rain water harvesting for ground water recharge

Promotion of ZT in Gurgaon district

Resource conservation through laser leveling

Soil reclamation through gypsum

Carrot weed control for environmental safety and bio-resource conservation

Soil Health Maintenance

Popularizing mustard-chicory intercropping for higher profitability

Popularizing barley in the salinity prone mustard areas

Watch and catch Wild oat and *Phalaris* in wheat

Installation of Solar Photovoltaic Pumps (SPV) for popularising non-conventional energy usage in farming

Establishment of biogas units

Proposal for establishment of Weather Watch and Forecasting System

6.4.2. Special projects (Stream I) for development of allied sectors

Nursery raising in Poly houses / Poly tunnels

Promotion of less water requiring onion

Development of mini dairy farming in Gurgaon district

Project on Mineral mixture feeding to lactating cattle

Conservation of murrah buffalo breed through Community Bulls

Proposal for establishment of nutritional gardens around tube wells

Project for Survey, Monitoring and Evaluation

In order to achieve targeted growth rate of 4.0 per cent in agriculture and its allied sectors, the innovative schemes as proposed above have been included in the district plan.

VISION OF XIth Plan for the district

To meet the productivity targets of agriculture and allied activities by rebalancing these as per market demand. The emphasis would be on conserving the natural resources in an integrated diversified system with the aim of sustaining farm income at an increased level.

6.5 District Plan

Table 6.1. Physical and Financial Programme Proposed for development of Agriculture Sector under CDAP during XI plan. (Phy. Nos/ha, Rs. in lacs)

Sr No.	Activity	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Trainings												
	In Service	700	4.2	700	4.2	700	4.2	700	4.2	700	4.2	3500	21.0
	Farmers (District level)	6900	29.6	6900	29.6	6900	29.6	6900	29.6	6900	29.6	34500	148.0
	Farmers (Block level)	2000	4.0	2000	4.0	2000	4.0	2000	4.0	2000	4.0	10000	20.0
2.	Demonstrations												
	Varietals	1150	57.5	1150	57.5	1150	57.5	1150	57.5	1150	57.5	5750	287.5
	INM/ SSNM	2000	100	2000	100	2000	100	2000	100	2000	100	10,000	500.0
	IWM	300	15.0	300	15.0	300	15.0	300	15.0	300	15.0	1500	75.0
3.	Other activities												
	RCTs	2000	100	2000	100	2000	100	2000	100	2000	100	10000	500.0
	FFSs	69	13.8	69	13.8	69	13.8	69	13.8	69	13.8	345	69.0
	Group formation	57	11.4	57	11.4	57	11.4	57	11.4	57	11.4	285	57
	Total	-	335.5	335.5	335.5	335.5	335.5	335.5	335.5	335.5	335.5	1677.5	

Table 6.2 Physical and Financial Programme Proposed for *special projects* for development of *Agriculture Sector* under CDAP during XI plan.

Sr. No.	Projects	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
I	Green manuring	10000	37.5	10000	37.5	10000	37.5	10000	37.5	10000	37.5	50000	187.5
II	Ground water recharge	100	100	100	100	100	100	100	100	100	100	500	50
III	A)Reclamation of sodic soils	2000	36	2000	36	2000	36	2000	36	2000	36	10000	180
	B)Reclamation of saline soils	2000	50	2000	50	2000	50	2000	50	2000	50	10000	250
IV	Mustard residue management	4000	308	4000	308	4000	308	4000	308	4000	308	20000	1540
V	Inter-cropping chicory+ mustard	10000	15	10000	15	10000	15	10000	15	10000	15	50000	75
VI	Introduction of Barley	2000	17.12	2500	21.4	3000	25.7	3500	30.0	4000	34.25	15000	128.38
VII	Zero-tillage	50	12.5	50	12.5	50	12.5	50	12.5	50	12.5	250	62.5
VIII	Laser levelling	10	18	10	18	10	18	10	18	10	18	50	90
IX	Solar photovoltaic (SPV) pumps	40	198	40	198	40	198	40	198	40	198	200	990
X	Management of wild oat	10000	35	10000	35	10000	35	10000	35	10000	35	50000	175
XI	Carrot weed eradication	--	225	--	225	--	225	--	225	--	225	--	1125
XII	Seed treatment of Wheat	50000	162.5	50000	162.5	50000	162.5	50000	162.5	50000	162.5	250000	812.5
XIII	Establishment of bio-gas	500	50	500	50	500	50	500	50	500	50	2500	250
XIV	Weather watch and forecasting	1.0	100									1.0	100
	Total	-	1364.62	-	1268.9	-	1273.2	-	1277.5	-	1281.75	-	6465.97

(Phy. Nos/ha, Rs. in lacs)

Table 6.3 Physical and Financial Programme Proposed for development of *Allied Agricultural Sectors* under CDAP during XI plan.

Sr. No.	Activity	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Trainings												
	In Service	700	4.2	700	4.2	700	4.2	700	4.2	700	4.2	3500	21.0
	Farmers	3350	13.4	3350	13.4	3350	13.4	3350	13.4	3350	13.4	16750	67.0
2.	Demonstrations												
	INM (Hort./Veg.)	200	9.75	200	9.75	200	9.75	200	9.75	200	9.75	1000	48.75
	IPM (Hort./Veg.)	190	9.5	190	9.5	190	9.5	190	9.5	190	9.5	950	47.5
3.	Varietal Demonstration	150	7.5	150	7.5	150	7.5	150	7.5	150	7.5	750	37.5
4	FFSs (All Allied Sectors)	150	21.0	150	21.0	150	21.0	150	21.0	150	21.0	525	105.0
5	Group formation	100	20	100	20	100	20	100	20	100	20	500	100
	Total		85.35		85.35		85.35		85.35		85.35		426.75

(Phy - in Nos/ha, Fin- Rs. in lacs)

Table 6.4. Physical and Financial Programme Proposed for *special projects* for development of *Allied Agricultural Sectors* under CDAP during XI plan.

Sr. No.	Projects	2007-08		2008-09		2009-10		2010-11		2011-12		Total	
		Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
I	Supplementing Mineral Mixture	10000	37.5	10000	37.5	10000	37.5	10000	37.5	10000	37.5	50000	187.5
II	Green fodder	150	17.5	150	17.5	150	17.5	150	17.5	150	17.5	750	87.5
III	Community bulls	50	40	50	40	50	40	50	40	50	40	250	200
IV	Mini dairies	40	78.75	40	78.75	40	78.75	40	78.75	40	78.75	200	393.75
V	Nursery raising in poly houses	10	25	10	25	10	25	10	25	10	25	250	50
VI	Kinnow planting	100	300	100	300	100	300	100	300	100	300	500	1500
VII	Onion planting	100	27.5	100	27.5	100	27.5	100	27.5	100	27.5	500	137.5
VIII	Nutritional gardens	4000	4.0	4000	4.0	4000	4.0	4000	4.0	4000	4.0	20000	20.0
IX	Survey monitoring, Evaluation		40		40		40		40		40		200
	Total	--	570.25	--	570.25	--	570.25	--	570.25	--	570.25	--	2851.25

(Phy - in Nos/ha, Fin -Rs. in lacs)

Table 6.5 : Summary of Physical and Financial Programme Proposed under CDAP during XI Plan

(Rs. in lacs)

Name of Work	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Extension Activities						
Agriculture	335.5	335.5	335.5	335.5	335.5	1677.50
Allied sectors	85.35	85.35	85.35	85.35	85.35	426.75
Total	420.85	420.85	420.85	420.85	420.85	2104.25
Special projects						
Agriculture	1364.62	1268.9	1273.2	1277.5	1281.75	6465.97
Allied sectors	570.25	570.25	570.25	570.25	570.25	2851.25
Total	1934.87	1839.15	1843.45	1847.75	1852.00	9317.22
Grand Total	2355.72	2260.0	2264.3	2268.6	2272.85	11421.47

Conclusion

The agriculture in Gurgaon district was revolutionized in late sixties when rural electrification was achieved and the dry fields of the district were watered through tube well. This period coincided with the evolution of green revolution era equipped with improved varieties and their management, creation of favorable infrastructure of irrigation, fertilizer industry and marketing. As a result of higher input use, the production and productivity of the district noticed a marked increase. But in the quest of higher production, the available natural resources were desperately used causing their degradation. Due to mushrooming growth of tube wells and ill water management practices, the water level in the district is falling at the rate of 45 cm per annum in the last 3 decades. On the other hand, the indiscriminate use of water has caused the secondary salinisation / sodification of the soil affecting the crop productivity. In addition to this, with the increase in cropping intensity and inadequate and imbalanced fertilizer use, with reduced use of organic manures, the soils have been rendered deficient in major and micro-nutrients, affecting the crop productivity. Consequently, the recent debate on falling water table and deteriorating soil health has prompted scientists to rethink. Therefore, it is high time for farmers to move away from frequent cultivation, excess water use, imbalance use of fertilizers, and excess use of pesticides.

The increased targets of eleventh five year plan could be met only by the greater adoption of efficient Resource Conservation Technologies like Laser Land Leveller, Zero Tillage Machines, Seed-cum-Fertilizer drills and Ridger-Seeder . These technological tools will be of greater use for efficient water and nutrient use, precise placement of seeds and fertilizers at the appropriate depths. More over, the efforts will be diverted to increase the organic matter content of the soils by adopting multi pronged strategy using compost, green manuring and residue retention by adopting Zero Tillage technology, judicious use of mustard byproduct in composting, use of biogas compost and green manuring, so as to make the soil physically, chemically or biologically healthy. It is expected that the custom hire services will be encouraged. It is also expected that more land will be available on lease and therefore farmers would need more machinery for saving labour and increasing the efficiency of inputs. Yield level of top 10 per cent farmers may be assumed as an attainable yield in any coming season. The exercise of monitoring yield levels in each district must be done for planning for the next season. Time has now come to again review the recommendation of fertilizer and to meet the target of attainable yield of top 10 per cent farmers.

The perusal of the district income reveals that the major contributor to district income is agriculture sector (45 %), followed by Animal Husbandry (49.7 %). The contribution of fruits, vegetables and floriculture (2.7%) as well as the subsidiary occupation is dismally low (2.6%), despite the fact that the district is ideally located at the doorstep of big NCR market. The grasping urbanization in the district calls for large scale adoption of subsidiary occupations. We are convinced that the different sources of income including cultivation of fruit, vegetables, floriculture, dairying, mushroom cultivation and honeybee production etc can help farmers to get daily income.

The reductions in energy consumption up to 50 % need to be targeted through reduced fuel consumption at crop establishment. Savings in energy consumption is expected to reduce the

associated carbon dioxide emissions. The price of already subsidized diesel will rise further. Technologies like zero-tillage for conservation agriculture are available that can reduce the energy consumption and increase profits in clusterbean, pearl millet, paddy and sesame based cropping systems prevalent in the district.