COMPREHENSIVE DISTRICT AGRICULTURE PLAN (C-DAP)

DISTRICT KAITHAL
HARYANA

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

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DISTRICT KAITHAL

HARYANA

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CHAPTER-I

Introduction

The economic reforms commenced in 1991 has 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 contrary, it witnessed a sharp 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 10^{th} 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 11^{th} 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 29^{th} 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 incentivise 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 in sensitize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating horticulture, livestock, poultry and fisheries etc. 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 over come 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 and 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. Keeping this in view the C-DAP of district Kaithal is prepared 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 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 where ever needed for plan preparation.

1 Meeting of KVK, Kaithal staff was held with representatives and extension officers of line departments (fishery, forestry, agriculture, and animal husbandry), farmer association's representatives and gram Panchayats members (PRA villages) to prepare the comprehensive district agriculture plan of Kaithal district. The following points were discussed:

- Discussed the participatory rural evaluation, time frame, activities and responsibilities of all involved stakeholders during the discussion
- Discussed the programme and expected output for 5 year plan in progress. The stakeholder were made clear about subsidies for seeds, fertilizers, existing possible gaps and create environment for incentive for farmer in development and implementation of the District Action Plan

2. Holding farmers meeting at each Agro-ecological based sites within the district. The following discussions were made:

- Current practices were described and discussed with the farmers.
- Promising new practices identified and agreed upon with the participating farmers.

- Responsibilities of all the stake holders including farmers were established before the start of the meeting.
- In the meeting PRA schedule was prepared and data needed was highlighted.
- Important points for discussion containing proposed changing practices (crop management, varieties, site specific nutrient management IPM, seed and allied activities) were highlighted. The schedule was simple and easy to understand.

3 During meeting

The meeting was informal. The farmers were encouraged to interact and participate in discussion. Lecture type meeting was avoided. Farmers were informed about the objectives of the meeting. The dialogue was started on gap analysis and current scenario regarding profitability, productivity and risks associated with farming system.

The possible changes in management practices were targeted.

i) Field preparation: Zero tillage, Lazer leveling, bed planting, transplanting, puddling,

ii) Crop establishment: Plant density, plant distance, seed rate, seed grading, sowing time.

iii) NPK Application, other nutrients required, their rate, application timing and sources, use of organic manure, top dressing of fertilizer, their rates, time and sources, application of Potash, Micronutrient important pest including insect based on economic value, diseases, nematodes, weeds and salt concentrations.

iv) Animal husbandry practices, feeding problems, reproductive disorders, calf mortality, fodder availability, problem of endo and ecto parasites

v) Farmers and scientists came to general agreement on what to do to fill the gaps in productivity of crops and animals.

vi) Discussed about the proposed plan demonstrations identified allied activities in a farming system approach

Keeping in view the following decisions were made

a) Profitability of cropping system and the rate of return. In order to achieve good rate of return for long term family welfare, bee-keeping, dairy farming, vermi composting, food preservation mushroom production, poultry farming, horticulture and vegetable cultivation etc. were discussed.

b) Also discussed with the farmers regarding market infrastructure and opportunities, custom hiring services and some of the policy issues related to subsidies

c) The farmer's ability for investment was also discussed.

Work plan and activities for resource poor farmers were collected and discussed the farmer requirement for on farm and off farm activities related to agriculture and allied subjects.

CHAPTER-II

General Description of the District

Kaithal district came into existence on November 1, 1989. It was carved out of Kaithal and Jind districts. The district has two sub divisions namely Kaithal and Guhla and six development blocks namely Kaithal, Guhla, Siwan, Pundri, Rajound and Kalayat. Kaithal is located at 29.8^{o} N 76.38^{o} E. It has an average elevation of 220 meters (721 feet). This city is situated on National Highway No. 65 connecting the state capital Chandigarh to Hisar. Also, it is connected through road network to Delhi via Karnal and Patiala and Sangrur in Punjab. It is connected by Railways to Narwana in west and Kaithal in East, Nearest Airports are Chandigarh & Delhi. Kaithal is a city and a municipal council in Kaithal district in the Indian state of Haryana. Historically Kaithal was known as Kapisthal and it is said to have been founded by the mythical hero Yudhisthira of Mahabharata, and is connected by traditional with the monkey-god Hanuman. In 1767 it fell into the hands of the Sikh Chieftain, Bhai Desu Singh, whose descendants, the bhais of Kaithal, ranked among the most powerful Cis-sutlej states. Their territories lapsed to the British in 1843. There remains the fort of the bhais, and several Muslim tombs of the 13^{th} century and later. Razia Sultana, the first women ruler of India, died here. This aspect is still not very commonly known to many, but residents of Kaithal know about the mazaar of Razia Begam since generations.

Kaithal is situated in North Western part of Haryana. The Kaithal district is surrounded by Punjab in North, Kurukshetra and Karnal district in East and Jind district in South and West. It has a total geographical area of 231077 hectare. As of 2001 Indian census, Kaithal had a population of 946131. Males constitute 54 % of the population and female 46%. Kaithal district has an average literacy rate of 59 %. Ghaggar River is passing through Northern parts of the district. The district has adequate drainage facilities. The important Amin and Pehowa drains prevent the district from floods. The water of the river and drains can be harvested for crop production.

Climate-The climate of Kaithal district is of very pronounced character i.e. very hot in summer and very cold during winters. Temperature ranges from 1-46 degree Celsius. Annual rain fall is 400-700 mm. Topography of the district is plain. Soils are clay loam to sandy loam with pH ranging from 7.5 to 8.5. In Kaithal 56%, 36% and 8% water poor, marginal and good quality respectively.

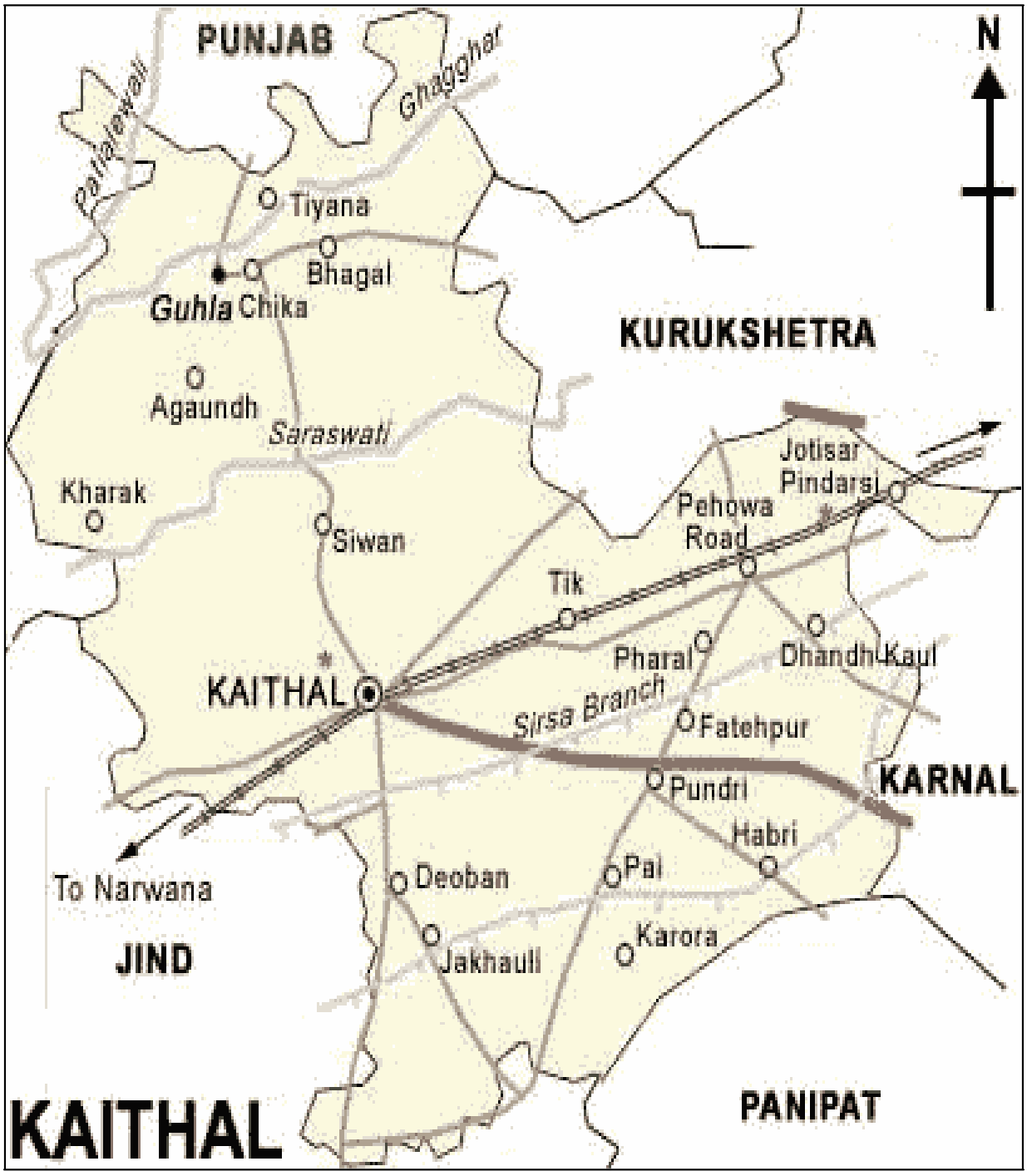
Crops- Paddy-wheat is the main crop rotation followed in the district. The average yield of paddy and wheat are 42.0 and 41.6 quintals per hectare respectively. The other crops grown are bajra, cotton, sugarcane, oilseeds and pulses. Buffalo is the main milch animal followed by cow. Horticultural and vegetable crops are also cultivated in the district. Agro forestry trees like eucalyptus and popular are also finding their ways in the farming system.

Table 2.1 Demographics details

No. of blocks	6
Total villages	273
No. of gram Panchayats	264
Total Population	946131
Male population	510513
Female population	435618
SC/ST population	302875
SC./ST male population	110372
SC/ST Female population	93503
Total literacy (%)	59.0
Male (%)	69.2
Female (%)	47.3
SC /ST total literacy (%)	36.73
SC/ST Male Literacy (%)	45.1
SC/ST Female Literacy (%)	26.84
Total geographical area (ha)	231077
Net cultivated area (ha)	196635
Gross cropped area (ha)	311082
Cropping intensity (%)	190.4
No. of farm families	66927
Marginal farmers (0-1 ha)	20077
Small farmers (1-2 ha)	16731
Semi medium farmers (2-4 ha)	17401
Medium farmers (4-10 ha)	8037
Large farmers (> 10 ha)	4688
Major crops	
Paddy (ha)	150488
Wheat (ha)	174552
Baja (Ha)	12510
Cotton (ha)	6590
Sugarcane (ha)	4000
Horticulture (ha)	916
Forest Area (ha)	7680
Irrigation by canal (ha)	66441
Irrigation by Tube well (ha)	150016
Livestock	

Cross bred cows	20639
Indigenous cow	60300
Improved buffalo	280380
Indigenous buffaloes	107792
Improved sheep	565
Indigenous sheep	18662
Improved goat	1901
Indigenous goat	3579
Others	22769
Poultry (broiler)	884800
Poultry (layer)	355800
Milk production per animal (Kg/lactation)	1345
Vety. Health Institutions	123
Average yield (q/ha.) 2006-07	
Paddy	42.0
Wheat	41.60
Bajra	18.92
Cotton	10.0
Guava	86.0
Ber	82.0
Aonla	65.0
others	60.0
Land holdings	
Total farm families	66927
Marginal farmers (0-1 Ha)	20077
Small farmers (1-2 Ha)	16731
Semi medium farmers (2-4 Ha)	17401
Medium farmers (4-10 Ha)	8037
Large farmers (more than 10 Ha)	4688

District Map



Vision

One of the key factors of stability in agriculture and productivity has been the release of modern crop varieties in crops like rice and wheat have led to intensification of cropping system. The cropping system intensification has led to increased use of fertilizer and now declining soil productivity. Modern varieties, more fertilizer use and modified management system led to more problem of pest and weeds and, therefore, new IPM issues. Decline in factor productivity which is per unit capital and labour requires change in the mind set of planners, policy makers and researchers, etc. The issues like natural resource management, long-term profitability, productivity and sustainability have become more important. On the top of it competition and value addition for quality production are becoming the important components of research and extension interface.

The policies which are based on commodity-based research will not be as productive an investment which we think. Some of the problems and priority settings for Kaithal have been highlighted in the concluding paragraph of vision statement. Through the past 40 years, agricultural research has evolved number of technologies each one followed by a rapid change in the use of inputs and improved economy of farmers. The foundation technologies and their acceptance gradually started showing the emergence of new problems. Green revolution allowed the successful productivity growth in the eastern zone of Haryana including Kaithal with basmati rice concentrated in about 30-40% specific area.

The impressive rates of yield growth achieved up to 1991-92 are no longer being sustained. In some intensively cultivated areas of rice-wheat, the growth has actually become static. The issue of flattened growth in rice is because of increase in area under basmati rice which has averaged out the increased productivity of non-basmati rice. The continuous and intensive cereal production in eastern zone of Haryana including Kaithal is not showing the expected increase in wheat yields except during 2006-07 where agronomic management brought about a significant improvement in wheat productivity. Yield of cotton has also improved significantly due to introduction of Bt cotton. The yield in both wheat and cotton actually declined significantly during the worst period of herbicide resistance in wheat (1993-97) and pest resistance in cotton (1996-2001).

The monitoring and field evaluation have shown the convergence of four important gaps including gaps highlighted separately.

1. Despite best efforts made by the scientists, conventional breeding is not showing expected gains in cereals and needs focused attention on resistance breeding, hybrid rice and genetic engineering.

2. Decline in soil productivity with nutrients extraction is not always matched by nutrient input.

3. Increased incidence of pest, diseases and weeds especially in the high productivity zones of the State.

4. Irrigation which has been instrumental in facilitating intensification in agriculture is impaired by lack of maintenance, increase in water table in some areas while decrease in water table in some other areas with salinity and alkalinity problems getting intensified.

Diversification, which is difficult process, has to be based on farmers' opinion and cannot be imposed because we want it. This will be definitely an important component but we must develop economically viable alternative for that. It needs lot of investment and a change in the mind set. We should see that either crops or cropping systems that have less pressure on natural resources are introduced or technologies that help conserving natural resources are evolved. Based on such recommendations, policy makers planned to get rid of the part of rice-wheat cropping system and concentrate on diversification of this cropping system. However, the average profitability in RWCS was more than the alternate cropping system. The advocates of diversification need to notice that farmers, specially the small land holders, cannot take risk associated with the profitability of an alternate cropping system. Results of diversification to replace rice so far are unimpressive. The RWCS does seem to need diversification. However, farmers are not happy with the relative profit offered by diversification of this cropping system. We should know what does and what does not work. Any activity on the part of extension agencies is good if it attracts farmers and is bad if it repels them. Every private enterprise including a farmer maximizes the difference between

total revenue and total costs that is profit. Rational action, however, occurs within a particular institutional context. Efforts to diversify the RWCS in favour of crops other than RWCS seem not to have worked. So, there remains an opportunity for large scale diversification within rice-wheat cropping system with more policy incentive to basmati rice, diversification across enterprises, including dairying, introduction of resource conservation technologies (RCTs). The balancing effect of RCTs will allow RWCS to maintain the ecosystem without having to diversify on a large scale. Technologies such as zero-tillage may turn the lessons learnt from diversification programme to its advantage. This technology is the rational risk avoiding strategy with tremendous potential to conserve natural resources.

To enlarge the concept of crops and animal husbandry (being practiced by them since long) incorporating poultry, fish, pig, vermiculture, beekeeping, vegetables and mushroom etc may also be attempted. In Kaithal district, RWCS will remain a major contributor to the food and livelihood security of millions of rural and urban poor. The forecasted global demand for wheat and rice, the production has to be increased @ 4% during the XI plan. The following vision statement has been included not only to sustain this cropping system but also to diversify the system in the favour of other enterprises.

VISION STATEMENT

To meet the productivity growth targets, conserve the natural resources and integrate the farming systems to further boost the profitability of farmers.

Priority Setting

- Soil reclamation by gypsum, FYM, Vermi-composting and green manuring through dhaincha.
- Judicious use of problematic water.
- Popularizing RCT through seed grading, laser levelling, zero tillage, bed planting, summer moong cultivation and water harvesting.
- Use of IPM in paddy, IWM in wheat and INM in all crops.
- Adoption of agro-based vocations.
- Introduction of agro forestry and horticulture in farming system.

- Dairy management, mineral mixture feeding, breed improvement, deworming, and fodder production and preservation.
- Food preservation and knowledge up gradation of farm women.

CHAPTER-III

SWOT analysis

This is modern management tool to analyze the strength, weaknesses, opportunities and threats of an organization/institute/centre in order to make that organization more productive and efficient.

Strengths

- Suitable agro climatic conditions for crop rice- wheat dominant cropping system with dairy animals
- Good network of canal and tube wells
- Less urban biasness, predominantly rural district
- Farmers are receptive and innovative with large acceptance of recommended inputs
- Marketing facilities for grain within 10 km
- Good transport facilities through rail and road
- Milk coop. societies at village level.
- Assured input availability net work.
- Financial help through banks and cooperatives available
- Mechanized farming gaining importance
- Adequate extension services
- Good communication facilities in villages
- Good linkages and synergy between university KVK and line department
- Rice Sheller and sugar mill are at approachable distance

Weaknesses

- Declining water table
- Problem of salinity and sodicity in areas of poor underground water quality
- Decreasing organic carbon
- Poor underground water quality in Rajound, Kalayat and Kaithal Blocks
- Average rainfall at rice transplanting is erratic
- Increase in incidence of pests a diseases
- Injudicious use of pesticides
- Inadequate fodder production

- Poor management of organic waste.
- Monoculture of rice –wheat cropping system and its adverse effect on natural assets
- Labour availability scarce and costly
- Poor feeding management of livestock
- No disincentive for excessive use of water and electricity
- Quality concern of farm inputs

Opportunities:

- Suitable agro climatic conditions for diversification within rice-wheat cropping pattern.
- Mechanization to solve the problem of labour
- Scope of amelioration of salt affected soils
- Scope for recycling of organic waste and improvement in soil health
- Scope for diversification in favour of dairy based farming systems
- Creation of subsidiary occupation to solve the problem of unemployment
- Skill and knowledge up gradation through vocational training
- Improving information and communication technology (ICT) for real time extension
- Establishment of commodity based and /or technology based farmers association
- Improving the linkages and synergies with private sector, NGOs and other public sector organizations
- Multidisciplinary and farmers participatory approach to find solution for site specific problem/issues
- Creation of network of custom hire services
- Processed food and milk products to support retail marketing
- State designated certifying agencies for specific food items like organic products

Threats:

- Disenchantment among young farmers towards agriculture as an occupation
- Lack of incentives towards dairying and subsidiary occupations
- Unscientific and un-decomposed farm yard manure and organic farm waste management

- Overexploitation of ground water for irrigation
- Problem of salinity and sodicity
- Breeding problems in milch animals associated with mineral deficiencies
- Higher calf mortality
- Decreasing availability of green fodder
- Shifting of productive land to non agriculture use

CHAPTER-IV

Development of agriculture sector

4.1 Introduction

Agriculture is the backbone of the district Kaithal as there are no industries to provide employment to rural as well as urban people. The majority of the population is engaged in agriculture. The major crops of the district are rice and wheat .The introduction of modern varieties of wheat and rice in 1960s and 70s changed the agricultural landscape of the district considerably with diversified cropping system in 60s to predominantly rice-wheat system now. The use of fertilizers and improved irrigation facilities improved the cropping intensity to almost 190%. The increase in the use of fertilizer, irrigation and now pesticides have led to increased cost of cultivation and second generation problem discussed in chapter-II and III. The challenge now is to increase the growth rate in the productivity of crops and reduction in the cost of cultivation and use of natural resources at the same time.

4.2 Land use

There is 1, 97,000 ha net area under cultivation of different crops. The percentage of net area sown to total geographical area is 85.28%. Rice, wheat, cotton, bajra and sugarcane are the major crops grown in the district. The area under different agricultural crops is given below in the Table.

Table 4.1 Present status of different crops in district Kaithal (Year 2006-07)

Sr. No.	Crop	Area (ha)	Production (tones)	Productivity (quintal/ha)
1.	Rice	150488	632049	42.0
2.	Wheat	174552	726136	41.6
3.	Sugarcane	4000	252800	632.0
4.	Bajra	12510	23644	18.9
5	Cotton	6590	6590	10.0

4.3 Soil Health

The soil health of the district is of moderately good. As per the soil health indices 68% soil is saline or alkali and 32% are of neutral pH. The soils are medium to low in organic carbon. Most of the soils are deficient in N, P, Zn and Ca. The potassium status of soil is better than organic carbon and phosphorus. In respect of available potash, soils are under medium to high category.

4.4 Water Resource & Management

4.4.1 Irrigation

The area under irrigation to net sown area is 95% as against the state average of 83.7%. Due to predominance of rice-wheat cropping pattern and dependence on ground water for irrigation, the problems of salinity and alkalinity are increasing demanding for continuous reclamation. There are 47787 tube wells and pumping sets in the district to irrigate the land under agriculture which are run by electricity and diesel engines. Most of the tube wells are submersible adding to the problem of ground water depletion

4.4.2 Scope for improvement in respect of irrigation

There is need of awareness among the farmers for adopting water saving techniques as proposed in resource conservation earlier. The water conservation techniques like laser leveling, judicious use of problematic water, use of bed planter, zero tillage technique and pucca water courses etc needs to be popularized. The Ghaggar River and several drains are passing through the district so the ground water can be recharged with the construction of water harvesting structures.

4.5 Major crops and varieties in the district.

Rice, wheat and forage crops (berseem and sorhum) are the major crops of the district. There is 100% area of wheat and about 50% area of rice is under high yielding varieties. The varieties of sorghum also belong to private sector and the lone variety of berseem grown in the district mascavi belongs to public sector. The major varieties of sugarcane are COS 8436, COH-119, COS-767, COJ-64, CO-7717 and COH-99.

The spectrum of varieties of rice and wheat grown in the district are given below as per the survey conducted during the years 2006 and 2007.

Table 4.2 Spectrum of rice varieties and hybrids (H) grown by farmers in district

Year	Dwarf varieties	Dwarf hybrids	Basmati varieties
2005	HKR-126, Pusa-44, PR-112, PR-113, PR-114, PR-118, PR-119	PH-71, H-6444, H-6129, H-6111, H-257, H-832, H-801, H-Sonata, H-359, H-401	HBC-19, CSR-30, PB-I, Sarbati, Pusa-1121, Sabnam
2006	HKR-126, HKR-47 Pusa-44, PR-106, PR-111, PR-112, PR-113, PR-114, PR-116	H-71, H-6444, H-6111, H-6129, H-257, H-832, H-140, H-9433, H-Sona, H-999, H-Samarat	HBC-119, CSR-30, PB-I, Sarbati, RH-10, Pusa-1121, Sabnam
2007	HKR-47, HKR-126, Pusa-44, PR-103, PR-110, PR-111, PR-112, PR-113, PR-118, PR-119,	P-71, H-6444, H-6129, Uro-36, H-999, US-312, H-9433, Dhoom-I, H-257, H-EXI, H-502, H-857, H-9334, H-832, H-810, H-748, N-9394, H-26P26, H-25P25, H744, H-Prithvi, H-464	CSR-30, PB-I, HBC-19, B-370, Pusa-1121, Sarbati, Sabnam, RH-10, Pepsi

Table 4.2a Spectrum of wheat varieties grown by farmers in district

Years	Varieties
2005-06	PBW-343, PBW-502, WH-711, WH-542, WH-147, Raj 3765, PBW 373
2006-07	PBW-343, PBW-502, PBW-373, WH-711, WH-542, Raj-3765

4.6 Input management

The major input used in different crops is seed, fertilizers and pesticides.

4.6.1 Seed

The area under rice and wheat constitutes 76 and 88 percent of total cultivable area respectively. At present the seed replacement rate (SRR) of wheat and rice is 10 and 12%, respectively. Thus, the scope of SRR is ambient in future to enhance the productivity of rice and wheat in the district.

4.6.2 Fertilizers

The adoption pattern of different nutrients (year 2007) in rice and wheat based on the survey conducted is given below:-

Table 4.3 Present status and projections of fertilizers for XI Plan

Fertilizers	Used in 2006-07 (tones)	Projections in XI Plan (tones)				
		2007-08	2008-09	2009-10	2010-11	2011-12
Urea	110997	114050	116400	119350	123000	126350
DAP	30348	30770	31280	31870	33050	34200
MOP	148	200	1320	1850	2190	2440
Total	**141493**	**145020**	**149000**	**153070**	**158240**	**162990**

4.6.3 Pesticides

The quantity of different pesticides (insecticides, fungicides and herbicides) used by farmers in different crops were 900.9 tones during the year 2006-07.

Table 4.4 Present status and projection of pesticides for XI Plan

Pesticides Blocks	Used in 2006-07 (tones)	Pesticides in XI Plan (tones)				
		2007-08	2008-09	2009-10	2010-11	2011-12
Pundri	150.9	131.8	130.0	140.0	145	150
Guhla	190.0	165.0	160.0	160.0	160.0	160.0
Kalayat	210.0	180.0	180.0	170.0	170.0	170.0
Kaithal	170.0	165.0	140.0	150.0	160.0	170.0
Rajound	180.0	190.0	200.0	205.0	210.0	220.0
Total	**900.9**	**831.8**	**810.0**	**825.0**	**845.0**	**870.0**

4.7 Farm Mechanization/Farm equipment

Farm Mechanization

Farm mechanization has been helpful in improving productivity of different crops, time saving, reducing drudgery, timely farm operations, resource conservation and protection from natural calamities. The timely sowing of wheat due to zero tillage seed cum fertilizer drills has improved the productivity of wheat during the years 2006 to 2008 which is remarkable achievement in wheat production. Placement of fertilizers under drill sowing, results in higher nutrient use efficiency and likewise higher irrigation efficiency under bed planting and laser leveling. There are 13333 tractors, 4289 threshers and 452 combine harvesters in the district. Use of crop harvesting machines ensures early completion of harvesting and threshing works which escapes the untimely rainfall and storms hazards particularly in wheat. Seed grader, laser leveler, bed planter and zero tillage machine needs large scale adoption

4.8 Special projects/programmes on going in the district

The following special projects are on going in the district.

a) Agriculture Technology Management Agency (ATMA) programme is being implemented.

b) Since 2004-05 the integrated scheme of oilseeds, pulses, oil palm & maize (ISOPOM) is being implemented in the district.

c) Since 2006-07 the Macro management Mode of Agriculture is also being implemented to strengthen the mechanization in agriculture in the district.

d) A small scheme viz. front line demonstration on oilseed and pulses is being implemented through ICAR in Krishi Vigyan Kendra Kaithal.

e) Vaccination against foot and mouth disease and H.S. under Assistance to States for Cure Against Diseases (AFCAD) and state funding projects respectively

4.9 Gap analysis

Table 4.5 Sustainability issues and gap analysis of productivity of different crops and resources

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
A.	***Wheat***					
1.	Timely seeding of wheat	Delayed harvesting of Basmati rice, cotton, availability of irrigation, excess/ untimely rains	Zero tillage, short duration varieties of rice, reduced duration of Basmati rice, direct seeding of Basmati, Bt cotton, regulation of canal irrigation water supply	Research, extension and development agencies should jointly approach in a farmers' participatory 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. The technology meet to be further developed for other cropping systems and other crops. Testing of novel seeders in preparation for its commercialization e.g. Happy seeders.	1.5 lac ha up to 10th Nov. areas to be covered include whole coarse rice and 50% Basmati rice	Zero tillage will help Improving soil health including soil biology Improved environment Less water use More productivity Less problem of *P. minor* & decreased use of herbicides Reduced cost of cultivation Facilitates early sowing under high soil moisture conditions
2.	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 district	Productivity growth on sustainable basis

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
3.	Nutrient mining & increased incidence of multiple nutrient deficiencies	In RWCS, average N ranges from 160-180 kg/ha and average P use is 57 kg/ha. Recommendation is 5:2:1 not 4:2:1	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 1st 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 through more appropriate nutrient management.	Experimental research in different cropping systems, rethought at soil test values, change in the recommendation of practice	Whole rice-wheat cropping system, use of more fertilizers in low productive blocks	The residue retention will help improving soil productivity, improved water permeability, decreased losses of nutrients

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
4.	Varietals improvement	No variety to tolerate terminal heat, short duration variety produces less yield	Varieties with stay green character near maturity, long duration varieties, varieties which can fit early sowing staring from 15th Oct. to manage terminal heat at maturity	Pre-breeding, work on hybrid wheat.	At least 75% area should be covered with varieties which can yield equal or more than WH 711 and PBW 343	More enhanced use of natural resources
5.	Management of salinity & alkalinity	Decreased yield in the drought year because of life saving irrigations with brackish water in K**harif** crops	Avoid irrigation with brackish water in drought years because it leads to secondary salinity; 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 adapt agronomic practices, especially the timing and amount of fertilizer and irrigation in order to increase ecological sustainability, profitability and yield.	Rice-wheat, Bajra-wheat, in NW Haryana should be studied for long-term salinity and sodicity build-up due to water management in **Kharif** season.	Kaithal district	Long-term productivity of wheat will sustain by proper water management in the system as a whole

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
6.	Weed management	*Phalaris minor* seriously affects wheat yields in rice-wheat cropping system. Complex wheat flora seriously affects wheat yield in non-rice wheat cropping system. Phalaris resistance will become a major problem and needs immediate attention for ecological solution. We must delay or avoid resistance.	Improve the efficiency of existing herbicides. Introduce new herbicides. Capacity building for spraying techniques. Ecological approaches including zero-tillage and crop rotation. Monitoring of resistance build up. Germplasm management for competitive varieties	State level strategic plan for the management of *Phalaris minor* integrated. Capacity building of extension agencies and farmers for appropriate spraying techniques. On farm demonstrations of new herbicides	Kaithal district	Anticipated economic benefits are increased profitability, increased yield and increased food security.
B.	***Rice***					
1.	Hybrids	Less number of hybrids in Basmati group, lodging in coarse rice hybrids	Increase area under hybrids in coarse rice.	Should concentrate on evolving hybrids for Basmati rice	50% area of coarse rice should come under hybrids	Due to fear of lodging farmers use less N which is good for sustainability
2.	Low plant density	Drudgery of transplanting operation, hired labour, non-availability of labour	Introduction of paddy transplanter under zero-tillage and/or under unpuddled situations, direct seeding in unpuddled situation, varieties that can compete with weeds under direct seeding.	Farmers' participatory approach for evolving crop establishment techniques, availability of paddy transplanter, custom hire services for raising nursery	5% growth in area under paddy transplanter in next two years. Similarly 5% growth in area in direct seeded Basmati rice	Improvement in soil physical conditions, better soil health, less water use, less drudgery of labour, better yield of wheat after rice due to unpuddled situation or improvement in soil physical conditions

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
3.	Green manuring	Shortage of varieties for summer moong, shortage of quality seed of Sesbania (Dhaincha)	Introduce summer moong immediately after wheat harvest even under zero tillage situations, evolving varieties for summer moong with synchronized maturity.	Farmers' participatory approach and KVK farmers	Whole Basmati rice area and 50% coarse rice	Improvement in soil health, soil organic matter, integrates mechanization, better fertilizer use efficiency, less water use in some situations
4.	Decline in soil organic carbon	Coarse textured soils with high pH, faster microbial degradation, excess puddling, low moisture and high temperature in summer, cultivation of summer rice	Introduction of summer moong, enhanced use of FYM, green manure, promote 50% area under Basmati rice, use of leaf colour charts, slow-release fertilizers	Long-term trials to study soil organic carbon and fractionation of organic matter, INM	Whole Basmati area and maximum area of coarse rice	Improved organic carbon content
5.	Declining water table	More area under summer rice, transplanting before the onset of monsoons, continuous flooding, pan formation and puddling reduces percolation of water	Avoid early transplanting, introduction of mechanical transplanter, irrigation at hair line crack formation or use of tensiometers for irrigation scheduling, avoid puddling	Both types of research involving cropping system at research farms and at farmers' fields	The whole Kaithal district	Improvement in water table
C.	***Cotton***					
1.	Integrated pest management	Problem of Helicoverpa	Increase area under Bt cotton, monitoring of Bt cotton for resistance development, recommend agronomy for Bt cotton	More research is needed on agronomic management and resistance development, strategies to delay or avoid resistance development	80% area with assured irrigation	Better use of external inputs, less use of pesticides

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
2.	Quality seed	Non-descript Bt hybrids, poor quality seed	Better integration between public and private sector, double gene or triple gene Bt hybrids, better cycle of Bt upgrades, address problems that consumers may demand	More research on bio-technology, better understanding of IPR	Rajound and Kalayat blocks	Provide higher yield with less pesticides, short crop duration thus enabling early wheat sowing
3.	Mealy bug	Availability of niches for carry over of pest	Precautionary measures for uprooting and burning, management of host and proper management strategies after occurrence	Integrated approach of good agronomic practices and monitoring	Rajound and Kalayat blocks	More productivity and long-term decline in pest population
4.	Plant population	Hot and desiccating winds at sowing	Bed planting, irrigation management, use of seed-cum-fertilizer drill	Research at experimental farm and at farmers field for crop establishment techniques	Rajound and Kalayat blocks	Better use of inputs, high efficiency

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
D	***Water management***					
1.	Reduced water use efficiency	Poor rain and irrigation water management, poor land leveling, low power tariff, supply driven irrigation system, summer rice	Shifting transplanting to mid June, intermittent ponding, introduction of zero tillage, bed planting, laser land leveling and green manuring, improvement in percolation rate, introduction of micro-irrigation, water harvesting, introduction of watersheds, improvement I irrigation and canal operation schedules	Demonstrations, development and research	Whole district	Savings in water, improved water use efficiency, better water-nutrient interactions
2.	Drainage congestion	Low-lying areas, excessive rain water, absence of water conservation measures	Introduce surface or sub-surface drainage, devise seeding techniques under relatively wet situations, develop varieties which can tolerate high moisture, bio-drainage	Research in bio-technology for developing varieties, more research on soil and water engineering	Waterlogged areas of district	Better use of water and other natural resources

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
E.	***Integrated pest management***					
1.	Weed management in wheat	Development of resistance in *P. minor*, cross resistance	Accelerated adoption of zero tillage, mechanized weeding using bed planting system, more competitive varieties, bringing 10% area at each farm level under alternate crops, rotation of herbicides of different chemistries,	Basic research on the mode and genetics of resistance, release of competitive varieties, monitoring of resistance development	Whole district	Sustained productivity of wheat, reduction in herbicide use, better use of natural resources
2	Emergence of new pests	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	Throughout district	Avoid emergence of new pest problems and reduction in pesticide use

S.N.	Gap	Factors/constraints leading to gaps	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
F.	***Vegetables***					
1.	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, sugarcane based intercropping of vegetables	Supply and quality of hybrid seed, marketing enhancement of vegetables, improved Germplasm for garlic and onion	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 and mushroom growers	Special emphasis of vegetable based infrastructure in the district	Will help diversifying agriculture for transforming the system into income generating activities through improved productivity and marketing
G.	**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	Rajound and Kalayat blocks	Will meet the requirement of feed and fodder at the cost of less resources

4.10 Recommended interventions for the district with detailed action plan with cost

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Seed production	1 Seed planning	1.Participatory selection of improved variety at farmer's field. 2.Motivating. farmers to produce the seed of best variety 3.Surveying the yield performance of varieties/hybrids in each crop. 4.Presenting data of best performed variety. 5.Deleting varieties/hybrids with low yields in any current season. 6.Mandatory testing of new variety hybrids through KVK	DDA for serial no. 1 2, and 5 KVK for 3, 4 and 6 Data for all activities will be presented in the officers workshop	Table 4.6
	2 Seed grading for quality	Supply of tractor mounting seed graders for farmers using their own seeds/custom hire services.	DDA	Table 4.17
	3 Seed treatment	1. Chemical treatment and .non-chemical treatment 2. Capacity building resource person/extension agencies/seed companies and farmers	DDA/HSDC	Table 4.18a

Table 4.6 Proposal for seed planning

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
40 Demonstrations @ Rs.5000/demo	2.0	2.0	2.0	2.0	2.0	**10.0**
Monitoring (2 crops) 50000/crop	1.0	1.0	1.0	1.0	1.0	**5.0**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/ Targets**	**Cost**
2. RCT (i) Zero-tillage	Environmental (Carbon sequestration, soil fertility gains etc.) and economic benefits (saving in labor, diesel, machinery wear and tear etc) will be catalogued and calculated. Zero till technology will be extended to wheat in other cropping system and other crops including rice, sorghum, maize and pulses. ☙ Assemble district level data and use them for bio-physical and socio - economic characterization using GIS. ☙ Evaluate the concept for ecological intensification of cereal systems. ☙ Improve agronomic efficiency of nutrients. ☙ Improve recovery efficiency of nitrogen ☙ Improve crop water productivity and irrigation water productivity for a system as a whole ☙ Improve biological activity in the soil. ☙ Reduce energy budget for rice-wheat cropping system.	Monitoring of farms where farmers have practiced zero-tillage for more than five years. (10 ha) KVK & Scientist from main campus/research station. KVK & Scientist from main campus/research station. DDA & KVK	KVK DDA Demonstration and long term trials will be laid out by KVK at farmer's field. DDA will ensure visit of farmers at demonstration sites.	For subsidy on ZT machines (Table 4.26) Table 4.7

Issues	Programme	Activities	Collaborators/ Targets	Cost
	The rate of soil organic matter (increase and anticipated environmental benefit including improved soil fertility, soil structure and reduced leaching of N will be targeted)			
(ii) Bed Planting	☙ Technical and financial constraints will be studied to arrive at impediments that stand in the way of adoption of bed planting. ☙ New scientific knowledge of its success in water log situation will be evaluated. ☙ System level integration through multiple land use will be evaluated and accelerated to get full benefit from this technology. ☙ This system will follow different pathways for system-level changes leading to ecological intensification through inter-cropping. ☙ Will target, high yields, high profits and high resource efficiency (water, energy, nutrients, labour through improved management solutions). ☙ Permanent raised bed system would be evaluated to arrest rate of ground water decline due to less use of ground water.	Dual purpose virtues of technology will be demonstrated ininter-cropping based system approach through University and State department.(10ha)	KVK & DDA	For Demonstration Table 4.7 for subsidy on bed planter table 5.12

Issues	Programme	Activities	Collaborators/ Targets	Cost
	Switching from rice-wheat cropping system to multiple land use system with sugarcane, vegetables, maize will be evaluated for their potential for less use of ground water.			
(iii) Direct Seeding	Direct seeded rice, direct seeding by zero-tillage machine, and direct seeding by drum seeder under wet situation. Green manuring immediately after wheat harvest, brown manuring by retaining residues and then seeding with machine, use of hybrids under direct seeded rice, decrease in maturity period, saving in water. Direct seeding will alleviatelabour problem,will save water. The purpose of this sub-programme is to develop strengthen based and farmers driven direct seeded technology in basmati rice. The window between wheat harvest and rice seeding will be utilized for green manuring and then retaining the residue on the surface.	KVK will lay out demonstrations on basmati rice. Demonstrations include direct seeding dry seeded and direct seeding wet seeded. Dry seeding will be done by machine while wet seeding will be done by drum. (4 ha)	KVK & DDA	For Demonstration Table 4.7

Issues	Programme	Activities	Collaborators/ Targets	Cost
(iv) Alternate wetting and drying	Effect of switching from fluid to alternate wetting and drying method of irrigation for crop establishment on reduction in water use without effecting the productivity will be accessed	DDA will lay out demonstrations on coarse rice in each block. DDA will also record data on water saving. The yield penalty if any will be recorded while recording data on yield	DDA	For Demonstration Table 4.7
(v) Laser – Leveling	Laser land leveling for water saving, land saving and improving yields in rice, wheat and sugarcane. The improvement in the productivity of crops	DDA will organize and monitor the distribution of laser leveler especially on custom hire services. Data on water saving and yield will be recorded. The data will be discussed in joint meeting of KVK and DDA. The presentation of data finalized in the meeting will be made by DDA. DDA will also ensure the exposure visit of farmers on sites already demonstrated by KVK. Two way subsidies may be given 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.	DDA & KVK	For subsidy on laser leveler Table 4.20 For Demonstration Table 4.7

Issues	Programme	Activities	Collaborators/ Targets	Cost
(v) Green manuring	Improvement in the soil health.	DDA will ensure the timely availability of dhaincha seed at 75% subsidy. 50 per cent area will be covered during the plan period of five years.	DDA	Subsidy for green manuring Table 4.23
(vi) Summer moong	Introduction of summer moong in the rice-wheat cropping system to discourage summer rice. To ensure timely transplanting of rice and to sustain the productivity of summer moong, the sowing should be preferred up to 20th April	DDA will ensure the acceleration of the technology and timely availability of treated seed. The suitability of variety to be ensured through KVK. Seed producing farmers may also be given incentives. Farmers producing summer moong for commercial purpose may be given incentive in the form of MSP and guaranteed procurement	DDA and KVK Ten per cent area will be covered. HSDC/DDA/HAFED/HLRDC	Subsidy for summer moong Table 4.24

Table 4.7 Proposal for demonstrations on RCT

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Demonstration on trials of ZT in 10 ha @ 5000/ha	0.5	0.5	0.5	0.5	0.5	**2.5**
Exposure visits	0.5	0.5	0.5	0.5	0.5	**2.5**
Demonstration on bed planting in 10 ha @ 5000/ha	0.5	0.5	0.5	0.5	0.5	**2.5**
20 Demonstration on direct seeded rice @ 10000/demo	2.0	2.0	2.0	2.0	2.0	**20.0**
100Demonstrations on alternate wetting and drying of rice @3000/demo	3.0	3.0	3.0	3.0	3.0	**15.0**
10 demonstration on laser leveling @ 5000/demo	0.5	0.5	0.5	0.5	0.5	**2.5**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Water management (Depleting water table)	◴ Deficit irrigation increase water use efficiency. ◴ Keeping 40-50 per cent area under basmati rice. ◴ Testing of high yielding basmati varieties. ◴ Salinity/sodicity stress mitigation at farmers' fields ◴ Water harvesting and recharging ◴ Watershed development in rain fed areas ◴ Utilization of brackish water. ◴ Ground water testing for nitrate and sulphate contamination. ◴	Deficit irrigation for 15 days in July or August will be tested for coarse rice. Economics of basmati rice in favour of farmers will be ensured through technological interventions and policy frame work. Varieties for traditional basmati for yield improvement. The price incentive of a multiple of 1.6 for traditional basmati and 0.6 for coarse rice compared to prevailing price of evolved basmati rice in the region. Reclamation through gypsum & use of Tolerant varieties. Bio-drainage through tree plantation.	KVK & DDA will jointly lay out demonstrations in ten hectares Agricultural Economist at KVK or group of KVK and concerned agronomist will prepare the data sheet on the profitability on different groups of varieties. Incentives on quantity of water saved or enhanced water productivity will be suggested. DDA will demonstrate and KVK will collect yield data on successful demonstrations. Subsidy on gypsum and its availability will be ensured. Tolerant varieties like CSR-30 will be evaluated with other candidate varieties.	For Demonstration Table 4.8 Table 4.25

Issues	Programme	Activities	Collaborators/Targets	Cost
		Alternate/conjunctive use of water. Survey of marked sites for nitrate and sulphate contamination Characterization of nitrate and sulphate contaminated areas.	ASCO and DDA will ensure the characterization of water logged areas and plantation of useful tree species. DDA/concerned departments in consultation with KVK	For Demonstration Table 4.8 For Demonstration Table 4.8

Table 4.8 Proposal for water management demonstrations

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
40 Demonstration on deficit irrigation, use of problematic water, bio-drainage @ 5000/ demo	2.0	2.0	2.0	2.0	2.0	**10.0**

ACTIVITY OUTPUT MATRIX				
Activity/crop	**Issues**	**Mode of action**	**Collaborators/Targets**	**Cost**
1. Site specific nutrient management	Number of split application and timing of top dress N with reference to irrigation	The project will identify, test and promote intervention for the sustainable rice-wheat cropping system through site specific nutrient management. Fertilizer recommendation will be based on the principles of SSNM. SSNM will include yield gap analysis, guidelines for regional protocol. Integrated soil and crop management for rehabilitation of pulse production in rice-wheat cropping system. Surface residue management for improving soil health. Improving the efficiency of nutrient utilization.	Multi-disciplinary testing laboratory at Kaithal Special provisions need to be made for creating regional level designated labs for quantifying micro-nutrients deficiencies. (DDA) Existing fertilizer use will be quantified on the basis of farmer's field survey. The ratio of NPK and quantity of each components currently use by farmers will be compared with recommended practices a t farmer's field. The data will be presented in officer's workshop for further research and/or recommendation. (DDA) DDA will ensure quality seed of important pulses for Kharif and Rabi seasons. The university will ensure recommendation of varieties tolerant to various types of biotic and a biotic stresses.	For multi facility lab Table 6.7 Demonstrations on INM Table 4.21
	Bio-fertilizers	DDA will demonstrate the recommended technologies at farmers field	Happy seeders and other machineries for uniform distribution of residue will be ensured by DDA. Residue retention machinery, second generation machinery, precision and no-till farming for crops and cropping system.	For Demonstration Table 4.9 For Demonstration Table 4.9

Table 4.9 Proposal for demonstrations on site specific nutrient management (SSNM)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
50 Demonstration on Existing fertilizer, use in comparison to recommended practice @ 10000/demo	5.0	5.0	5.0	5.0	5.0	**25.0**
10 demonstration on bio fertilizer use @ 5000	0.5	0.5	0.5	0.5	0.5	**2.5**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
IPM in paddy	Management of bakane disease (Foot rot disease) through nursery management. Management of blast in basmati Management of leaf folder, stem borer and white backed plant hopper (WBPH)	DDA will organize farmer's field schools.	DDA	Table 4.22

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/ Targets**	**Cost**
IWM	Spraying techniques for improving efficiency of herbicides. Monitoring of herbicide resistance	Demonstrations and supply of spray booms Survey and demonstrations	DDA/KVK DDA/KVK	Table 4.10

Table 4.10 Proposal for demonstrations of IWM

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
10 Demonstration on spraying techniques @ 5000/demo	0.5	0.5	0.5	0.5	0.5	**2.5**
2000 Spray booms @ 250/boom for each year	5.0	5.0	5.0	5.0	5.0	**25.0**
Survey and demonstration of herbicide resistance	0.5	0.5	0.5	0.5	0.5	**2.5**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Timely seeding of wheat	Delayed harvesting of Basmati rice, cotton, availability of irrigation, excess/untimely rains Zero tillage, short duration varieties of rice, reduced duration of Basmati rice, direct seeding of Basmati, Bt cotton, regulation of canal irrigation water supply	Research, extension and development agencies should jointly approach in a farmers' participatory 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. The technology meet to be further developed for other cropping systems and other crops. Testing of novel seeders in preparation for its commercialization e.g. Happy seeders.	1.5 lac ha up to 10th Nov. areas to be covered include whole coarse rice and 50% Basmati rice,	Campaigns, hoarding/posters, field days, district level training camps Table 4.11

Table 4.11 Proposal for extension activities on timely sowing of wheat

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Campaigns, hoardings, posters, field days and district level training camps	5.0	5.0	5.0	5.0	5.0	**25.0**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Management of salinity & alkalinity	Long term sustainability of different crops will depend on management of salinity and alkalinity in the system as a whole rather than commodity crops Avoid irrigation with brackish water in drought years because it leads to secondary salinity; 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 adapt agronomic practices, especially the timing and amount offertilizer and irrigation in order to increase ecological sustainability, profitability and yield	Rice-wheat, Bajra-wheat, and cotton-wheat will be studied for salinity/alkalinity buildup from life saving irrigation given in the Kharif season. The yield of Rabi crops will be recorded for farms where farmers have given variable number of irrigation with brackish water in Kharif season.	DDA, KVK and regional research stations will monitor the level of yield penalty due to irrigation with brackish water in Kharif season. Management of such problem through diversification, in favor of introduction of salt tolerant varieties.	Table 4.12

Table 4.12 Proposal for demonstrations on management of salinity and alkalinity

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
40 demonstrations on management of salinity and alkalinity @ Rs. 5000/demo	2.0	2.0	2.0	2.0	2.0	**10.0**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Rice	Introduction of hybrids for both coarse and basmati rice. Fertilizer management in hybrid to avoid lodging and incidence of pest and diseases Mechanical transplanting to avoid labor problem	DDA, KVK and concerned scientists from research will help in accelerating the adoption of hybrids or competing varieties of coarse rice and basmati. Revise the recommendation of fertilizer use for achieving target yields. Accelerated adoption of paddy transplanter and direct-seeded rice. DDA, KVK and concerned scientists from research will help in accelerating the adoption of hybrids or competing varieties of coarse rice and basmati. Revise the recommendation of fertilizer use for achieving target yields. Accelerated adoption of paddy transplanter and direct-seeded rice.	DDA and KVK will jointly demonstrate the virtues of new technologies under the leadership of KVK scientists. Linkage and synergies with private sector will be developed for outsourcing hybrid seeds and/or developing MOU for seed production by securing parent lines.	Table 4.13

Table 4.13 Proposal for demonstrations on hybrid rice and paddy transplanter

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
40 demonstrations on hybrid rice @Rs. 5000/demo	2.0	2.0	2.0	2.0	2.0	**10.0**
40 demonstrations on mechanical transplanter @Rs. 5000/demo	2.0	2.0	2.0	2.0	2.0	**10.0**
Paddy transplanter 2 each year @ Rs. 2.0 lac/ paddy transplanter	4.0	4.0	4.0	4.0	4.0	**20.0**
Grand total	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**40.0**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Cotton	.Quality seeds, mealy bug, less plant population, resistance development, availability of niches for carry over of pests, delayed picking and its adverse effects on wheat sowing.	DDA will facilitate demonstrations on six niche areas proposed in column 2 Survey will be conducted for spectrum of pests	Linkage and synergies with private sector will be developed for outsourcing Bt hybrid seeds and/or developing MOU for seed production by securing parent lines.	Table 4.14

Table 4.14 Proposal for demonstration on cotton

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
10 demonstrations on Bt hybrid @Rs.10000/demo	1.0	1.0	1.0	1.0	1.0	**5.0**
10 demonstrations on plant population in cotton @Rs. 5000/demo	0.5	0.5	0.5	0.5	0.5	**2.5**
Survey for insect pest spectrum study	0.5	0.5	0.5	0.5	0.5	**2.5**
Grand total	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**10.0**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Sugarcane	Late planting after wheat harvesting, lack of mechanized planting, lack of varieties in early group Less use of potash	DDA will facilitate autumn planting of whole sugarcane area planted after wheat harvesting, facilitate intercropping of Rabi crops with autumn sugarcane using bed planting, testing of early varieties through KVK s and sugar mill	DDA, Cane commissioner, sugar mills and KVK	Table 4.27

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Bajra	Consolidation of short duration and long duration hybrids depending on the availability of irrigation and annual rainfall. Monitoring of possible disease incidence due to introduction of hybrid of unknown pedigree. Introduction of ridger seeder to avoid crust formation. Less use of phosphorus	KVK will survey the performance of hybrids and will present data in the workshop. The best performer will be short listed; disease incidence on short listed hybrids will be debated. The ridger seeder will be reintroduced with suggested modifications. Phosphorus application will be demonstrated	DDA will facilitate the survey of hybrid performance. DDA will demonstrate the virtues of ridger seeder DDA will facilitate the survey of hybrid performance. DDA will demonstrate the virtues of ridger seeder	Table 4.15

Table 4.15 Proposal for demonstration on Bajra

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
5 demonstrations on Bajra @Rs.5000/demo	0.25	0.25	0.25	0.25	0.25	**1.25**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Pulses	Management of pod borer in chick pea	Management of pod borer will be demonstrated	DDA	Table 4.16

Table 4.16 Proposal for demonstration on management of pod borer in chickpea

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
10 demonstrations on pest management in chick pea @Rs.5000/demo	0.50	0.50	0.50	0.50	0.50	**2.5**

A. SEED GRADING

The general rule is the larger the seed for any particular variety, the stronger and more vigorous the seedlings are likely to be. Large seeds also produce plants with more tillers than those grown from small seeds. So the aim of seed grading is to maintain this quality from one season to the next by removing all these destructive elements:

- Other crop seeds
- Weed seeds (especially herbicide resistant weeds)
- Straw, soil dust and other inert material
- Immature, shriveled, damaged, cracked, and undersized or oversized seed.

You will have selected only the best and highest quality seed for sowing. The cost of cultivating, fertilizing and controlling weeds in a farm are high and you cannot afford to permit faulty, foreign or diseased seed to occupy your carefully prepared land. When efficient grading methods are used, the small grain which is unsuitable for seed is taken out and can be sold at market rates, while the screenings make excellent stock food. Seed grading has the smallest cost input in crop management. Both expert official tests and practical results have proved that proper seed grading gives a dramatic increase in yield. Seeds are living organisms and unless looked after will rapidly deteriorate. The value of high seed germination is obvious. However, the vigour of seedlings is just as important. Vigour is a seed's ability to germinate, emerge and produce healthy, rapidly growing seedlings even when planted in poor field conditions such as heavy crusting soils or when planted too deep. A low vigour seed may germinate well in ideal conditions of temperature and soil moisture. However, in less than perfect conditions it's another story. Poor emergence may limit yield. Vigour is one of the most important characteristics of seed quality because of its vital effect on seedling establishment. This was clearly shown by trial work conducted by several countries of the world.

Major findings are available that small cereal seed will germinate just as well as large, plump seed, but emergence is considerably less for pinched, small and broken grain. Seed with less than 80% emergence is not considered satisfactory and will require higher sowing rates to obtain optimum plant density. Grading your seed maximizes germination and emergence. In other words, grading produces high seed vigour.

Seed type	Germination (%)	Emergence (%)
Large	95	85
Pinched	99	73
Small	91	72
Broken	21	3

Larger seed not only has greater vigour but emerges faster. The speed of germination and emergence is a powerful factor because it occurs early in the growth of the crop. Early emerging seedlings have a high probability of being larger at stem elongation and of producing more grains than those that emerge a few days later. Seed grading will actively encourage consistency as well as competitiveness of seed. Uniformity of seed permits more even distribution of grain through the drill. Seed spacing is important as blanks and then clusters are a disadvantage for optimum plant density..

Grading is critical with legume seed. That's because grain legumes have a very poor capacity to compensate for low plant numbers. So yield is vitally dependent on seed quality. Even the most experienced farmer cannot accurately assess the true quality of legume seed by visual inspection alone. Weather damage, rough handling, insects, poor storage, and disease – all these vital factors may not be immediately obvious. Good crops are not grown on hope alone. You invest too much in a crop to risk poor establishment. Sowing correctly graded legume seed plays an essential part in overcoming all these problems. Only correctly graded seed ensures vigorous, healthy legumes. Herbicide resistance (Weeds that have developed resistance to herbicides including *Phalaris minor)* is increasing. This is an arguably the gravest challenge to agriculture this decade.

- Saves time and money
- Maintains profitable control of weeds
- Delays herbicide resistance
- Avoids annoying blockages at sowing time.

One of the central aims of an herbicide resistance management program is to reduce the number of viable weed seeds. Sowing seed which has been thoroughly cleaned is an integral part of herbicide resistance management.

In Kaithal district paddy-wheat is the main crop rotation and 75 and 95 cent area is cultivated under these crops, respectively. The seed requirement for these major crops is 30097 and 174552 quintals. There is no valid reason why the seed is not graded when it has all time high benefits.

Even if a well ripped crop is harvested with good harvesting and threshing machine. The percentage of shrinked, broken and undersize seed varies from 10-15 %. And these seeds have no germination or poor germination resulting in 10 % decline in cereal production if sown un-graded. Several studies have revealed that a rightfully graded seed increases the crop yield by 10-15% in paddy and wheat crops. Therefore, it is suggested that the good quality seed grader may be provided one in each block of Kaithal district for custom hire service to the farmers. The cost of seed processing to the farmers would be Rs. 30-40 per quintal. 10 seed graders may be added each year to the farmers. In overall 47 seed graders will cater to the seed grading need of the district and one seed grader will be sufficient for six villages. The benefits realize through this technology would be 8.82, 21.42, 34.02, 46.72 and 59.22 (total 170 crores) during the XIth Plan period. Similar benefits would also be obtained from paddy seed graded. Therefore, this proposal is strongly recommended because the technology gives the highest return with the list cost. The seed grader provide at different locations will move from village to village just like moving wheat floor mills attached with the tractor at the door step of the farmers on an average 1 seed grader can process 300 quintals of seed.

Table 4.17 Proposal for Seed Grading (Rs. Lac)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	7	10	10	10	10	47
Estimated Cost @ 8.0 Lac/grader	56	80	100	100	100	436
Financial aid /Subsidy Req.	**28**	**40**	**50**	**50**	**50**	**218**

B. Seed Treatment in wheat

Wheat is the main crop sown during Rabi season in an area of 1.74 lac hectare. Wheat productivity in the district in the current year (2007-08) is around 44 quintals

per hectare. Seed treatment is one of the major factors/ component which may result into increased yield due to not allowing the pathogens and insect pests to infect and infest the crop. The seed borne and soil borne disease like loose smut, flag smut, and Karnal bunt are difficult to control after they appear on plants. Such disease are however, easy to manage through treatment of seed before sowing, as a prophylactic measure. Most seed treatment products are fungicides or insecticides applied to the seed before planting. Fungicides are used to control diseases of seeds, seedlings and plant while insecticides are used to control insect-pests. Fungicidal seed treatments are done for three reasons

1 To control soil borne fungal pathogens which generally cause seed rot, root rot, stem rot, damping off, seedling blight etc

2 To control fungal pathogens which are surface borne on the seed

3 To control the internally seed borne pathogens such as loose smut in wheat

Insecticidal seed treatments are mainly done for not allowing the soil inhabiting insect pests like termite to damage the seed, seedling and grow up plant in their initial stages of growth. It results into sufficient plant population with vigorous and healthy growth. These protect ants provides sufficient improvement in stand and vigour, protects from insect-pests and diseases resulting in yield increase, seed treatment is a cheap, easy, effective and eco-friendly approach.

Keeping in view the advantages of seed treatment in increasing the yield of wheat crop, it is suggested that the entire district be brought under seed treatment programme in wheat crop for a few years after which the farmers will themselves follow this practice.

Objective

In order to improve the effectiveness of seed treatment, seeds will be treated with the help of seed treatment drum. Keeping in view the necessity of such drums, Punjab mandi board has started providing seed treatment drums to all gram Panchayats of Punjab free of cost in a phased manner. The supply of drums will make the farmers realize the importance of seed treatment. Once the technology in appreciated and adopted by the farmers, it will become an important step in the process of agricultural production.

Seed Treatment in Paddy

Application of chemicals to seed is the safest, cheapest and most effective means of controlling most seed borne pathogens. Fungicidal treatment may kill or inhibit seed borne

pathogens and may form protective zone around seeds that can reduce seed decay resulting in healthy and vigorous seedlings.

Seed treatment is invariably essential for the control of disease like foot rot and bakanae in paddy crops. This disease can not be controlled by any chemical in the standing crop and misuse of chemicals have created lot of problems like environmental pollution, killing of non target organisms, residue in food and feed.

Table 4.18 Seed and seed treatment chemical requirement

Crop	**Area (Ha)**	**Seed Requirement (qtls.)**	**Chemical required for seed treatment (kg/liter)**	
Wheat	174552	174552@100kg/ha	34910	Bavistin
			26182	Chloropyriphos
Paddy	150488	30097@20kg/ha	3009	Emisan
			300	Streptocycline
Cotton	6590	82375 @ 12.5 Kg/ha	990	Emisan

Table 4.18 a Proposal for seed treatment

Seed treatment	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Wheat	146.0	146.0	146.0	146.0	146.0	730.0
Paddy	110.0	110.0	110.0	110.0	110.0	550.0
Cotton	7.5	7.5	7.5	7.5	7.5	37.5
G. Total	**263.5**	**263.5**	**263.5**	**263.5**	**263.5**	**1317.5**

Table 4.19 Seed replacement Strategy

Crop	Area	Requirement (2007-08)	Replacement Ratio (%)2007-08	Requirement as per RR 2008-09	2009-10	2010-11	2011-12
Wheat	174552	174552	17455 (10%)	26183 (15%)	34901 (20%)	45383 (26%)	57602 (33%)
Paddy	150488	30097	3010 (10%)	4514 (15%)	6019 (20%)	7825 (26%)	9932 (33%)
Cotton	6590	823	823 (100%)	800 (100%)	750 (100%)	740 (100%)	720 (100%)
Bajra	12510	625	625 (100%)	610 (100%)	600 (100%)	580 (100%)	550 (100%)
Fodder	15760	7880	1182 (15%)	8130 1626(20%)	8380 2095(25%)	8630 2589(30)	8880 2930(33%)

Table 4.19a Proposal for seed replacement of wheat and paddy (Rs. in lacs)

Seed Replacement	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Wheat (qtl)	17455	26183	34901	45383	57602	181524
Subsidy @ 25% of seed cost (1600/q)	69.82	104.73	139.6	181.53	230.4	726.08
Paddy	3010	4514	6019	7825	9932	31300
Subsidy @ 25% of seed cost (2400/q)	18.06	27.08	36.11	46.95	59.59	187.79
G. Total	**87.88**	**131.81**	**175.71**	**228.48**	**289.99**	**913.87**

C. Resource conservation through laser leveling

Shrinking water resources owing to over exploitation of ground water in Haryana threaten the maintenance of agricultural productivity. As a result, the water is falling in 100 % areas of north eastern parts of the Haryana State calling Paddy belt. In Kaithal district the average level of water table is 80 feet and it is declining @ 2-3 feet annually. All the shallow tube wells have become non functional and some of the deep tube wells installed between

200-300 feet in Pundri , Cheeka and Siwan block of the Kaithal are facing threats with low level of discharge at this depth. If the problem continues the small and marginal farmer's lands will become barren. In the district 68 % water is alkaline and 32 % water is neutral. The problem of alkalinity further add this problem because the water extracted on the ground evaporates or percolates in the ground again leaving a large quantity of undesired salt on the soil surface.

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 lazer leveler is one proven technology i.e. highly useful in conservation of irrigation water. The technology is so popular among the farmers of the district that after conducting two field days on lazer leveling at Batta and Teak, KVK and department of Agriculture have received more than 400 applications for field leveling before the harvesting of wheat crop. As per the studies conducted, 20-25 percent amount of water is lost during its application at farm due to poor farm designing and unevenness of fields. This problem is more pronounced in case of rice fields. The fields that are not leveled have uneven crop stands, increased weed burden, uneven maturing and damaged to the crop particularly in wheat due to stagnation of water. Unevenness of the soil surface has a significant effect on the germination, stand and yield of crops. Farmers also recognized this problem and therefore devote considerable time, resources in leveling their fields. However, even after devoting a long time and resources the traditional method of leveling are cumbersome time consuming expensive and unreliable.

Objectives of Land leveling:

Effective land leveling is meant to optimize water use efficiency, improved crop efficiency, reduce the irrigation time and efforts to require managing the crop.

Benefits of the leveling

- Save water 25-30 %
- Improved crops establishment
- Reducing the weed problem
- Uniform maturity of crop
- Decreasing the time to complete the task of irrigation

- Reduces the amount of water required for land preparation
- Easy farm operation
- Fewer incidences of diseases and insect
- Increase in net cultivable area
- Saving of diesel/ electricity

One lazer leveler cost is Rs. 3.6 lac and 65HP tractor costs Rs. 5.50 lacs (approx), thus one lazer leveler attached with the tractor costs Rs. 9.10 lac. The individual farmers can not afford to purchase the technology at this cost; therefore, it is proposed that a 50 % subsidy on the lazer leveler may be provided so that the most popular technology can be implemented in letter and spirit for the benefit of larger number of farmers. KVK, Kaithal have suggested that 250 lazer leveler may be provided in the district in the entire 11th Five Year Plan. The 250 lazer levelers will level 75000 ha. @ 300 ha. per leveler. The water saving through this technology will be 2625 cubic metes per hectare. The total water saving upto 11th Plan would be 664 Million cum in paddy and 166 million cum in wheat crop. The yield increment @ 10 % will be 1, 06,260 MT. In this way the farmer will get additional income of 106.2 crores in paddy and 119.9 crores in wheat crop. Through this technology about 790 lac units of electricity in paddy and 200 lacs units in wheat crop will be saved resulting in a saving of 31.6 and 7.9 crores respectively.

Table 4.20 Proposal for land leveling through laser leveler

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Machines Required (no.)	70	60	50	35	35	250
Present cost @ 3.6 Lac /machine	252	216	180	126	126	900
Subsidy @ 50%/ leveler	**126.0**	**108.0**	**90.0**	**63.0**	**63.0**	**450**

D. Demonstrations on INM

Imbalanced plant nutrient, not only increases the cost of production, but also invites insect and pest problems and lodging of crops at maturity. There is a general perception in

the mind of farmers that the crop appearing dark green in colour yields more. Excessive fertilizers are applied in an unhealthy competition among the farmers. Integrated nutrient management in crop production particularly in paddy and wheat is very important for the growth of plants. To check the indiscriminate use of excessive fertilizers, the farmers need to be educated. For INM 200, 90 and 90 demonstrations on cereals, fodder crops and vegetables crops are proposed with a financial grant of Rs. 10 lac, Rs. 4.5 lac and Rs. 4.5 lac, respectively.

Table 4.21 Proposal for INM demonstrations

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Cereals	30	40	40	40	50	200
Cost/ demo @ Rs. 5000	1.5	2.0	2.0	2.0	2.5	**10.0**
Fodder crops	10	15	20	20	25	90
Cost/ demo @ Rs. 5000	0.5	0.75	1.0	1.0	1.25	**4.5**
Vegetable crops	10	15	20	20	25	90
Cost/ demo @ Rs. 5000	0.5	0.75	1.0	1.0	1.25	**4.5**
G. Total	**2.5**	**3.5**	**4.0**	**4.0**	**5.0**	**19.0**

E. Integrated pest management

The predominance of rice-wheat cropping system in Haryana has led to significant changes in agricultural scenario and the trend of pests on these crops. The wide spread introduction of new high yielding, fertilizers responsive crop varieties has considerably improved the living conditions of pests. But the higher yield potential of new cultivars was not realized because of extensive pesticides applications which resulted in the expression of side effects on target and non target organisms/ pests. Major side effects were noted in terms of destruction of natural and introduced antagonists of pests, development of resistance to

potential applications, disease trading, insect resurgence and above all general ecological disruptions.

Under such situations IPM strategy is ecologically safe, effective and economical. It includes greater safety to all, higher profit to the farmers and if used effectively more high quality food to all. Efforts are needed to workout the viable alternatives to target pesticides, information on the biological alternatives, botanical pesticides, semio chemicals, cultural alternatives and genetic alternatives be generated for workable IPM strategies.

In Kaithal district, paddy is cultivable in 150488 ha. During the last decade, several varieties, hybrids of superfine and basmati groups have been introduced by the public and private sector resulting into changed pest scenario. The pest problems have variable effect on the produce of paddy depending upon the susceptibility of the plant and the prevailing environmental conditions. From the private sector extension system, the farmers are being advised by the input supplier for the higher use of insecticides in an undesired direction resulting in heavy use of non required and non recommended insecticides. Field data collected during last 3 years revealed that on an average farmers are using 15 kg cartap hydrochloride, one liter endosulfan, one liter Chloropyriphos 80 ml confidor, 500 g bavistin, 120 g beam/civic or 200 g tilt/ result in basmati paddy and these chemicals costs Rs. 5000 per ha. The total pesticide consumption in the district is 75 crores rupees (Which is approximately 10 % of the produced value of crop). About 60 % of the chemicals amounting to Rs. 45 crores are being used by the farmer's upto 31st August. The field survey during the last three years reveals that no serious threat of insect, pests and diseases upto this period has been observed. The insect problems generally start appearing in early September till the maturity of the crop. During this period, pest problem is not dealt effectively by farmers who are undertaking 5-6 applications of insecticides which can be brought down up to 2-3. Use of more than one chemical with higher doses and low quantity of water needs to be discouraged. The above practice followed by the farmers in the district not only increases the cost of production but also have detrimental effects on food quality and soil health. Therefore, the need arises for launching a farmer and environment friendly campaign on IPM activities with the following objectives in paddy crop.

1. Reduction in cost of production
2. Environmental friendly approach

3. Improvement of soil health
4. Conservation of natural enemies
5. Low Residual toxicity in food

Two field trials will be conducted by the KVK to assess and refine the IPM technology in paddy crop. The results will be compared with the farmers practice in terms of pest population, damage and yield will be shown to farmers as result demonstrations.

Table 4.22 Proposal for IPM demonstrations

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Cotton	15	20	20	20	20	95
Cost/ demo @ Rs. 5000	0.75	1.0	1.0	1.0	1.0	**4.75**
Paddy	30	30	30	30	30	150
Cost/ demo @ Rs. 5000	1.5	1.5	1.5	1.5	1.5	**7.5**
10 Field school @ Rs. 50000/school	5.0	5.0	5.0	5.0	5.0	**25.0**
Plant clinical lab in KVK		1.0				**1.0**
G. total	**7.25**	**8.5**	**7.5**	**7.5**	**7.5**	**38.25**

G Green Manuring through dhaincha

In Kaithal district wheat and paddy are cultivated in 88 and 76% areas respectively. Both the crops are draining heavy plant nutrients from the soil. Non addition of farm and animal waste into the soil and burning of crop residues have badly effected the soil health resulting in a significant decline in organic carbon and other essential plant nutrients. The green manuring through dhaincha between wheat and paddy crops is a good substitute for improving the fertility of the soil. Green manuring in this period will also check the serious problem of Sathi Dhan cultivation during summer which has become a threat in depleting ground water table. Therefore, it is proposed that upto the end of 11^{th} Five Year Plan 1 lac ha. area should be brought under green manuring with dhaincha with a financial outlay of Rs. 450.5 lac.

Table 4.23 Proposal for green manuring through dhaincha

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area (ha)	10000	15000	20000	25000	30000	100000
Seed required @ 30 kg/ha (q)	3000	4500	6000	7500	9000	30000
Fin. Asstt. Required @ Rs.1500/qtls.	**45.0**	**67.5**	**90.0**	**112.5**	**135.5**	**450.5**

H Introduction of summer moong

Pulses (proteins) are important part of human diet. During the last four decades with expansion of irrigation facilities through tube wells resulted in problem of salinity and alkalinity in most parts of the district. Pulses once grown in major areas are reduced to a very less area. The problems of salinity compelled the farmers to bring more and more area under wheat and paddy cultivation resulting into depletion of under ground water level and low organic carbon in soil due to heavy exploitation of plant nutrients. The problem of residue burning in both crops has further added this problem. The remunerative prices of rice encouraged the farmers to sow sathi dhan in their fields leading to fast depletion of under ground water. Introduction of summer moong will not only overcome the problems explained above but also make available important proteins to the common man kitchen at reasonable prices. Import of the pulses from other parts of the world will also be checked. It will also improve the fertility of soil. Therefore it is proposed that 19000 ha area should be brought under summer moong cultivation with the financial aid of Rs. 118.75 lac.

Table 4.24 Proposal for cultivation of summer moong

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area (ha)	1000	2000	4000	5000	7000	19000
Seed required @ 25 kg/ha (q)	250	500	1000	1250	1750	4750
Cost of seed @ Rs. 5000/q (lacs)	12.5	25.0	50.0	62.5	87.5	237.5
Subsidy. Required @ 50 %.	**6.25**	**12.5**	**25.0**	**31.25**	**43.75**	**118.75**

I Soil reclamation through gypsum

In Kaithal district the soils are sodic in Kaithal, Kalayat, Rajound and parts of Guhla block. Excessive use of problematic water in rice cultivation further adds this problem. With the accumulation of salts on the soil, the water permeability of soil is decreased resulting in a sharp decline in productivity of all the crops in general and paddy and wheat in particular. These soils needs continuous reclamation by the use of gypsum, therefore, it is proposed that in the 11th Five Year Plan 28000 ha of lands should be reclaimed in a phased manner with a financial aid/ subsidy of Rs.1260 lac.

Table 4.25 Proposal for soil reclamation through gypsum

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be reclaimed (ha)	5000	5000	6000	6000	6000	28000
Gypsum required (MT)	25000	25000	30000	30000	30000	140000
Present Cost @ 1800/MT.(LACS)	450	450	540	540	540	2520
Subsidy Req. @ 50 % (lacs)	**225.0**	**225.0**	**270.0**	**270.0**	**270.0**	**1260.0**

J. Zero Tillage:

The technology of zero tillage was first introduced in 1997 in Kaithal district with an zero Tillage machine in the first year, the technology was tested in 14 acre at KVK farm and 18 acres at farmers field. The technology is very useful in resource conservation. It has several benefits viz, saving in ploughing, water less incidence of weeds, 5-7 days early sowing of wheat less lodging problem at mortality etc. Presently the sowing of wheat is done

with zero tillage drill in more than 50,000 ha in the district. The farmers of the district are saving more than Rs. 10 crores per annum through this technology. Adoption of this technology by larger number of farmers is proposed so that while saving the resources, large number of farmer can be benefited.

Table 4.26 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 @ 25000 (Rs. In lac)	12.5	12.5	12.5	12.5	12.5	62.5
Subsidy required @ 50 % (Rs. In lac)	**6.25**	**6.25**	**6.25**	**6.25**	**6.25**	**31.25**

K Bed Planting

Soil and water of Kaithal district is problematic pulses and oilseeds sown on flat bed are occasionally damaged due to stagnation of water after irrigation. If these crops are planted in beds, the problem of damage can be avoided. Water required for irrigation will be less. This technology can also be used for inter cropping of sugar cane with cereals, pulses, oilseeds and vegetables in autumn planting season. The technology will conserve the resources while giving good returns per unit and needs promotion in terms of demonstrations and subsidiary help on bed planters.

Table 4.27 Proposal for bed planters

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of bed planters required	10	10	10	10	10	50
Cost @ 50000 (Rs. In lac)	5.0	5.0	5.0	5.0	5.0	25.0
Subsidy required @ 50 % (Rs. In lac)	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**12.5**
40 demonstration 0n bed planting @ Rs.5000/demo	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**10.0**
Grand Total	**4.5**	**4.5**	**4.5**	**4.5**	**4.5**	**22.5**

K Capacity building for field functionaries and farmers

The developments are taking place rapidly in the agricultural production and the marketing strategies. The knowledge of field functionaries assigned the duties of agricultural production needs to be upgraded continuously to make pace with the development taking place. These field functionaries are directly linked with the ultimate beneficiary farmers of these technologies. To reduce the gap in the adoption of useful technologies the importance of knowledge up gradation of field staff can not be overlooked.

The ultimate beneficiary of the technologies is the farmers. Training is an important tool to transfer the benefit of technology generated to the end users. Therefore, involvement of farmers, in the training programme is highly essential for realizing the benefits of technology generated. In the XI Five Year Plan, the funds required for agricultural staff and farmers are Rs. 9.0 lac, Rs. 28 lac respectively.

4.28 Proposal for capacity building of agriculture staff

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Training of Agri. staff (No.)	12	12	12	12	12	60
No. of Trainees 25/ training	300	300	300	300	300	1500
Cost/ training @ Rs. 600/Trainee/day	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**9.0**

Table 4.29 Proposal for capacity building of agriculture farmers

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	50	50	50	60	70	280
No. of Trainees (25/ training)	1250	1250	1250	1500	1750	7000
Cost/ training @ Rs. 400/trainee/day	**5.0**	**5.0**	**5.0**	**6.0**	**7.0**	**28.0**

CHAPTER-V

Allied Agricultural Sectors

5.1 Animal Husbandry

Before the start of green revolution, animal husbandry was the main occupation in the eastern parts of Haryana state. With the introduction of green revolution and demand of food grains, emphasized the need of bringing more and more area under wheat and paddy cultivation. The area under these crops steadily increased from northern to southern part of the region and paddy and wheat came as major crop enterprises. These developments took place at cost of animal husbandry. Up to this period each house hold in the region was rearing animals viz. cow, buffalo, goat, sheep, pig or backyard poultry. The landless farmers rearing these animals were maintaining them on fallow lands, village common lands or by the side of rails, roads and canals and animal production were affected beyond repair. In Kaithal district out of 197000 hectare net cultivable area two major crops wheat and paddy are now cultivated in 88 % and 76% area respectively. The landless farmers have been compelled to be away from animal production.

In this system due to mechanization of agriculture, the bullocks have been completely replaced with the buffalo's bull. Before this system, each village was having a community bull of proven quality and was used for buffalo breeding purposes. The cows in the region were usually reared for producing bullocks for crop cultivation and the mechanization of crop production programme made the indigenous cows useless to the farming community. For small farm operations, buffalo bulls replaced the bullocks. The proven quality bulls steadily removed from the breeding system of the buffaloes. The indiscriminate use of low quality bulls in buffalo breeding has resulted in the degradation of buffalo breeds in the district, causing a great and irreparable loss to the buffalo breed improvement programme initiated by the ancestors.

Secondly, in both the crops, weeds are removed with chemicals leaving no scope for rearing milch animals by the marginal and landless farmers. Several weeds which were very palatable, rich in nutrients and useful for animal feeding were vanished away from the system. Intensive cultivation of paddy and wheat made the soil deficient in important macro and micro nutrients. This has adversely affected the production potential of dairy animals. The deficiency problem has resulted in, increase in age at first calving, wider calving

interval, repeat breeding, abortion and vaginal prolepses in female dairy animals. The production of rice in such a large area in the region has completely changed the microclimate of the district. This change gave rise to the new insect-pests which are affecting the productivity of dairy animals. Abundance of housefly during day time and mosquitoes during the night, keeps the animals restless leading to low productivity.

The agricultural production system has also affected the management practices of dairy animals. One time being the main enterprise, dairy farming has reduced to a subsidiary farm vocation. The old technical know-how gained from generation to generation and used for upkeep of animals has been lost with no reason leading to the problem of underfeeding, overfeeding and imbalanced feeding. The replacement of paddy straw has introduced new fungal disease causing a great loss of animal health. The system has also created a situation where the young farmers have little or no interest in animal husbandry. Dairy products are the main constituent of the kitchen of small and middle class families in rural and urban Kaithal and occupies 60-80% share in total food expenditure incurred by a family.

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Farming system through dairy Improving milk productivity Disease management in diary animals	Establishment of commercial dairy farming of 20, 50 and 100 milch animals. Improving the infrastructure facility for procurement of milk. Strengthening facilities for creation of milk processing units. Facilities for creation of silage and hay making Incentives for fodder crops in summer season. Creation of facilities for drinking water. Promotion of crossbred and buffalo in rice-wheat cropping system areas Promotion of Murrah buffaloes. A.I. and natural service through community bulls (Private Public interface)	AH, lead bank and KVK will initiate action for establishment of dairies by selecting appropriate sites depending on market strategies. The existing facilities of milk procurement will be extended in all villages. Milk processing unit may be created/strengthened at district headquarter. Demonstrations for economical and sustainable silage and hay making in dairies proposed in column1. Special demonstrations for maize/sorghum + cowpea fodder in rice-wheat system Village ponds need de-silting, Creation of dairies of crossbred cows and their management. Buffalo conservation is to be promoted. Private Public linkage and synergies be created. Retail outlets may also be associated with productivity improvement through A.I. and natural services.	DDAH, Lead Bank. KVK HDDCF DDAH, KVIC, KVK DDAH, KVK DDAH, KVK Gram Panchayats, DRDA DDAH DDAH, KVK	**Table 5.8b** **Table 5.3b, 5.3c** **Table 5.3a** **Table 5.7** **Table 5.5**

Issues	Programme	Activities	Collaborators/Targets	Cost
	Reduction of calving period – by adopting mineral mixture feeding and balanced feeding, deworming, summer management, anestrous management, free hormone therapy for repeat breeder of resource poor.	DDAH and KVK will jointly demonstrate the usefulness of technologies detailed in column 2. Creation of facilities for cattle feed, mineral mixture through co-operatives. DDAH and disease diagnostic labs to formulate common strategies for disease forecasting and management. Procurement of special kits like crytoscopes, mastitis diagnostic kit, foot and mouth diagnostic kit etc.	DDAH, KVK	**Table 5.1**

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Animal Husbandry	Mineral Mixture feeding	Demonstrations to overcome reproductive problems, improving breeding ability and increasing milk production	DDAH	Table 5.1
	Deworming in calves	Reduction in calf mortality, better growth, early age at first calving	DDAH and KVK	Table 5.2
	Fodder production and preservation	Demonstrations on fodder production , silage and hay making	DDAH and KVK	Table 5.3a, 5.3b and 5.3c
	Balanced feeding	Demonstration to reduce cost of milk production	DDAH	Table 5.4
	Community Bulls	Breed improvement through bulls on custom hire basis	DDAH	Table 5.5
	Pig, sheep, and backyard poultry	Income and employment generation to weaker section/landless farmers	DDAH	Table 5.6
	Conservation of village ponds	Drinking water facility to animals protection from floods	Gram Panchayats, DRDA	Table 5.7

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Poultry Production	Menace of bird flu,	Proper vaccination schedule against fatal disease Up gradation of knowledge about the effect of migratory birds Purchase of chicks from reliable sources	DDAH for arranging suitable training of poultry farmers along with KVK	Table 5
	High temp in May and June and High temp. associated with high humidity in the month of July –August	Raising the height of poultry sheds Use of local material on roofs to avoid thermal radiation Increase air circulation through exhaust fan Use of good litter management	DDAH will conduct demonstration with the guidance of KVK	
	Lack of knowledge about sanitary measures	Prohibiting the entry of undesired person Disinfection of feed and water Clean habit of poultry attendants		

Table 5 Proposal for demonstration on scientific poultry production

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of demonstrations	10	10	10	10	10	50
Cost @ Rs. 20000 per demo	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**10.0**

A Mineral mixture feeding

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 micro nutrient particularly Ca and P. etc. have severely affected the health and breeding efficiency of dairy animals. Reproductive problems vi.z 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 in the main constituents of human diet in Kaithal 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 made available be 1935.75 MT good quality mineral mixtures with a grant of Rs. 967.88 lacs during the 11^{th} plan period.

Table 5.1 Proposal for mineral mixture feeding

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Lactating animals(L)	1.64	1.67	1.70	1.74	1.77	8.52
No.(%) of animal to be Covered under MM	8200 (5%)	16700 (10%)	25500 (15%)	34400 (20%)	44250 (25%)	129050
MM req. @ 50g/day/animal for 300days (MT)	123.0	250.5	382.5	516.0	663.75	1935.75
Cost @ Rs. 50000/MT (Lacs)	**61.5**	**125.25**	**191.25**	**258.0**	**331.88**	**967.88**

B Deworming

In Kaithal district 165000 calves are born every year. The calf mortality ranges from 20-30 % up to one year of age. Such a high rate of calf mortality is cause of concern for every rightful mind. Untimely, over and low quantity of colostrums feeding, worm infestation at young age, extreme climatic conditions coupled with poor general care of calf at young age are some of the valid reasons responsible for this high rate of mortality. Continuous deworming of calves up to 1 year of age with first dose at day 15 can reduce 60% of the calf mortality. These internal parasites not only cause economic losses to the dairy keepers due to death of calf but poor or retarded growth of calves is the biggest matter of concern. It is very easy to calculate the losses occurred due to the depth of calf but difficult to assess the losses caused due to retardation of growth. The sexual maturity of female calf in determined by its body weight and not by age. In the district the average age at first calving is very high (48 month) posing serious economic burden to the livestock keepers. Use of dewormers enhances the gain in body weight with usual diets the calves are fed thereby reducing the age at first calving. Therefore, it has become the compelling reasons to include the deworming campaigns, training and demonstration programme in 11th five year plan with grant in aid of Rs.193.58 lac for training and demonstration.

Table 5.2 Proposal for deworming in calves

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-2012**	**Total**
No. of Calves born (Lac)	1.64	1.67	1.70	1.74	1.77	8.52
No.(%) of calves Covered under deworming	8200 (5%)	16700 (10%)	25500 (15%)	34400 (20%)	44250 (25%)	129050
Cost of DW req. @ Rs.150/ calf/ yr (Lacs)	**12.3**	**25.05**	**38.25**	**51.60**	**66.38**	**193.58**

C. Fodder production and preservation

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 palatable fodder crops like maize, Lucerne, oat and cowpea have almost become extinct from the scene in paddy wheat crop rotation areas. In the recent years lucrative minimum support price of rice and wheat has compelled the farmers to decrease area under fodder crops leading to poor availability of green fodder for dairy animals. In Kaithal district the area under fodder crops has decreased from 10-12 % in early nineties to 6-8 % in 2007-08. Since the contribution of livestock in total GDP of district is more than 30% and the limiting availability of green fodder is the biggest concern in dairy production system in the district. Adequate availability of green fodder round the year not only improves the health of animals but also reduces the cost of production considerably.

Keeping in view the constraints explained above the only viable alternate to overcome the problem is to launch a big campaign to grow green fodder in larger areas just after wheat harvesting. The crop can be harvested before paddy transplanting and the harvested fodder can be preserved in form of silage. Silage is a proven technology used world wide in dairy advance countries. The fodder thus ensiled can fed to animals any time after two months preservation. The plan of fodder production between two crops can be successfully implemented without affecting the production of wheat and paddy.

Similarly, in Rabi season berseem fodder is available in abundance during the months of February and March. This surplus fodder can cut and dried suitably to preserve in the form of hay. The leguminous fodders preserved as hay have excellent DCP and TDN content. If sufficient quantity of hay is fed to dairy animals it can support up to 10 Kg milk production without supplementing any concentrate. Implementation of these technologies requires big campaign of demonstration and training programme for the field functionaries and farmers. This proposal is submitted for conducting 59 demonstration for silage with 11.8 lac grant and 59 demonstrations for hay making with grant of 2.95lac. The expenditure required for conducting demonstration of important varieties of fodder would be 27.0lac for 540 demonstrations in Rabi and Kharif seasons.

Table 5.3a Proposal for demonstrations on fodder productions (ha)

Description	2007-08	2008-09	2009-10	2010-11	2011-2012	Total
Rabi	50	50	50	60	60	270
Cost @ Rs.5000/ha	2.5	2.5	2.5	3.0	3.0	**13.5**
Kharif	50	50	50	60	60	270
Cost @ Rs.5000/ha	2.5	2.5	2.5	3.0	3.0	**13.5**
Grand Total (lac)	**5.0**	**5.0**	**5.0**	**6.0**	**6.0**	**27.0**

Table 5.3b Proposal for demonstrations on Silage

Description	2007-08	2008-09	2009-10	2010-11	2011-2012	Total
Number	6	8	10	15	20	59
Cost/ demo @ Rs. 0.2lac	**1.2**	**1.6**	**2.0**	**3.0**	**4.0**	**11.8**

Table 5.3c Proposal for Demonstrations on hay

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	6	8	10	15	20	59
Cost/ demo @ Rs. 5000	**0.3**	**0.4**	**0.5**	**0.75**	**1.0**	**2.95**

D. Balanced Feeding in Animals

Feeding cost accounts for more than 70% of total cost of milk production. The profitability of any milk production programme and health of animals depend upon the feeding management of animals. The problems associated with feeding are, under feeding, over feeding, in balanced feeding and mineral deficiency. There is a common practice in the villages to take care of milch animals. Young, heifers and non lactating animals are generally ignored. This practice is not desirable. The care ignored at young age and during dry period badly affects the milk production and health of the animals in subsequent lactations. Balanced feeding improves the body weight gain, reduces the age at first calving, overcomes the problems of mineral deficiency and helps in better milk production. For educating the farmers on this important aspect of animal husbandry, it is proposed to conduct 180 demonstrations on balanced feeding with a financial assistance of Rs. 8.5 lac during the five year plan in a phased manner.

Table 5.4 Proposal for demonstration on balanced feeding

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	25	25	40	40	50	180
Cost/ demo @ Rs. 5000	**1.25**	**1.25**	**2.0**	**2.0**	**2.0**	**8.5**

E. Facility for Community Bulls for 158 villages

In Kaithal district, there are 123 A.I. centers but 158 villages lack this facility. In the absence of A.I. facilities, the farmers are using nondescript animals for breeding their animals. This has resulted in decline in productivity of dairy animals. For increasing the milk production and income from milch animal, an efficient and practical animal breeding system is of immense importance. The success rate of A.I. in the buffaloes is very low and the reason for this are manifolds. Therefore, it is proposed that bulls of proven breeding ability may be provided in each village with maintenance allowance. The duty of maintaining bulls can be assigned to a person of good repute in the village itself. For this proposal, a financial help of Rs. 73.1 lac will be required.

Table 5.5 Proposal for providing community bulls

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	20	30	30	40	38	158
Cost @0.30 lacs/bull	6.0	6.0	6.0	8.0	7.6	**33.6**
Maintenance Cost 0.25/bull/yr	5.0	7.5	7.5	10.0	9.5	**39.5**
G. Total	**11.0**	**13.5**	**13.5**	**18.0**	**17.1**	**73.1**

F. Income and employment generation for landless farmers through piglets, sheep, goats and backyard poultry.

Before the formation of Haryana state, each household in the villages owned one or the other livestock enterprise. The farmers were rearing cows and buffaloes for farm power and milk production, whereas landless farmers were used to rear sheep, goats, pigs and backyard poultry for meat and milk production. These small animals were maintained by grazing on common lands, by the sides of rail, roads and fellow lands which were found in abundant at that time. Improvement in irrigation facilities and demand for more food grains left no scope/ place for maintaining these animals. As a result these small enterprises were vanished away from the system resulting in unemployment among the poor section of society. To generate income and employment for this section of the society, efforts are required to again start these enterprises. These enterprises will fulfill the increasing demand of milk and meat, therefore introduction of these small enterprises is proposed with an outlay of Rs. 11.25 lac in the XI th Five Year Plan.

Table 5.6 Proposal for piggery, sheep, goat and poultry

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
3+1 piglets/ beneficiary to 20 households of SC/ST	80	80	80	80	80	400
Cost @ Rs. 600/piglet	0.48	0.48	0.48	0.48	0.48	2.4
6+2 Young one of sheep & goat/ beneficiary to 20 households of SC/ST	160	160	160	160	160	800
Cost @ Rs. 800/ young ones	1.44	1.44	1.44	1.44	1.44	7.2
Back yard Poultry 10+1 Chicks to 100 SC/ST Households	1100	1100	1100	1100	1100	5500
Cost @ Rs. 30/chick	0.33	0.33	0.33	0.33	0.33	**1.65**
G. Total	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**11.25**

G. Conservation of Village ponds

In rural Haryana, the villages were established on higher topographies by using scientific minds by the ancestors. One or more pond was constructed in each village with the objective of harvesting rain water, protection of village from the floods and using the harvested water for drinking of animals throughout the year. With the passing of time and increase in population the condition of village ponds deteriorated beyond repair. The village ponds are important resources for the reasons stated above. Up to now no serious efforts have been made to conserve these ponds on scientific lines for the purpose they were constructed. Extensive use of soaps and detergents, throwing of animal waste in or near the ponds has made these ponds purposeless. With the slight rainfall, flood like situations are created near the ponds and the pollution caused by these ponds have posed a serious threat to human population in these villages due to decreasing water holding capacity of these ponds. There is no valid reason why the matter should not be addressed suitably at the earliest. Therefore, an outlay of Rs. 450 lac is requested for conserving 90 ponds in Kaithal district.

Table 5.7 Proposal for conservation of village ponds

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**Total**
Number	10	20	20	20	20	90
Funds Req.@ Rs.5 lac	**50.0**	**100.0**	**100.0**	**100.0**	**100.0**	**450.0**

H Commercial Dairy Farming

In Kaithal district, there are 66579 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 division 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 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 price in the area reaches up to Rs. 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 Kaithal district.

The reasons stated above have demanded the introduction of large commercial dairy farms, which can be run on economy of scale. The automation of this enterprise can being down the cost of milk production, thereby making a good scope for commercially viable large sized dairy farms. Therefore, the proposal is submitted for introduction of 85 commercial dairy farms with a subsidy help of Rs. 425 lac and training grant of Rs. 3 lac during the proposed plan period.

Table 5.8a Proposal for commercial dairy trainings

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of Trainings for three days	4	4	4	4	4	20
No. of Trainees 25/ trg.	100	100	100	100	100	500
Cost/ training @ Rs. 600/Trainee for 3 days	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**3.0**

Table 5.8b Proposal for Commercial Dairy Units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	10	15	20	20	20	85
Cost @ 20 l/unit	200	300	400	400	400	1700
Subsidy @ 25%	**50.0**	**75.0**	**100.0**	**100.0**	**100.0**	**425.0**

Table 5.9 Proposal for capacity building of animal husbandry staff

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Training AH staff (No.)	6	8	12	12	12	50
No. of Trainees 20/ training	120	160	240	240	240	1000
Cost/ training @ Rs. 600/Trainee/day	**0.72**	**0.96**	**1.44**	**1.44**	**1.44**	**6.0**

Table 5.10 Proposal for capacity building of animal husbandry farmers

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	20	25	25	30	30	130
No. of Trainees (25/ training)	500	625	625	750	750	3250
Cost/ training @ Rs. 400/trainee/day	**2.0**	**2.5**	**2.5**	**3.0**	**3.0**	**13.0**

5.2 Horticulture vegetables, fishery, forestry and agro based vocations

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. In the Kaithal district a good number of farmers are coming forward for cultivation of these crops. 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.

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Horticulture and vegetables	Diversification, fruit and vegetable availability, increased farm income	Demonstrations on hybrid vegetables and good seedlings for fruit crops	DHO and KVK	Table5.11
Forestry	To increase productivity and boosting of farmers income	Demonstrations on clonal Eucalyptus and good cultivars of poplar	DFO and KVK	Table 5.14
Fishery	Utilization of village ponds and increasing farmer income	Demonstrations on feeding management and skill improvement	Fishery department	Table 5.17

Table 5.11 Proposal for demonstration on horticulture and vegetables

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**Total**
Hort. demos	20	20	20	20	20	100
Funds Req.@ Rs.0.1 lacs/ha	2.0	2.0	2.0	2.0	2.0	**10.0**
Vegetables	20	20	20	20	20	100
Funds Req.@ Rs.0.05 lacs/ha	1.0	1.0	1.0	1.0	1.0	**5.0**
G. Total	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**15.0**

Table 5.12 Proposal for capacity building of horticulture staff

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Training of Hort. staff (No.)	4	4	4	4	5	21
No. of Trainees 15/ training	60	60	60	60	75	315
Cost/ training @ Rs. 600/Trainee/day	**0.36**	**0.36**	**0.36**	**0.36**	**0.45**	**1.89**

Table 5.13 Proposal for capacity building of horticulture farmers

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	6	6	6	6	6	30
No. of Trainees (25/ training)	150	150	150	150	150	750
Cost/ training @ Rs. 400/trainee/day	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**3.0**

5.3 Forestry

Kaithal which is mainly an agrarian district of Haryana state has only about 7600 ha forest area which is only 3.28 % of the total area. But according to National Forest Policy 1989 about 25 % area of plain should be under tree covers for pollution control and sustainable production in any area. In spite of all efforts by forest department and other agencies involved for planting of trees, the forest area is not increasing in the district. The only scope for increasing the forest covers in the district is on the farmer's fields. The plantation of trees on the farmer's field not only increase the forest area in the district but

also enhance the productivity of the farmer fields which ultimately increase the net income of the farmers on sustainable basis. For this extension activities like trainings, demonstrations of different trees especially eucalyptus and poplar (fast growing tree species) are to be intensified in the coming years. The details regarding demonstrations of clonal eucalyptus/poplar during the 11th five year plan has been given as under:

Table 5.14 Proposal for demonstrations on Clonal Eucalyptus/Poplar

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	20	20	20	20	25	105
Cost/ demo @ Rs. 0.1lac	**2.0**	**2.0**	**2.0**	**2.0**	**2.5**	**10.5**

Table 5.15 Proposal for capacity building of forest staff

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Training of Forest staff (No.)	4	4	4	4	5	21
No. of Trainees (15/ training)	60	60	60	60	75	315
Cost/ training @ Rs. 600/Trainee/day	**0.36**	**0.36**	**0.36**	**0.36**	**0.45**	**1.89**

Table 5.16 Proposal for capacity building of forestry farmers

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	6	6	6	6	6	30
No. of Trainees (25/ training)	150	150	150	150	150	750
Cost/ training @ Rs. 400/trainee/day	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**3.0**

5.4 Fishery

In Kaithal district, fish production is generally carried out in village ponds taken on lease from the gram Panchayats for a period convenient to Panchayats. Production of fish at farmer's field has not gained momentum. The farmers engaged in the fish production programme are lacking in skill of breeding, feeding and other management practices related to fish production. A yield gap of about 1323 Kg/ unit exists in the district. To realize the full potential of fish production per unit and to motivate the larger number of farmers to adopt this vocation on commercial basis. To generate additional income, a plan out lay of Rs. 4.0 lac is requested for conducting demonstrations at different locations in the district.

Table 5.17 Proposal for demonstrations on Fishery

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	5	5	10	10	10	40
Cost/ demo @ Rs. 0.1lac	**0.5**	**0.5**	**1.0**	**1.0**	**1.0**	**4.0**

Table 5.18 Proposal for capacity building of fishery staff

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Training of Fishery staff (No.)	2	2	2	2	2	10
No. of Trainees 15/ trg.	30	30	30	30	30	150
Cost/ training @ Rs. 600/Trainee/day	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**0.9**

Table 5.19 Proposal for capacity building of fishery farmers

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	6	6	6	6	6	30
No. of Trainees (25/ training)	150	150	150	150	150	750
Cost/ training @ Rs. 400/trainee/day	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**3.0**

5.5 Income and employment generation through agro based vocations

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Bee-keeping	Trainings ,bee keeping units and honey processing units	Supply of bee colonies, honey extracting and processing, monitoring and education	DHO and KVK	Table 5.20a Table 5.20b Table 5.20c
Mushroom	Trainings ,mushroom units and processing unit	Construction of semi- pucca house, compost pasteurization unit, education will be ensured by DHO and KVK	DHO and KVK	Table 5.21a Table 5.21b Table 5.21c
Vermi-Composting	Unit establishment, earth worms, education	Construction of units, supply of earth worms, trainings, monitoring	DHO,DDA and KVK	Table 5.22a Table 5.22b
Food Preservation	Trainings units to be established	Fruits and vegetable, milk and milk products for increasing shelf life and value addition	DDAH,DHO,KVIC	Table 5.23

A Bee Keeping

Why has mankind been so interested in bee keeping over the centuries? You can bet that the first motivator was honey. After all, for many years and long before cane sugar, honey was the primary sweetener in use. It is no wonder that honey remains the principal draw for many backyard beekeepers. But the sweet reward is by no means the only reason folks are attracted to beekeeping. For a long time, agriculture has recognized the value of pollination by bees. Without the bees' help, many commercial crops would suffer serious consequences. Even backyard beekeepers witness dramatic improvements in their gardens' yields; more and larger fruits, flowers and vegetables. A hive or two in the garden makes a big difference in your success as a gardener.

The rewards of beekeeping extend beyond honey and pollination. Bees produce other products that can be harvested and put to good use, including bees wax, propolis, and royal jelly. Even the pollen they bring back to the hive can be harvested (it is rich in protein and makes a healthy food supplement in our own diets). Any health goods store proprietor can tell you the benefits of the bees' products. Honey, pollen, royal jelly and propolis have been a part of healthful remedies for centuries. Honey and propolis (a sticky resinous material that bees collect from trees and plants) have significant antibacterial qualities. Royal jelly (the substance that is secreted from glands in a worker bee's head and is used to feed brood) is loaded with B vitamins and is widely used overseas as a dietary and fertility stimulant. Pollen is high in protein and can be used as a homeopathic remedy for seasonal pollen allergies.

In Kaithal district 400 bee keeping units of average size 30 boxes per units (range 10-250) are functional. The average honey production per box is 30 Kg with total production of 360 MT with present value of 2.16 crores. In these units 700 youths are directly employed. The proposal submitted will further add 160 units in the district giving direct employment to 300 persons and generating additional income of Rs. 1 crore. It will also increase the yield of all cross pollinated crops, vegetables and fruits plants. The scientific processing, grading and packaging of honey will further add to the value of product, therefore proposal for five honey processing units are also submitted for value addition and employment generation in the district

Table 5.20a Proposal for bee keeping trainings

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of Trainings for three days	2	2	2	2	2	10
No. of Trainees 25/ training.	50	50	50	50	50	250
Cost/ training @ Rs. 600/Trainee for 3 days	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**1.5**

Table 5.20b Proposal for bee keeping units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	20	20	30	40	50	160
Financial help @ 0.2 l/unit	**4.0**	**4.0**	**6.0**	**8.0**	**10.0**	**32.0**

Table 5.20c Proposal for honey processing units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	1	1	1	1	1	5
Financial help @ 20 l/unit	**20.0**	**20.0**	**20.0**	**20.0**	**20.0**	**100.0**

B Mushroom Production

Mushroom once grown up as a wild fungus on the organic matters during rainy seasons have now become a commercially grown agro based vocation. It is very palatable, nutritious and contains highest chain of amino acids. Mushroom is particularly suited to the heart patients, young children and sick persons due to its easy digestibility. The vocation requires very less land and can be successfully done on commercial basis. The training facilities are available in the KVK. With the nearness of the town with Delhi, Chandigarh,

Ludhiana and Patiala there is enough scope of mushroom production. To make this vocation popular amongst farmers, it is proposed to impart to trainings to 250 farmers with a financial out lay of Rs. 1.5 lac. Target for the establishment of mushroom units of medium size is kept 55 at the rate of 50 % subsidy with a financial outlay of Rs. 27.5 lac. Since mushroom is a highly perishable commodity and needs immediate processing and packaging and hence five mushroom processing units need to be established in the district with the financial grant of Rs. 50 lac.

Table 5.21a Proposal for mushroom production trainings

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of Trainings for three days	2	2	2	2	2	10
No. of Trainees 25/ trg.	50	50	50	50	50	250
Cost/ training @ Rs. 600/Trainee for 3 days	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**1.5**

Table 5.21b Proposal for Mushroom Units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	5	10	10	15	15	55
Cost @ 1.0 l/unit	5.0	10.0	10.0	15.0	15.0	**55.0**
Subsidy required @ 50%	**2.5**	**5.0**	**5.0**	**7.5**	**7.5**	**27.5**

Table 5.21c Proposal for Mushroom Processing Units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	1	1	1	1	1	5
Cost @ 20 l/unit	20	20	20	20	20	**100**
Subsidy required @ 50%	**10.0**	**10.0**	**10.0**	**10.0**	**10.0**	**50.0**

C Vermi-composting

Animal and plant wastes are rich source of all plant nutrients which are required for improvement of soil health and sustainability of crop and animal production. Unfortunately recycling of these nutrients is not done in a justified way. Most of plant nutrients are either burnt or put at undesired places leading to soil and water pollution on one hand and loss of plant nutrients on other hand in terms of worth billion of rupees . Vermicomposting is an excellent method for recycling the farm wastes into valuable plant nutrients.

Table 5.22 Nutrient contents of vermi-compost

Nutrient	**Availability (%)**
Nitrogen	1.5-2.5
Phosphorous	0.9-1.7
Potash	1.5-2.4
Calcium	0.5-1.0
Magnesium	0.2-0.3
Sulphur	0.4-0.5

According to survey 28 % small farmers, 58% medium farmers and 96% big farmers burn paddy straw. Burning of crop residues increase air pollution and atmospheric temperature giving adverse effect on human health. Vermi-compost is organic manure (bio-fertilizer) produced as vermicast by the earth worms feeding on biological waste material, plant residues. This compost is an odorless, clean organic material containing adequate quantities of N,P,K and several micronutrients essential for plant growth. It is eco-friendly; non toxic consumes low energy input for composting, a recycled biological product and a source for organic farming. Conversion of farm wastes into good quality manure through vermin composting has become the need of hour and its advantages are manifold.

- Vermicompost is rich in all essential plant nutrients.
- Provides excellent effect on overall plant growth and improves quality and shelf life of produce.
- It is free flowing, easy to apply, handle and can be stored in or near dwellings
- It improves soil structure, texture, aeration and water holding capacity and prevents soil erosion.

- It is rich in beneficial micro flora such as fixers, P solublizers, cellulose decomposing micro flora.
- It contains earth worm cocoons and increases the population and activity of earthworms in soil.
- It prevents nutrient losses and increases the use efficiency of chemical fertilizers.
- It minimizes the incidence of pest and disease.
- It enhances the decomposition of organic matter in soil
- It contains valuable vitamins, enzymes and hormones like auxins, gibberellins etc.
- It is suitable specially for fruit and vegetable cultivation

KVK Kaithal after imparting trainings to the farmers has established 250 units of vermicompost which are successfully running. Some of the farmers are selling the quality vermicompost prepared in neighboring state of Himachal Pradesh. KVK Kaithal proposes to establish 190 units of vermicompost with the financial assistance of rupees 38 lacs and 20 farmers training programme with a financial aid of rupees 3 lac.

Table 5.22a Proposal for vermi-compost trainings

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number of Trainings for three days	4	4	4	4	4	20
No. of Trainees 25/ trg.	100	100	100	100	100	500
Cost/ training @ Rs. 600/ Trainee for 3 days	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**3.0**

Table 5.22b Proposal for Vermi-compost Units to be established

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	30	30	40	40	50	190
Financial help @ 0.2 l/unit	**6.0**	**6.0**	**8.0**	**8.0**	**10.0**	**38.0**

D Food Preservation

Milk, vegetable and fruits are important parts of human diet. These food products are highly perishable in nature if not properly taken care of. Preservation of these food stuffs adds to their values and utility. The preserved products can be transported to distant places and used for a longer time. Preservation of these products generates a lot of income and employment opportunities for the farm women and unemployed youths for supplementing their family income. Food preservation in Panipat district has developed into a fully commercial viable enterprise and several thousand families are engaged in this occupation, directly or indirectly. These enterprises can be introduced in the Kaithal district also with a suitable skill improvement of farm women and unemployed youths through trainings. Therefore, a plan outlay of Rs. 16.0 lac is requested under this programme.

Table 5.23 Proposal for setting up of food preservation units

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Trainings	4	4	4	4	4	20
Funds Required @ Rs. 0.1 l/ trg	0.4	0.4	0.4	0.4	0.4	**2.0**
Fruit & Veg. Preservation Units	5	5	5	10	10	45
Funds Req.@ Rs.0.2 lacs/ structures	1.0	1.0	1.0	2.0	2.0	**7.0**
Milk & Milk Products Units	5	5	5	10	10	35
Funds Req.@ Rs.0.2 lacs/ structures	1.0	1.0	1.0	2.0	2.0	**7.0**
G. Total (lac)	**2.4**	**2.4**	**2.4**	**4.4**	**4.4**	**16.0**

CHAPTER VI

District Plan

6.1 Introduction

The proposed district plan includes agriculture, horticulture, forestry, animal husbandry, fisheries and innovative as well as miscellaneous schemes as the major activities to be undertaken in the district Kaithal. The existing status of these sectors has been issued 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:

6.2.1 Agriculture

a) Increasing area under hybrids in rice, improved varieties in wheat and sugarcane

b) Resource conservation technologies for sustaining and improving the productivity levels.

c) Mechanization for increasing water use efficiency.

d) Seed grading, treatment and enhancing seed replacement rate.

e) IPM, INM and IWM.

f) Demonstration and capacity building of field functionary and farmers

g) Human resource development.

6.2.2. Horticulture

a) Increasing area under fruits and vegetable crops.

b) Providing improved planting material of fruit crops.

c) IPM and INM

f) Encouraging income and employment generating vocations through agro based vocations viz. mushroom, bee-keeping, vermi composting and food preservation etc.

g) Demonstrations and trainings including farmers and field official

6.2.3 Forestry:

a) Increasing area under forests through plantation in community lands.

b) Increasing area under agro-forestry.

c) Establishment of wood market

d) Demonstrations and trainings including farmers and field officials

6.2.4. Animal Husbandry:

a) Mineral mixture feeding

b) Deworming

c) Breed improvement through community bulls and A.I.

d) Fodder production and preservation

e) Balanced feeding

f) Improvement of village ponds

g) Demonstration and capacity building of field functionary and farmers

6.2.5 Fisheries:

a) Improvement of village ponds.

b) Making availability of good quality fish seed

d) Balanced feeding. In ponds

e) Capacity building of farmers and field functionary.

6.3 Innovative Projects

ACTIVITY OUTPUT MATRIX				
Issues	**Programme**	**Activities**	**Collaborators/Targets**	**Cost**
Depletion of ground water	Reutilization of harvested water	Digging of water storage structure near drains and low lying areas	Irrigation department with the assistance of KVK	Table 6.1
Fruit and vegetable grading units	Value additions, increase in shelf life	Establishment of grading and packaging units	KVIC,DIC,DHO	Table 6.2
Wood market	Remunerative price for farmers, availability to consumers and market problems	Identifying locations, infrastructural development, regulatory mechanism	HSAMB and DFO	Table 6.3
Fodder Market	Remunerative price for farmers, availability to consumers and market problems	Identifying locations, infrastructural development, regulatory mechanism	HSAMB and DDAH and DDA	Table 6.4
Minor Irrigation department	To reduce seepage losses of water , availability of water to users at tail	Lining of water courses with 9 inch wall	CADA, Irrigation department, Gram Panchayats	Table 6.5
Farm and Animal disposal	To minimize losses of plant nutrients, recycling of nutrients and pollution problems	Digging of pits for proper disposal and fermenting of bio wastes	DRDA,DDAH,DDA and KVK	Table 6.6
Multi facility Testing Lab	Seed germination, Soil and water health, cattle feed and milk quality ,animal disease problems	Establishment of multi testing lab through public or private sector	DDA, DDAH, DHO ,KVK	Table 6.7
Krishi Bhawan	Better collaboration of line departments, farmer's problems	Roofing of line departments at one place	DDA,DDAH,DHO,ASCO,HLRDC,KVK	Table 6.8
Strengthening of KVK	Training facility, and infrastructural development at KVK	Construction of training hall, lining of water courses, water harvesting + fish demo, seed storage & grading for custom hiring for farmers, soil reclamation, marketing information hub, ag. Museum and model nursery	KVK and CCS HAU Hisar	Table 6.9

6.3.1 Water Harvesting Structures near drains & rain water channels

Due to over exploitation of under ground water, the water level is continuously declining in the district. All the shallow tube wells have become non functional. Installation of submersible tube wells by the small and marginal farmers have become a dream, thereby affecting the agricultural productivity in the district. The Ghaggar River and several drains are passing through the Kaithal district. During the rainy season water is passing through these river and drains. If serious efforts are made to harvest the flowing water the problem of declining water table can be checked easily. Krishi Vigyan Kendra, Kaithal has constructed a water harvesting structure at its farm which has shown encouraging results. Therefore, it is proposed that to overcome the problem of declining water level, 50 water harvesting structures may be constructed with a financial help of Rs. 200 lac during the Plan Period.

Table 6.1 Proposal for water harvesting structures

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	5	10	10	10	15	50
Funds Req.@ Rs.4 lacs/ structures	**20.0**	**40.0**	**40.0**	**40.0**	**60.0**	**200.0**

6.3.2 Fruit and Vegetable Grading Units

About 25 % vegetable and fruits are damaged due to non grading and unsuitable packaging. Value additions through grading and attractive packaging have become an important aspect in fruit and vegetable marketing system. Through this, the farmers not only can fetch high price of their produce but it can also be made available to consumers at distant place without any damage.

In the district, presently there is no commercial fruit and vegetable packaging unit. In the absence of these structures, the farmers are unable to grade and pack their produce and are losing lucrative prices. Therefore, it is proposed that after imparting training to the farmers, 8 units of grading and packaging may be established at different locations with 50 % subsidy amounting Rs. 80 lac in a phased manner.

Table 6.2 Proposal for fruit and vegetable grading units

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	1	1	2	2	2	8
Cost@ Rs.20 lac/ unit	20.0	20.0	40.0	40.0	40.0	160.0
Subsidy @ 50%	**10.0**	**10.0**	**20.0**	**20.0**	**20.0**	**80.0**

6.3.3 Wood Market

Kaithal district falls under semi arid climate where paddy –wheat is the main crop rotation followed by the farmers in the area. Due to the concerted efforts of different agencies farmers have started growing eucalyptus, poplar, shisham and other agro forestry trees in their fields as block plantation, boundary plantation and along with water courses. In the years to come the plantation of agro forestry trees will increase substantially on the farmer's fields.

According to survey conducted by KVK, Kaithal scientists about 510 MT woods/ logs/ per day of eucalyptus, shisham, kikar, neem etc. comes in Kaithal city for sale. The wood/ logs are sold by the farmers in an unorganized market at the sale points (near trunk market, tempo union and janta dharma kanta) in Kaithal. Some times tractor trolleys fully loaded with wood remains standing by the sides of roads and create frequent road jams. Establishing a well regulated wood market in the district will yield the following benefits.

- Farmers will get good price of their produce, ultimately leading to grow more and more trees at their fields.
- Illegal selling of trees/ wood will be stopped which is causing great revenue losses to the state exchequer in terms of market fees. The money thus generated can be used for further developmental works.
- More employment will be generated.
- Sawing machines/ factories can also be transferred near or in this market which are now causing a great pollution and noise hazards in the residential areas/markets

- Farmers will be out of clutches of unorganized traders and will get good price of their invaluable products.
- By establishing an organized wood market consumers will also get good quality furniture for their use in this market.

Table 6.3 Proposal for establishment of wood market

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	-	-	1 (Kaithal)	1(Cheeka)	-	2
Funds Required(Lac)	**-**	**-**	**400.0**	**200.0**	**-**	**600.0**

6.3.4 Fodder Market

A large number of commercial dairy units are establishing in and around urban areas of the district. Feed and fodder are important inputs required in milk production programme. In the absence of organized marketing system, the business is run in colonies, market and other undersized places resulting in problems of disposal, environmental pollution, creating nuisance for the society, frequent road jams, loss of market fee, fire hazards less price to the producers and problems for the buyers. Due to increase in milk demand in urban areas, more and more feed and fodder will be required to meet the demand for these dairy units. Therefore, it is proposed that a regulated market may be established in five towns of the district. The funds required for the purpose would be approx. Rs. 900 lac in the plan period. Regulated market will not only ensure good price to the producers but the consumers will also be benefited. The quality control an important concern of milk production can also be redressed. Lot of funds will be generated through realizing market fee, which can further be used for the development of milk production programme.

Table 6.4 Proposal for establishment of fodder market

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Number	1(Kaithal)	1(Cheeka)	1(Kalayat)	1(Pundri)	1(Dhand)	5
Funds Required (lac)	**300.0**	**200.0**	**200.0**	**100.0**	**100.0**	**900.0**

6.3.5 Minor irrigation facilities (Lining of Water Courses)

No agricultural production programme can yield desired results in absence of irrigation facilities. Over exploitation of under ground water has resulted in depletion of under ground water. The supply of canal water is diminishing day by day for want of drinking water in the public health development programme initiated in villages, towns and cities. The only alternative left with the farmer is to save each and every drop of available canal water for crop production avoiding seepage and evaporation losses. The water courses lined during the last period either have become non functional or not fulfilling the purpose of water saving due to thin walls (4 inch wide). Though several canals and minor are passing through the district yet the water is not reaching up to the tails due to poor condition of insufficient pucca water courses. For making appropriate utilization of each and every drop of available water lining of water courses is badly needed in the district. Therefore, lining of 75 water courses with a grant in aid of Rs. 900 lacs is proposed in phased manner in the coming plan

Table 6.5 Proposal for minor irrigation facilities (Lining of Water Courses)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of water courses	15	15	15	15	15	75
Area to be covered under irrigation @ 160ha/ water course	2400	2400	2400	2400	2400	9600
Funds required @ 0.75lac/ acre length for 9" wide walls	**225.0**	**225.0**	**225.0**	**225.0**	**225.0**	**1125.0**

6.3.6 Farm and Animal Disposal

For any agricultural production system the soil health is the key factor. Due to the over exploitation of land in Kaithal particularly in paddy- wheat crop rotation, the soil has become low in organic carbon and deficient in other major and minor plant nutrients which resulted in stagnation of crop productivity. This problem has aroused mainly due to the breakage of cycle between soil, plants and animals. In Kaithal district there are 80939 cows, 388172 buffaloes, 29227 sheep, 5480 goats and 1241600 poultry birds. Total livestock

produces plant nutrients worth rupees 28.26 crores. More than 50 % of these nutrients are wasted due to improper disposal and storage of farm yard wastes. The farm yard waste is generally stored on the sides of roads and water ponds. It not only creates sanitation problem in villages but plant nutrients worth million of rupees are wasted also. The water stored in the village ponds is destroyed and becomes unsuitable for animal use. The animals using this water face health threats. The improper disposal of farm wastes becomes breeding centre for mosquitoes and other disease causing organisms. Thus causing a serious threat to the human and livestock health .Establishment of 10-15 manure pits is proposed in each village of the district during the 11^{th} five year plan to overcome the problems stated above. For digging pits for suitable conversion of farm waste into good quality manure to improve soil health and crop productivity Rs. **20.5 lac** will be required for **4100** pits.

Table 6.6 Proposal for farm and animal disposal pits

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Pits to be prepared	200	400	800	1200	1500	4100
Funds required @ 500/pit (lacs)	**1.0**	**2.0**	**4.0**	**6.0**	**7.5**	**20.5**

6.3.7 Establishment of multi facility testing laboratory

For finding a solution of the problem, its testing in the laboratory, is of immense importance. Once the cause of problem is diagnosed, its cure becomes easy and less expensive. In the absence of testing facilities related to agriculture and animal husbandry, lot of expenditure is incurred for treatment without getting desired results. Soil and water testing, seed germination testing, seed and fodder testing, fertilizer and pesticide testing are the facilities required for supplying quality inputs and solving problems related to agriculture and animal production. In the absence of adequate testing facilities farmers move from here and there and incur lot of time and money for getting solution to their problems. Therefore, it is proposed that a central multi testing facility laboratory for conducting the following tests may be established at Kaithal district for benefiting the farmers in solving their day to day problems. Outsourcing help can be sought for fulfilling the objectives.

i) Seed germination test.

ii) Soil and water testing.

iii) Cattle feed and mineral mixture testing.

iv) Milk testing.

v) Dung, urine and blood testing in animals.

vi) Fertilizers and chemical testing.

vii) Semen quality evaluation

The expenditure proposed for establishment of laboratory will be Rs. 80 lac.The assignment can be given to public or private sectors.

Table No. 6.7 Proposal for Multifacility Laboratory.

Item	**Grant needed (Rs. in lacs)**
Multifacility Laboratory	80.0 lac

6.3.8 Krishi Bhawan

The agricultural developmental offices viz. Deputy Director Agriculture, Sub Divisional Agricultural Office, District Horticulture Office, Asstt. Soil Conservation Office, Asstt. Cane Development Office, Asstt. Agricultural Engineer, Deputy Director Animal Husbandry, Sub Divisional Officer, (Animal Husbandry) Haryana Land Reclamation and Development Corporation and Krishi Vigyan Kendra, Kaithal are situated at different locations. The innocent farmers remain wandering here and there for redressing their problems. Lot of time and money is spent in tracing these offices. Several times, the problems of farmers remain unattended due to poor knowledge and distant location of these offices.

If these offices are housed in one building, the problems of the farmers stated above can be solved in a better and efficient way. The proposal submitted will provide a better coordination among the different line departments besides solving the problems of farmers under one roof. The system will also help in making the activities of different departments more transparent. The construction of Krishi Bhawan can be done on land of KVK, Kaithal free of cost, having good connectivity of Road. Amalgamation of all the agricultural offices at one place will minimize the hiring cost of office buildings.

Table 6.8 Proposal for Krishi Bhawan

Item	Grant needed (Rs. in lacs)
Krishi Bhawan	150.0 lac

6.3.9 Strengthening of KRISHI VIGYAN KENDRA

Krishi Vigyan Kendra (KVK), Kaithal was established in 1991-92 under the aegis of Chaudhary Charan Singh Haryana Agricultural University, Hisar. This Kendra was allotted 50 acres of land by Gram Panchayat Devigarh for its establishment and conductance of adaptive research trials on various aspects of agriculture, animal husbandry, horticulture, home science, agro forestry etc. for the benefit of various sections of rural and urban society. The KVK farm is located 110 kms far from the main campus on National Highway-65 on Peoda Road in the revenue estate of village Devigarh near Kaithal.

Krishi Vigyan Kendra (KVK) is an innovative science based institution which undertakes vocational training for farmers, farm women and unemployed rural youth; conducts ' On Farm Research' for technology refinement and front line demonstration to properly demonstrate the latest agricultural technologies to the farmers as well as to the extension workers. The KVK functions on the principles of collaborative participation of scientists, subject-matter specialists, extension workers and farmers.

To reduce the time lag between the generation of technologies and their transfer to the farmers through the application of science and technology KVK works on the principle of "Teaching and learning by doing". Since inception the KVK has done tremendous work for the up liftment of the farming community in the district. The activities of the KVK have been appreciated at several levels. This KVK have received two best KVK Awards, one best Presentation Award by ICAR, One best Pathshala award by United Phosphorus Limited, Four national farmers' awards, Three State level Kisan Awards.

The farm land transferred to KVK falls in low lying area and it was subjected to the floods. The crops at the farm were destroyed due to stagnation of water and water logging conditions. The KVK scientists have constructed an Innovative Water Harvesting Pond which is first of its kind in North India with the aims to protect the crop from flood, recharging of underground water, up gradation of KVK paths, structural and textural changes in the soil and reuse of harvested water. The water harvesting pond is fulfilling the all above

said objectives. The water quality at the farm is very poor and sodic in nature. The land of the KVK is to be reclaimed through gypsum and for this purpose a financial help of Rs. 4.5 lac is required. The water harvesting pond is constructed in 2 acres of land and 12 feet deep. It has a capacity to harvest 150 feet acres water. The water of Amin drain passing 400m away from KVK can be harvested by connecting the pond with a under ground water channel of suitable capacity. Due to the frequent rains, erosion of side walls is a big problem, therefore, the proposal is submitted in this plan for side lining of water harvesting pond and the financial help required for this purpose is Rs. 25.00 lac. After lining of the pond this structure will also become a very excellent training facility/ demonstration unit for fish cultivation. The land of KVK farm has different topography and irrigation with tube-wells is a great problem. Frequent tripping of the electric current add this problem further. Therefore, it is suggested that a financial help of Rs. 15.00 lac may be given to the KVK so that the water courses can be lined up and lot of water and electricity can be saved.

Krishi Vigyan Kendra, Kaithal is the only institution in the district approved by the ICAR, state and center government for imparting trainings to the in service field functionaries of line departments viz, agriculture, horticulture, forestry, animal husbandry, cooperatives etc. In this centre vocational trainings on agro based vocations are regularly organized on Poultry farming, Dairy Farming, Pig Farming, Nursery raising, Bee Keeping, Mushroom Production, Vermi-composting, Milk and Milk products, Food preservations, Medicinal plants. Several thousands of unemployed youths after getting training from this centre are successfully doing their business and helping in increasing the income of their families, thereby their standard of living. The KVK has a trainees hostel and all latest training equipments required for conducting effective trainings are available but there is no place to sit for the trainees. Therefore, it is proposed that in the 11^{th} five year plan a training hall capable of accommodating 200 farmers/trainees should be constructed with all furniture and fixtures, so that training need of district for unemployed youths, field officers of line departments and farmers can be fulfilled. The approximate expenditure required for this purpose is Rs. 40.00 lac.

In the KVK several thousand farmers visit per year to redress their grievances relating to the crop and animal production. The farmers of the district are innovative in nature and desire to go for diversification and high value crops. The marketing facility for these crops

for example medicinal plants is a great problem. The farmer desiring to shift towards these crops hesitates due to the marketing problem. Therefore, it is suggested that a marketing information network for the benefit of the farmers of the whole district may be established at KVK office, so that the farmers can get the desired information related to marketing of their produce at no cost. For this purpose a grant of Rs.3.00 lac is required.

KVK farm produces about 400-500 q seed of latest varieties of paddy and wheat. In the absence of storing and grading facilities the seed is given to HSDC, Umri,. If seed storage and grading facilities are provided to the KVK the farmers can get the seed from KVK itself. These grading facilities will also be provided to the farmers on custom hire basis for grading their seed. If the motor mounted grader is provided the seed grading facility can be provided to the adjoining 30-50 villages. Therefore, a proposal for these facilities is submitted and the estimated grant required will be Rs. 20.00 lac.

The area under horticulture and vegetable is growing steadily. The farmers are facing problems of good quality seedling and they will have to move here and there in search of the good planting material. KVK Kaithal intends to establish a nursery to cater the needs of the district farmers for horticultural crops. Therefore, it is suggested that a new innovative nursery facility may be provided to the KVK and the funds required for this purpose would be of Rs. 20.00 lac.

Table 6.9 Proposal for strengthening of Krishi Vigyan Kendra

Description	**Funds Required Rs. (Lac)**
Training Hall for 200 person sitting capacity with all furniture & Fixture facility	40
Lining of Water Courses for 20 acre Length @ 0.75 L/acre length	15
Lining of water harvesting pond , Fishery training & Demo unit	25
Seed Storage and Grading Facility with good quality seed grader	20
Reclamation of KVK farm land	4.5
Establishment of Marketing Information Network	3.0
Establishment of Agriculture Museum	10
Establishment of Nursery with all Facility	20
Total	**137.5**

6.4 Miscellaneous activities

6.4.1 Kisan Mela

In the Kisan Melas, the season based crop production technologies are demonstrated. The farmers visiting the melas themselves judge the performance of different technologies exhibited and adopt in their farming system. These melas provide a common platform to the farmers to exchange their views with the farmers and the expert/scientists. The buzz sessions help the farmers in highlighting their problems to the experts. Participation of agro-industrial input suppliers for demonstrating their latest technologies is an additional advantage in these events. Therefore two Kisan melas per year are suggested one each in Kharif and Rabi seasons in the district with a financial aid of Rs. 75000/- per mela.

6.4.2 Clinical Camps

Animal husbandry plays an important role in income and employment generation in the rural areas. There are several innovative technologies which can prove to be useful to the farmers for improving the health and productivity of animals are demonstrated are demonstrated in clinical camps. Operating up on a diseased animal through surgical operations is a troublesome problem. Some times, the cost of treatment exceeds the paying capacity of the farmers. The clinical camps provide an opportunity to the farmers to exhibit the cow and cattle in the melas for motivation of other farmers. The message delivered by the scientists in such events help the farmers a lot. Therefore one clinical camp in each block per year is proposed with a grant in aid of Rs. 50000/- per camp. Interaction of farmers with field officers of department and other farmers motivates the farmers for improving the health and productivity of their livestock.

6.4.3 Exposure Visits

There are several innovative farmers adopting good agricultural practices in the district, state and country. Exposure visits provide an opportunity to the farmers to see, judge and assess the suitability and gains of innovations in their production practices. Therefore five exposure visits per year , two for agriculture, one for animal husbandry, one for horticulture and one for aquaculture is suggested with a financial help of Rs. one lac per visit.

6.4.4 Farmer' Puraskar

Advance farmers spent a lot of time and money in creating new innovation in the agricultural production system. By adoption of these innovations, a large number of farmers

are benefited. If such farmers are encouraged with little awards, the other farmers will also be motivated for new innovations. Therefore five awards per year of Rs. 25 thousands each are proposed for best agriculture, animal husbandry, horticulture, agro forestry and fishery farmers.

6.4.5 Block Level Training Hall

Several projects are running simultaneously for the development of agriculture, animal husbandry, horticulture, agro forestry and fishery in the district. Inviting all the farmers at district headquarters for conducting small trainings is neither desirable nor possible. It not only wastes the time and money of the farmers but field functionaries also face a lot of problems. Therefore for training of farmers of all line departments' construction of a training hall with a cost of 20 lac per hall is proposed in five blocks of the district excluding Kaithal for which the budget has been demanded for a district training hall.

6.4.6 Disease diagnostic kits

The field officers of animal husbandry departments have to attend the problems of animals at the doorsteps of farmers. There are no facilities available for disease diagnosis in the veterinary hospitals and stockman centers. In the absence of these facilities, animals are not treated properly leading to wasteful farmers' expenditure. In the market disease diagnostic kits are available through which lot of help is available for proper diagnosis and treatment of animals. Therefore a budget provision of Rs. 50000 per year is required for equipping all the 40 veterinary surgeons in the district in the 11^{th} five year plan

6.4.7 Office automation

In the period of information technology, the information are required urgently and updated by the funding agencies for evaluating the performance of the project in the light of state and national priorities. Services of computer and accessories have become necessary for updating and processing information. Therefore, each block office of the department of agriculture, horticulture, animal husbandry, forestry and fishery may be provided computer and accessories and the estimated fund required for the purpose will be Rs. 5 lac per block

Table 6.10 Proposed Expenditure on Misc. Activities (Rs. in lacs)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Kisan Mela	1.5	1.5	1.5	1.5	1.5	7.5
Clinical camp, one in each block/year @ 0.5 lac/camp	3.0	3.0	3.0	3.0	3.0	15.0
Exposure visit 5/year @ Rs. 1 lac/visit	5.0	5.0	5.0	5.0	5.0	25.0
5 Purskar/year @ 0.25 lac	1.25	1.25	1.25	1.25	1.25	6.25
Block level training hall	20.0	20.0	20.0	20.0	20.0	100.0
Office automation	5.0	5.0	5.0	5.0	5.0	25.0
Disease diagnostic kits	0.5	0.5	0.5	0.5	0.5	2.5
Grand Total	**36.25**	**36.25**	**36.25**	**36.25**	**36.25**	**181.25**

6.4.8 Monitoring, Evaluation and Consolidated budget proposal

Monitoring and evaluation is the key to success of any developmental programme. Monitoring of the programme suggests the ways and means to add strong points and delete the undesired. Continuous monitoring and evaluation is also required for further extension of the project to achieve the desired goals. Therefore, it is suggested that year wise monitoring of progress may be made and evaluation of the goal achieved is done. Lot of expenditure will be incurred on monitoring and evaluation of the project on POL, TA and other office expenditure for submitting the desired reports to the concerned quarters. Therefore, an outlay of Rs. 11.0 lac is required under this need as per the details given below:

Table 6.11 Proposed Expenditure on monitoring and evaluation (Rs in lacs)

Description	2007-08	2008-09	2009-10	2010-11	2011-2012	Total
Expenditure on TA, DA, POL and hiring of vehicles and office expenses	**2.0**	**2.0**	**2.0**	**2.0**	**3.0**	**11.0**

Monitoring and evaluation of the project can be carried out by the Krishi Vigyan Kendra or it can be done through out sourcing.

Table 6.12 Consolidated Sector wise Budgetary Plan of District Kaithal (Haryana) Rs. In Lacs.

Sector	Activity	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Agriculture	Campaign	5	5	5	5	5	25
	Capacity Building	6.8	6.8	6.8	7.8	8.8	37
	Demonstration	38	34.25	34.75	34.75	35.75	177.5
	Field School	5	5	5	5	5	25
	Machinery/Equipment	171.75	166.75	157.75	130.75	130.75	757.75
	Monitoring	1	1	1	1	1	5
	Seed Replacement	87.88	131.81	175.71	228.48	289.99	913.87
	Seed Treatment	263.5	263.5	263.5	263.5	263.5	1317.5
	Subsidy on Inputs	276.25	305	385	413.75	449.25	1829.25
	Total	**855.18**	**919.11**	**1034.5**	**1090**	**1189**	**5087.9**
Animal Husbandry	Capacity Building	3.32	4.06	4.54	5.04	5.04	22
	Demonstration	9.75	10.25	11.5	13.75	15	60.25
	Infrastructure	100	175	200	200	200	875
	Subsidy on Inputs	87.05	166.05	245.25	329.85	417.61	1245.81
	Total	**200.12**	**355.36**	**461.29**	**548.64**	**637.65**	**2203.06**
Horticulture, Vegetables, Agro Forestry, Fishery and Agro Based Vocations	Capacity Building	4.3	4.3	4.3	4.3	4.48	21.68
	Demonstration	5.5	5.5	6	6	6.5	29.5
	Infrastructure	44.5	47	51	57.5	61.5	261.5
	Total	**54.3**	**56.8**	**61.3**	**67.8**	**72.48**	**312.68**
Innovative Projects	Infrastructure	556	477	1119	591	412.5	3155.5
	Misc	36.25	36.25	36.25	36.25	36.25	181.25
	Monitoring & Evaluation	2	2	2	2	3	11
	Strengthening of KVK	0	0	137.5	0	0	137.5
	Total	**594.25**	**515.25**	**1294.75**	**629.25**	**451.75**	**3485.25**
Grand Total		**1703.85**	**1846.52**	**2851.85**	**2335.72**	**2350.92**	**11088.86**

6.4.9 Closing the gap, Suggestions and outcome of the project

a) Closing the gap for realizing the vision

1. Haryana's farmers have become important competitors in all sorts of agricultural produce, from cereals to milk, mushroom, honey, vegetables and even fisheries. It is well known for its basmati rice and Murrah buffalo. It is now transforming its economy by increased emphasis on service and manufacturing sectors. The success of Haryana's economic transformation can be measured by the falling share of agriculture in the gross domestic product which decreased to almost 22%. Industry and service sectors are indeed growing even faster than farming and absorbing its surplus labour. Agriculture is likely to produce fewer jobs now compared with over two-third only ten years ago. Even so, over 60% of the lives in the villages, so a successful rural economy will remain the key to maintaining its impressive progress. Knowledge and skills of our farmers and extension agencies help us to understand our farming system better. It is also a source of creative, innovative and economic strength especially in situations that currently exist in rural Haryana where its young population does not wish to adopt farming as a profession. The way urbanization is happening in Haryana also calls creation of culture that helps farmers to adopt subsidiary occupations. The proportion of farmers directly working on farms is likely to decrease steadily. Diversity with in the rice wheat cropping systems and across sectors in the form of integrated farming systems is one of the important ingredients of success. We are convinced that the different sources of income including crops, dairying, mushroom cultivation and honey bee production etc. can help farmers to get daily income. Balancing crop culture and subsidiary occupations is the focal aspect of diversification in Kaithal district.
2. We systematically need to focus our activities through out the value chain on the challenges of sustainable agriculture development starting from production to processing and from crop based enterprises to all other enterprises that helps farmers to raise their income and remain engaged at the same time. Goal is to increase productivity 4% per year, reduce water consumption by 10% in each cropping system, energy consumption by 10%. The reduction in energy consumption up to

50% needs to be targeted through reduced fuel consumption at crop establishment. Saving in energy consumption is expected to reduce associated carbon dioxide emission. The price of already subsidized diesel is rising further. Technologies like zero-tillage for conservation agriculture are available that can reduce the energy consumption and increase profits. In future, especially in rice-wheat cropping system the size of operational land holdings will demand the use of these technologies to increase resource use efficiency.

3. Demand for labour from states like Bihar which is the biggest source of migrant labour is increasing. The most obvious source of GDP growth is now coming from service and industry sectors. It has started engaging more labour. The availability of migrant labour for rice transplanting, harvesting and other agriculture operations including grading and processing of grains, vegetables and fruits will decrease. This will demand still more mechanization for sowing, harvesting, storage and processing. This would require large scale availability of machinery for land leveling (Laser land leveler) and tillage (especially zero tillage machines, bed planter, and paddy transplanter). 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 would need more machinery for saving labour and increasing the efficiency of inputs. Yield level of top 10% farmers may be assumed as attainable yield in any coming season. The exercise of monitoring yield levels in Kaithal district must be done for planning for the next season.
4. As the computing has become easy and affordable, extension services or technologies can be out sourced from any where as it happened in case of hybrid paddy and vegetables, more and more linkages and synergies need to be developed by out sourcing technologies. More and more infrastructure, facilities need to be put use with DDA, DHO, animal husbandry officers, fishery officers which than can be linked to KVK for a perfect integration of agriculture. Data centers need to be created to increase the computing capacity of extension workers and the data center can be located at KVK.

b) Suggestions

- All the vocational trainings and in-service trainings will be conducted by the KVK in the office of KVK by the scientist of KVK.
- The farmers training will be conducted by the respective departments at the block level.
- Eighty per cent demonstrations on different technologies will be conducted by the respective department and 20 % by KVK on all technologies
- The Kisan melas and clinical camps will be organized in collaboration with the line departments. Exposure visits will be organized by the line departments. Farmer puraskar will be given to the farmers on the recommendation of a committee of all line departments chaired by Deputy Commissioner. Since the KVK is representing all the line departments. Sr. Coordinator, KVK, Kaithal will be the member Secretary.
- Subsidy on equipments will be given directly to the farmers by the concerned department.
- The budget allotted to different departments should be utilized in a way that maximum benefits percolate to the farmers.

c) Three most priority areas are

a) Seed grading
b) Laser leveling
c) Fodder production between two crops and its preservation.

d) Outcome

The project will ensure sustainable development of agriculture and allied sectors in the district with proper utilization of all available farm resources with an environment friendly, holistic approach through integration of all the farm enterprises. The expected incremental gain in production and productivity of wheat, paddy and milk is expected 20%, horticulture, agro forestry and fisheries, 10-15 %. By the end of XI th five year plan. The problems of depleting underground water level, decreasing organic carbon level in the soil, accumulation of salts in the soil, imbalanced use of fertilizers and pesticides, reproductive problems and imbalanced feeding in cattle, mortality in calves, shortage of fodder, spoilage

of grains, vegetable and fruits and related market issues will be suitably addressed. The overall outcome of the plan will be significant improvement in the standard of living of farming community through enhanced farm income.