DRAFT PLAN

COMPREHENSIVE DISTRICT AGRICULTURE PLAN (C-DAP)

DISTRICT KARNAL
HARYANA

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

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DISTRICT KARNAL
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 the contrary, it witnessed a sharp deceleration in growth after 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 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 but 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 (NADP)/ Rastriya Krishi Vikas Yojana (RKVY) be launched with following main objectives.

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

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

As per the NDC resolution, Government of India introduced a new Additional Central Assistance Scheme to incentivize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry, fisheries etc. more fully. 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 XI Plan provides an opportunity to restructure policies to achieve a new vision based on faster, broad-based and inclusive growth. It is designed to reduce poverty and focus on bridging the various divides that continue to fragment our society. It aims at putting the economy on a sustainable growth trajectory with a GDP growth rate of approximately 10 percent by the end of plan period and target a robust agricultural growth at 4 percent per year. 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. It could not be materialized in true sense as only sporadic efforts and isolated cases of such planning were practically attempted. For success of local area or District level plans the underlying constraints needed to be identified. The required infrastructural investment, extension and research system revamping and market reach with the system's conduct and performance have to be synchronized through a holistic policy approach. The Agriculture in the district (as in the state too) can't possibly achieve same growth as in the past without recognizing the role of farmer's participatory approach for formulating strategies and finding solutions to new and emerging problems. Similarly due to globalization, trade in agriculture will expand and the district like Karnal can hugely benefit when the trade expands and our farmers start making best use of such changes by becoming as secondary producer rather than a primary producer of agriculture commodities. Reforms based on globalization (coupled with other factors) can now pave the way for commercial dairies and subsidiary occupations. The demographic changes due to fast urbanization and slow down in the population will bring greater prosperity in the middle class families. This will lead to some diversification in food habits leading to more animals and requirement of more cereals for animals. Food demand will go up not purely because of population rise but also because of more requirement of cereals as animal feed. Although in district like Karnal land used for agriculture will decease but still there is no reason to believe that agriculture productivity can't be raised. New science like GM crops, new approaches like farming system and new technologies like resource conserving will always help us to face new challenges in agriculture development.

Keeping this in view the C-DAP of district Karnal is prepared on the basis of primary and secondary data of the district for achieving sustainable agricultural growth with improved farmers' income through participatory process involving stakeholders and various organizations. By establishing strong linkages with required institutional support services the

plan will ensure optimum utilization of scarce natural, physical and financial resources.

Methodology

The C-DAP was prepared as per the process and methodology suggested by the Planning Commission, Government of India. The approach followed in preparation of the document was necessarily of Participatory 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.

The responsibility of preparing C-DAP of Karnal district was given to Krishi Vigyan Kendra, Karnal. The KVK team, after receiving proper training from TSI held wide consultations with District/ Block/ Village Agriculture Planning Units of the District. The TSI conducted two days orientation workshop-cum-training programme on 30.3.08 and 31.8.08 at CCSHAU, Hisar. The following specific aspects were covered in the programme.

- Issues and challenges in Agriculture sector
- Planning concepts and district Planning
- Basic features and planning process of RKVY
- Vision, methodology and process of preparing C-DAP
- Participatory Rural Appraisal
- Farming system approach
- Farming situation based extension
- Integrated Nutrient Management (INM), Integrated Pest Management (IPM), Natural Resource Management (NRM), Human Resource Development (HRD), Marketing and other important aspects.

Data collection and consultation:

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

Primary Data:

For in-depth farm/ village level study covering important aspects of agriculture and

allied fields, the district was divided into two distinctively Agro-eco-situations (AESs) as was done for SREP preparation under ATMA Scheme. From each AES one representative village (Kamalpur from AES-I and Kachawa from AES-II) was selected for collecting required information on modified semi-structured schedules through PRA.

Con-current review and verification of data:

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

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

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

Work plan and activities before the preparation of plan-

- Meeting of resource team of KVK with Deputy Commissioner, Additional Deputy Commissioner, line departments heads and officers and PRI's representative
- Discussed the farmer participation evaluation, time frame activities and responsibilities of all involved in the plan.
- Discussed the plan and expected output from five year plan in progress. The stake holders were made clear about subsidies for seed, fertilizer and other inputs. Gaps that exists in achieving the targeted productivity growth across farmers participatory process was followed in developing and recommending Comprehensive District Agriculture Plan (CDAP).

Following discussion were held-

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

Before meeting

- The PRA schedule based on the past experiences and data required regarding the farmers' need was prepared.
- Important points for discussion containing proposed change in the practices (of management, varieties, site specific nutrient management, IPM, seed, soil health and allied activities) were included and the proforma for Gram Panchayat given in C-DAP manual was modified accordingly. The schedule was made simple and easy to understand.

During meeting-

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

The possible changes in the management practices targeted were-

- ❖ Field preparation-zero tillage, bed planter, laser leveler
- ❖ Crop establishment, plant population, seed rate etc.
- ❖ Nutrient management-N and P rate, time, source, use of organic manure, basal and top dressing of fertilizer, application of K and micronutrients.
- ❖ Important pests based on economic importance including insects, diseases, nematodes and weeds.
- ❖ Measures which improve the efficiency of inputs including water (by improving water productivity), energy (by reducing energy intensity like less fuel and less electricity) and labour (mechanization).It has to be a campaigning tool and also a guide to policy.
- ❖ To improve both productivity and profits and to generate rural employment, another option might be to reset the system approaches from a commodity approach to cropping system approach (Rice-wheat cropping system rather than rice or wheat as a separate commodity) and from cropping system approach to a farming system approach (Wheat-Buffalo).
- ❖ Farmers and scientist came to general agreement on what to do to fill the gap on crops and allied activities.

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

(i) Profitability of cropping system and the rate of return.

(ii) Market infrastructure and marketing opportunities, custom hiring services and some of the policy issues related to subsidy.

(iii) Farmers' inability to invest in the productivity enhancement as majority of farmers belongs to resource poor category.

(iv) Work plan and activities for landless and resource poor farmers.

(v) Collected and discussed the feed back regarding On-Farm and Off- Farm activities.

(vi) Crop insurance and cyclical assistance

(vii) Action plan

Chapter-II

General Description of the District

2.1 Introduction

Karnal is one of the old and important districts of Haryana State. It is centrally located on the National Highway i.e. Grand Trunk Road No.1. Karnal district lies on western bank of river Yamuna which once flood in the vicinity of Karnal city, but now flows about 11 KM to the east farming eastern boundary of the districts. It is in between Delhi and Chandigarh, almost 125 KM away from each city. Karnal is located at 29.43^{o} N latitude and 76.58 E longitude and is about 250 meters above mean sea level. Karnal has great historical importance since Mahabharta and is named after Daanveer King Karna. Karnal district is surrounded by Kurukshetra district on its North and north west, Jind distt. On its west, Karnal distt. On its south and Uttar Pradesh state on east. District has been divided into two sub-division namely Karnal and Assandh and constitute six blocks viz. Karnal, Gharonda, Indri, Nilokheri, Assandhand Nissing. It has 435 villages with total geographical area of 2,46,026 ha.

Topography

The topography of Karnal district is almost plain and well irrigated through tube-wells and canals also. Irrigated area is about 205627 ha., while the gross irrigated area is 388917 ha. Percentage of the gross irrigated area to total cropped is 98.72% while the cropped area is 387111 ha.

Climate

The climate of the district is dry and hot in summer and cold in winter. June is the hottest month while January and February are the coldest month of the year. Its maximum and minimum temperatures vary from 43^{o} to 21.5^{o} C in June and from 22^{o} to 4^{o} C in January.

Soil type

The land of Karnal district is plain and productive. Soils are medium to heavy (sandy loam to clay loam) in texture and varies from 7.4 to 8.9. The soils are alluvial and are ideal for crops like rice, wheat, sugarcane, vegetables etc.

Animal Wealth

The total animal population is as under:

Cattle		Buffaloes		Sheep	Goat	Poultry (Layer)
Cross bred	Indigenous	Cross bred	Indigenous			
92450	33345	300180	146598	22290	8914	1257500

Forests

Forests in Haryana are broadly categorised as Block forests and strip forests are those along the roads, canals railway lines and drains. The forests of the Distt. Karnal are strip forest types. The forest area has been classified as state forests and private forests. The state forests have been further classified into Reserved Forests, Protected Forests and unclassified forests while the private forests have been classified as forests closed under Indian Forests act and forest closed under Land Preservation Act.

General description of the district

Table: General Information

Block	General			Population (As per 2001 Census)			
	No. of villages	Area (ha)	No. of gram Panchayats	Male	Female	Total	S.C./ST
Karnal	84	40277	73	97236	63377	180613	33823
Nilokheri	80	40423	73	79491	68851	148342	37249
Indri	108	34505	79	69346	60507	129053	28024
Gharonda	65	36767	53	87747	75642	163309	38463
Nissing	49	40919	48	80572	69517	650089	39390
Assandh	48	49825	54	87498	76557	164055	37077
Total	434	244034	380	501890	434451	936341	214826

Table : Land holdings (Agriculture census, 2001)

Block	Marginal farmers		Small farmers		Semi-med. Farmers		Medium farmers		Large farmers		Total	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Karnal	10445	11460	2230	4460	300	1200	1000	7600	580	6800	14555	32520
Nilo-kheri	10085	11510	2180	4360	290	1160	1300	10850	585	7020	14440	34900
Indri	9504	10920	1860	3720	255	1020	1000	8020	450	5875	13069	29555
Ghar-onda	10085	11890	2920	5740	320	1480	1500	10000	610	7564	14035	36674
Niss-ing	10445	11910	2210	4420	310	1240	1000	8000	565	6780	14523	34350
Assan-dh	10665	11940	2390	4780	325	1300	1100	8800	560	6720	14040	41540

Table : Soil Fertility Indices

Block	No. soil samples analy-sed	PH			EC(ds/m)			Organic carbon (%)		
		Acidic	Neutral	Alkaline	Low	Med.	High	Low	Med.	High
Karnal	2768	-	2694	74	2709	59	0	2508	178	82
Nilokheri	2527	-	1487	156	2432	95	0	2408	119	0
Indri	1801	-	1711	90	1702	99	0	1785	16	0
Gharonda	2223	-	2127	96	2180	43	0	2166	57	0
Nissing	1788	-	1487	301	1749	39	0	1761	27	0
Assandh	2429	-	2085	344	2188	241	0	2381	38	0
Total	13536	-	12475	1061	12960	576	0	13009	433	82

Table : Micronutrient status

Block	No. of soil samples analysed	Iron (Fe)		Manganese (Mn)		Zinc (Zn)	
		Sufficient	Deficient	Sufficient	Deficient	Sufficient	Deficient
Karnal	892	841	51	854	38	837	55
Nilokheri	629	570	52	617	12	616	13
Indri	548	466	82	529	19	509	69
Gharonda	993	895	98	938	55	895	98
Nissing	716	667	44	676	40	668	48
Assandh	872	840	33	851	21	806	66
Total		4285	365	4465	185	4331	319

Vision

The Rice-Wheat Cropping System (RWCS) is the mainstay of agriculture in Karnal district. A significant increase in the productivity of these crops immediately after the release of modern varieties brought about a paradigm shift in the agronomy of these crops. The advent of green revolution also brought about a change: better procurement policies, creation of infrastructure like marketing, electricity, digging of more tube-wells, use of more fertilizers especially after 1970s, use of more pesticides including herbicides after 1980s and further intensification of RWCS.The shock of herbicide resistance from 1993 to1998 left a deep mark in Karnal and other districts with similar cropping system: farmers embraced

diversification and adopted sunflower, advanced the wheat sowings under all situations, accepted the concept of conservation agriculture by adopting zero tillage. The inspiration for such a paradigm shift was ahead of time because the crisis of herbicide resistance led to new opportunities.

After 40 years of green revolution, another shock of water crisis is under way. There has been a consistent but conspicuous decline in the water table during last 40 years. Subsidizing electricity also led to ignoring the consequence of hopelessly high energy use for extracting same amount of water from deeper depths. For many years we kept shrugging it off but now the time has come to relook at the whole cropping system for saving water and electricity. While drafting this plan, schemes have been included for starting special campaigns. Farmers can be persuaded to come to the rescue only if new technologies are risk free and provide adequate profits in any current year. Introduction of summer moong to displace summer rice, use of green manuring and lots of other resource conserving technologies will help farmers and policy makers cope with future water crisis, if any. Although this RWCS belt around Karnal may contain enough water in the deeper zones but extraction of water from deeper layers will be more expensive and time consuming. With still more use of external inputs and adding the cost of water extraction, the sustainability of this cropping will always be a cause of concern. Therefore, reducing the cost of cultivation and diversification will remain a priority area. Most farmers are sheltered from high input costs by subsidies but such subsidies now may have to be tagged with savings in natural resources. More a farmers saves without sacrificing yield more could be amount of subsidy.

The nutrient status in the soil has started to change with soils being low in phosphorus have increased significantly. Similarly the soil with potash category have been scale down significantly. The argument regarding imbalanced use of fertilizer has been brought forward, but farmers (based on the survey conducted in 2006 and 2007) in this region are using slightly more than recommended dose of nitrogen and full dose of phosphorus. Although, there does not seem to be a significant deviation between N and P ratio, but potash and micro nutrients may have to be rebalanced. Therefore, focus on ideal ratio of NPK, use of bio-fertilizers, use of pulses as intercrops, green manuring, use of farm yard manure and surface residue retention have to be brought in the form of special campaigns. Other issues include the use of micro-nutrient mixtures and extended use of gypsum. The decline in soil productivity with nutrients extraction is not always matched by nutrient input. The recommendation on fertilizer, therefore, may have to be revised upward to reach the target of 4% growth in productivity per year of rice and wheat in the XI plan. Similarly the increased incidence of insect diseases and weeds has to be monitored and managed.

Right now there is no risk free substitute of kharif rice or even wheat. But we need to accelerate our plans to diversify within RWCS through permutation and combination of resource saving varieties.. However, search of farmers for more and more profits can help catalyzing diversification in favour an integrated farming system leading to more milch animals per hectare, mushroom cultivation vegetable farming, intercropping and multiple land use systems.

Notables are instances of integration of vegetable and mushroom cultivation and up to some extent poultry and dairy farming where farmers have achieved commendable success, otherwise majority of the farmer are experiencing low productivity and profitability because

of poor knowledge, inefficient integration without farming system technologies which include modern farm management skills that enable farmers to improve the efficiency, increase cropping intensity and to integrated and diversify into more high value commodities/ enterprises in conformity with market trends. The allied enterprises are important part of the farming systems. Both price and income elasticity of demand for most of these enterprise's products are high. There is huge unfulfilled demand far these products. There exists high potential for increasing the yield rates of these enterprises as the gap between present productivity (in the district) and the achievable yield and potential yield is quite large.

VISION STATEMENT

To achieve the productivity growth targets, conserve the natural resources and integrate the farming systems to enhance the profitability of the farmers.

Priorities

- Sustainability of rice-wheat cropping system through
- Varietals diversity
- RCTs (Zero tillage, bed planting, laser leveling, green manuring, deficit irrigation, alternate wetting and drying, INM, IWM, IPM and summer moong)
- Management of problematic soils
- Multiple land use system through autumn planted sugarcane based intercropping systems
- Seed planning and seed production
- Livestock management, fodder production
- Vegetable production, fruit crops
- Fisheries
- Capacity building and infrastructural support

Chapter - III

SWOT ANALYSIS

Major strengths of the farming system

i) Good quality underground water for irrigation.

ii) Suitable agro climatic conditions for food grain crops, sugarcane, sunflower, fruits & vegetables.

iii) Soil are alluvial and best suited for crop productivity.

iv) District is strategically located nearer to National Capital New Delhi & State Capital Chandigarh.

v) Centre of Agricultural institutions such as I.A.R.I., C.S.S.R.I., N.D.R.I, N.B.A.G.R, S.B.I., D.W.R, CCS HAU Reg. Res. Station, etc.

vi) Well connected by road and rail, villages have metallic roads.

vii) Dairy is integral enterprise of farming system.

viii) MSP for rice and wheat.

ix) Well developed grain and vegetable markets.

x) Availability of inputs like seeds, fertilizers & pesticides in village cooperative or nearby markets.

xi) Crop loans are available - coop. & nationalized banks.

xii) Heavy investment on farm machinery.

xiii) A good network of extension services.

xiv) Assured input availability network.

xv) Farmers are innovative.

xvi) Milk coop. Societies at village level.

xvii) Good communication facilities in villages.

xviii) Fodder is available throughout the year due to assured irrigation facilities.

Weaknesses of the farming system

i) Due to over exploitation of water table in rice-wheat system, the district has gone to dark zone.

ii) There is constant erosion of soil fertility due to rice-wheat cropping system decreasing organic carbon.

iii) Small land holding.

iv) In-discrimination application of water in paddy due to flat rates of electricity.

v) Increase in incidence of pests and diseases.

vi) Poor management of cow dung & crop residues.

vii) Unavailability of labour during peak period of farm operation.

viii) Lack of pulse & oilseeds in present crops rotation due to non procurement of govt. agencies.

ix) Govt. policies inclined towards food grain crops.

x) Non-adoption of IPM, INM, over dependence on pesticides.

xi) Less area under fruits crops due to long gestation period and small land holding.

xii) Poor breeding, feeding and management of livestock.

xiii) Technological gap.

xiv) Soil are becoming deficient in micro nutrients.

xv) Lack of water harvesting and management practices.

xvi) Lack of infrastructure facilities to avoid post harvest losses in fruits, vegetables and flowers.

xvii) Rural unemployment due to lack of subsidiary enterprises.

xviii) Diversion of cultivated lands towards urbanization.

Major Opportunities:

i) Suitable agro climatic conditions congenial for horticulture crops.

ii) Agriculture wastes available in abundance which can be recycled to improve soil health and mushroom cultivation.

iii) Network of cooperatives.

iv) Good marketing infrastructure.

v) Technologies is available for pulses and oilseed crops.

vi) Good information and commutation system.

vii) Rail and road connectivity is good.

viii) Demand for milk and milk products, vegetables in Delhi.

ix) Cooperative Sugar mill at Karnal & Bhadson.

Threat to the Farming System:

i) Maximum are under rice-wheat cropping system.

ii) Very less area under horticulture, pulses and oilseed crops.

iii) Indiscriminate use and over exploitation of underground water for irrigation.

iv) Lack of recharging of underground water.

v) Continuous and exhaustive rice-wheat cropping system led to loss of soil fertility.

vi) High residues of pesticides due to indiscriminate use.

Chapter-IV

Development of Agriculture Sector

4.1 Introduction

Nearly 19% share in Gross Domestic Product (GDP) is held by agriculture and it employees almost 58% of the total work force. To meet the requirement of population in the year 2025, the country will require to produce 320 million tons of food grains from the current level of 213 million tons. The productivity gain in post green revolution era through adoption of high yielding varieties have seemed to be plateaued. A further intensification is therefore imperative through technological interventions and appropriate extension services to increase productivity and maintain in line with population growth. Major ecological and other problems withstanding , there is hardly any option available to the farmers of this region , but only to increase production and productivity of food grains and other agri-products. Agriculture is the core sector of Karnal district's economy and almost 80% of the geographical area is under plough.

4.2 Land use

The average net area sown in the district is about 210309 ha. with no scope for further expansion. The forest cover and land pasture are significantly less than what is optimally required. Good cultivable area near the city and towns is being put to non agriculture use in Karnal district, so there is no further scope for expansion of cultivable lands. The average size of holding is shrinking with increase in population and number of holdings. Average size of holding stands at 2.40 ha (as per 2001 census) which might have gone further down over the years. Vertical expansion of cultivation with multi-cropping and wide scale adoption of non-land enterprises are only viable option left to farmers. At the same time introduction of new crops i.e. summer moong and short duration vegetable crops, multi cropping, mixed cropping with emphasis on better resource and crop management are proposed herewith through varietal, INM, IPM, IWM and other demonstrations on comparatively greater scale.

4.3 Soil health

Shrinking size of land in the district is further aggravated by degradation in soil health.The neglect of composting imbalance and non-judicious application of nutrients and chemicals, intensive cultivation of paddy-wheat, sugarcane and vegetable crops over years have started taking its toll on soil health. The majority of the soil in district are low in organic carbon available nitrogen, phosphorous and zinc status of the soil. Surveys/studies reports by KVK and ICAR institutions indicate the increasingly declining status of potash , sulphur and iron which are affecting the production and productivity of the crops as well as animals in the district.

4.4 Soil and Water Resources management

A sizeable portion of land in Assandh block of Karnal district is affected by salinity and sodicity. As far as ground water resources is concerned good quality water is 60% and marginal water is 5% and rest being sodic, saline and saline sodic Nearly 98% of cultivable

area in Karnal district is under irrigation. Main sources of irrigation is through tube wells and little by canal. The area under tube well irrigation is increasing at much faster pace than the increase in area by canals over past years. However, there remains problem of irregular and insufficient water supply by canals and erratic power supply to the tube wells even at critical stages of crop growth.

The problem affecting the tube well irrigation in Khadar belt is of alarmingly depleting water table. The bore-wells are becoming disfunct and farmers are compelled to install submersible pumps which cost much more than bore-wells. Again in some regions, after a certain depth the ground water is not of good quality. The proper development of land and water resources are pre-condition for raising productivity to the desired level on sustainable basis. Due attention has been paid in preparing the district C-DAP towards these too many problems. Special projects on soil health maintenance and ground water recharge are proposed.

4.5 Major crops and varieties

Almost 80% of cultivable area in Karnal district is occupied by paddy-wheat crop rotation, remaining 20% by sugarcane, oil seed crops, forage crops and vegetables. The major area shift towards paddy-wheat reflect their productivity and profitability and the ease with which these crops can be cultivated. Some other crops which can be equally profitable and can be easily adjusted in existing cropping pattern are being ignored by the farmers on account of poor knowledge, risk uncertainty and poor yields. These existing crops and varieties are mostly been cultivated without proper care for suitable crop-rotations and other organic and non-cash practices which help in resource conservation, control of disease insect-pest and weeds, lowering cost of costing and stabilizing yields. Farmers are also sowing some non-descript varieties and varieties not recommended/suited to this region which is certainly a factor for lower productivity. All these issued are proposed to be tackled in the plan through conducting trainings, demonstrations, and other extension activities mentioned under recommended interventions for the district.

Crops	Varieties
Wheat	PBW-343, WH-711, PBW-502, WH-542, Raj-3765, C-306
Paddy	Pusa-1121, Sarbati, Pusa-1, HBC-19, CSR-30, HKR-47, HKR-127, PR-113 , PR-114, Pusa-44, RH-10
Sugarcane	COH-119, CO- 89003., COH-110, COS-767 and CO-96268
Jowar	Local
Raya	R.H-30, T-59, (RH-8812)
Maize	HHM-1, HHM-4, HHM-5
Berseem	Muskawi HFB-600, Haryana Berseem-1

4.6 Input management

Input management holds the key to production and productivity of the crops. In the light of rising costs of inputs and reducing farm profitability, emphasis will have to be an efficient and judicious use of improved seeds, INM, IWM and IPM to accelerate agriculture growth. At present, there exists a big gap between the productivity and potential of the crops in the district. One of the most critical input is availability of quality seeds. The government agencies assure the supply of different quality seeds during each season but the demand for quality seed always remain. The private sector should be welcomed in this area to ensure availability of quality seed and increased seed replacement rate. The most crucial crop of the district, paddy and wheat are having 13-15% of seed replacement while its recommendations are to be at least 33%. The availability of seed and its enhanced replacement can be ensured by involving farmers in seed production process with active help from public and private sector.

Fertilizer is an other crucial inputs, there is an affective distribution system in the district . The farmers are well aware about the fertilizer use in various crops. They are mainly concentrating on application of N, P and Zinc fertilizers where as the deficiency of Potash and Micronutrient is affecting the yield and productivity of crops in most parts of the district. There are two soil testing lab where soil samples are tested for primary nutrients only, there should be the facility of testing micronutrient also. Farmers need awareness regarding balanced fertilizer use, potash use and micronutrients to enhance productivity and quality of the product without depleting soil health.

The crop disease, pests and weeds are other major problems in raising optimum yield far all major crops in the district. The scrutinity of insect pest, disease and weed control measures being adopted by the farmers reveal gross negligence on part of farmers. The improper management of these control measures often results into increased cost of cultivation without corresponding increase in yield and quality. The farmers are depending more and more on chemical control with high doses for more concentrated form of chemicals. Urgent steps are required to be taken for promoting integrated measures for control of insect/pest, disease and weeds control which are in tune with sustainability and profitability without enhancing cost. To encourage farmers on quality seed production and ensured availability to them, special projects are being submitted under this plan. Other extension activities like trainings are also proposed to educate farmers and their capacity building in producing quality seeds.

4.7 Farm Mechanisation

The management of agriculture production system essentially involves effective management & timely completion of production operations. The use of mechanical power is thus becoming indispensable for making an optimal use of other resources and timely completion of various farm operations. Earlier the farm mechanisation has been essentially a tractorisation process in Karnal district. However with the introduction of various other farm equipment the number of threshers, rotavators, zero-till machines, straw ripper, harvester etc. which are on the increase in district. Inspite of the increased number of farm machinery and implements, there are greater scope of sustainable productivity enhancement of field crops through more extensive use of the existing as well as other machinery like laser leveller, bed

planter. To meet the future demand of agriculture machinery (especially the costly one) these would be substantially cheap and affordable for even small farmers either by purchase or by custom hiring.

A special emphasis is laid on the laser land leveler keeping in view its importance in increasing crop productivity and efficiency of other inputs including water saving.

4.8 **Constraints analysis and Recommended Interventions for Development of Agriculture Sector**

The yield gap analysis of major crops and enterprises was completed by KVK resource team by identifying different farming situations under which a crop or an enterprise is being grown under each AES in the district. The study of the existing practices was followed by identifying critical gaps by comparing the existing practices being adopted by the farmers with recommended practices. The factors and / or constraints leading to the gap were arrived at before finalizing the strategies along with approaches and methodology to overcome the constraints and bridging the gaps. Thereafter the performance indicators and sustainability out put are then listed (or indicated) to ensure time bound action and impact assessment. After words the sustainability and gap analysis issued were sorted out in a log frame summary indicating proposed more of action, collaborations/targets along with the cost involved in addressing the issues critical for increasing productivity with sustainability.

The recommended interventions with detailed plan of action with costs proposed under C-DAP.

The present institutional mechanism in Government sector is centralised by nature with Top-down approach. The approach focuses on individual commodities/enterprises rather than on a holistic/integrated approach. The involvement of stakeholders is rather restricted in this ad-hoc mechanism where farmers are considered as receivers of benefits rather than a responsible persons who can influence the productions process. The public extension system is supply driven rather than demand driven.

The institutional mechanism and conceptual frame work of Government sector extension is being gradually transformed under the aegis of Agricultural Technology Management Agency (ATMA) in the district. The impact of this transformation is yet to be seen in the actual working of different Government departments and other involved in it.

4.9 Gap analysis

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

S. No.	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, availability of irrigation, excess untimely rains	Zero tillage, short duration varieties of rice, reduced duration of Basmati rice, direct seeding of Basmati, 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 i.e. Happy seeders.	80% area up to 10th Nov., area to be covered include whole coarse rice and 50% Basmati rice	Zero tillage will help a) Improving soil health including soil biology b) Improved environment c) Less water use efficiency d) More productivity e) Less problem of *P. minor* & decreased use of herbicides f) Reduced cost of cultivation g) Facilitates early sowing under high soil moisture conditions
2.	**Seed treatment**	Termites, fungal diseases like loose	Seed treatment with insecticides,	Awareness of farmers regarding importance of	Whole district	Productivity growth on sustainable basis

		smut, flag smut and Karnal bunt	fungicides and bio-fertilizers. Seed priming if sowing is delayed	seed treatment by the University and the State Department of Agriculture		
3.	**Nutrient mining & increased incidence of multiple nutrient deficiencies**	In RWCS, average N ranges from 160-180 kg/ha and average P use is 55 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	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 of Karnal district.	The residue retention will help improving soil productivity, improved water permeability, decreased losses of nutrients

			weed problems through more appropriate nutrient management.			
4.	**Varietals improve-ment**	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.	**Manage-ment 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 adopt agronomic practices, especially the timing and amount of fertilizer and irrigation in order to increase ecological	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.	Karnal district	Long-term productivity of wheat will sustain by proper water management in the system as a whole

			sustainability, profitability and yield.			
6.	**High incidence of Weeds**	*a) Phalaris minor* seriously affects wheat yields in rice-wheat cropping system. b) Complex wheat flora seriously affects wheat yield in non-rice wheat cropping system. c) Phalaris resistance will become a major problem and needs immediate attention for ecological solution. We must delay or avoid resistance.	a) Improve the efficiency of existing herbicides. b) Introduce new herbicides. c) Capacity building for spraying techniques. d) Ecological approaches including zero-tillage and crop rotation. e) Monitoring of resistance build up. f) 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	Karnal 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**	Drudgery of	Introduction of paddy	Farmers' participatory	5% area to be	Improvement in soil

	density	transplanting operation, hired labour, non-availability of labour	transplanter under zero-tillage and/or under unpuddled situations, direct seeding in unpuddled situation, varieties that can compete with weeds under direct seeding.	approach for evolving crop establishment techniques, availability of paddy transplanter, custom hire services for raising nursery	grown paddy transplanter in next two years. Similarly 5% grown in direct seeded Basmati rice	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
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 till 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	Improvement in organic carbon content
5.	**Declining water table**	More area under summer rice, transplanting before the onset of monsoons, continuous flooding,	Avoid early transplanting, introduction of mechanical transplanter, irrigation at hair line	Both types of research involving cropping system at research farms and at farmers' fields	The whole Karnal district	Improvement in water table

		pan formation and puddling reduces percolation of water	crack formation or use of tensiometers for irrigation scheduling, avoid puddling			
6	**Poor adoption of Potashic (K) fertilizers application**	Less awareness regarding its contribution to yield	Awareness campaign regarding benefits of K use on yield in paddy be organized.	Demonstration and field days on application of K in paddy at farmers field be organized	10% grown area to be under K use every year	Improvement in yield and quality of produce
C	**Raya/Sarson**					
1.	**Non availability of frost resistant varieties**	Loss in yield due to frost in water	Survey and identification of frost resistant varieties	Popularisation of identified varieties and frost escaping management practices.	Assandh and Nissing blocks	Better utilization of resources.
2.	**Poor fertilizer manage-ment or no sulphur application**	No phosphatic & sulphur containing fertilizer application, no green manuring	Educating farmers on the importance of sulphur use and basal dose of fertilizers and its effects on yield enhancement.	Demonstration and field days.	20% growth in area every year.	Improvement in yield on sustainable basis.
3	**Poor disease and insect manage-ment**	Low awareness, increased incidence of painted bug	Making farmers aware	Trainings, demonstrations	10% growth in area every year	Higher yield.
D	**Sugarcane**					
1	**Late planting**	Planting after wheat harvesting	Emphasis on autumn and winter sowing of	Trainings, seminars, demonstrations, gosthis	20% growth in area every year.	Better returns with better utilization of

	after wheat harvesting		sugarcane maybe given			resources.
2	**Poor plant population and lack of mechanized planting**	Less quantity of seed used, faulty method of planting	Educating farmers on use of optimum seed rate and reduce drudgery of sowing operation.	Encourage the use of cane planter and optimum seed rate through training, demonstrations and gyan diwas.	10% growth in area every year	Optimum plant population to get targeted yields.
3	**Low adoption of INM practices**	Lack of awareness regarding use of K and Zn contribution in yield, poor organic manure use.	Emphasis the need of FYM, preparation of it in pits and use of K and Zn in getting higher yields of sugarcane	Farmers participatory approach .	10% growth in area under INM in sugarcane every year.	Improvement in water and nutrient holding capacity in the soil.
4	**Low adoption of IPM**	Termite, root borer, top borer, shoot borer, pyrilla attack is more	Seed treatment with insecticides, fungicides, bio agents and bio fertilizers	Awareness through demonstrations, campaigns, trainings, field days, gosthis.	10% growth in area under seed treatment in sugarcane every year	Improvement in yield on sustainable basis.
5	**Poor adoption of intercrop-pping**	Lack of mechanized crop establishment.	Use of bed planter for sugarcane based iner cropping of baby corn, maize, raya, gram and vegetables.	Farmers participatory approach.	20% growth in area under sugarcane intercropping every year	Multiple land use, getting more with less.
E	**Dairy**					
1	**Poor stock**	Un controlled breeding	Maintenance of herds of pure breed, supply of quality bulls, improvement in A.I.	Popularize benefit of A.I., provision quality bulls to the Panchyat with its responsibilities of	10% village panchyat should be provided	Improvement in breed and milk yield.

			facilities at village level.	maintenance.	quality bulls.	
2	**Imbalanced feeding**	Non availability of quality green fodder round the year. Lack of awareness regarding use of mineral mixture.	Educate farmers regarding benefit of mineral mixture	Ensure 6-8% of the total area under quality fodder	Entire district	Improvement of health in the animals and milk yield on sustainable basis.
3	**Repeat Anestrous problem**	Imbalance feeding, poor management practices, parasitic problem of heat detection.	Ensure balanced feeding, improved management practices and control of endo and ecto parasites. Kit for detection of heat in animals would be supplied to vety. hospitals. Deworming of adult animals.	Farmers would be advised/ educate to adopt the use of mineral mixture, extreme summer and winter management.	Entire district.	Improvement in animals health
4	**Calf mortality**	Endo & ecto parasites, poor winter management	Providing deworming facility at the doorstep with latest quality dewormer.	Mass awareness adoption campaign for deworming for control of endo parasites. Awareness campaign of feed management in extreme winter.	Whole of the district the calf mortality be reduced to 5% from 24% with in 5 years.	Increase in animals resource.
F	**Vegetable crops**					
1.	**Seed treatment**	Unawareness, unavailability of small packing of	Educate farmers regarding benefit of	Trainings, demonstrations, seminars, field days to	10% growth under seed treatment every	Increased yield on sustainable basis.

		fungicides	seed treatment	make aware farmers	year	
2	**Poor nursery management**	Unawarenss, poor germination	Line sowing drenching irrigation with showers, proper application of compost in nursery.	Mass campaign of nursery management through trainings and demonstrations, to popularise nursery raising in poly house	10% growth in area under good managed nursery every year	Quality seedlings, increased income and saving in resources.
3	**Lack of adoption in IPM**	Lack of awareness, excessive and indiscriminate use of chemical	Variation in dose and low frequency of application basis on economic threshold use of less persistant insecticides, crop rotation, synergestic, use of insect pheramones and hormones. Protection and use of natural enemies. Re-introduction of susceptible pests.	Farmers participatory approach, field schools, supply of pheramones, hormones to farmers.	20% growth in area under IPM every year	Improved quality and yield.
4	**Imbalance use of fertilizers**	Excessive use of nitrogenous fertilizers, less use of organic manures and micronutrients	Educate farmers on balanced use of fertilizer, importance of K and other micronutrients and organic manure on quality of vegetables.	Trainings, demonstrations, farmers field school and awareness campaigns.	15% growth in area under balanced use of fertilizers every year	Improved quality and quantity of the produce.
G	**Horticulture**					
1.	**Fruit drop**	Imbalanced use of fertilizers, untimely	Educate farmers on proper management	Trainings, demonstrations and farmers field school	15% growth in area to reduce	Increase yield and

		irrigation , poor management, lack of pollinators	of fruit drops, balanced and timely application of fertilizers, organic manure and irrigation.	through farmers participatory approach.	fruit drop every year.	profitability
2	**Increased incidence of insect – pest and diseases**	Poor management , lack of awareness, improper training and pruning, contract farming.	To aware farmers about preventing measures and control measures of insect-pest , disease infestation.	Training demonstration on proper management, training, pruning insect-pest disease management.	20% growth in area every year.	Improvement in quality and yield.
H	**Mushroom**					
1	**Poor quality of compost**	Long method of compost preparation	Preparation of composting on community base (subsidy)	Demonstration	5% growth in area every year.	Increase in productivity
2	**Low quality spawn**	No certification and testing facility	Quality spawn with proper certification from any agency.	Ensure distribution of good quality spawn.	20% growth in quality spawn every year	Increase in productivity
3	**IPM**	Lack of awareness, poor management	Disinfect of reused material used in shed, disinfect shed with fumigants, proper spray scheduling , avoid insect entry in the shed.	Demonstration, trainings, gyan diwas and exposure visits of the farmers	25% growth in shed with IPM every year .	Increase in productivity on sustainable basis.

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

ACTIVITY OUTPUT MATRIX				
Issues	**Programmes**	**Activities**	**Collaborators/Targets**	**Cost**
Seed production	1. Seed planning	1.Participatory selection of improved variety at farmers field. 2. Motivating farmers to produce the seed of best varieties. 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's.	DDA's for serial no. 1 2, and 5 KVK's for 3, 4 and 6 (Data for all activities will be presented in the officers workshop)	- 40 ha per year will be undertaken 40x5x5000=10 lac. - Monitoring 50,000 per crop. 50,000x4x5= 10 Lac - (Institutional fee)
	2. Best quality seed	Supply of tractor mounting seed graders for farmers using their own seeds/custom hire services.	DDA	Eight seed grading machines every year. 8 Lac per grader (50% subsidy) Budget - 8x4=32 Lac per year
	3. Seed treatment	1. Chemical treatment and non-chemical treatment. 2. Capacity building resource person/extension agencies/seed companies 3. Farmers	DDA/HSDC	Budget on seed treatment 300 lacs (60 lac x 5 years)

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.	Monitoring of farms where farmers have practiced zero-tillage for more than five years. (10 ha)	KVK	10x5x5000= 2.5 lacs
	❖ Assemble district level data and use them for bio-physical and socio - economic characterization using GIS.	KVKs & Scientist from main campus/research station.	DDA	Exposure visit = 2.5 lacs
	❖ Evaluate the concept for ecological intensi-fication of cereal systems. ❖ Improve agronomic efficiency of nutrients. ❖ Improve recovery efficiency of nitrogen ❖ Improve crop	DDAs & KVKs	Demonstration and long term trials will be laid out by KVKs at farmer's field. DDAs will ensure visit of farmers at demonstration sites.	Demonstration 10x5x5000=2.5 lacs Bed Planter 10x50000= 5.0 lacs 250 units with 50% subsidy on machines to be bought by the farmers. 250x25000= 62.5 lacs

	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. 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.	Dual purpose virtues of technology will be demonstrated in inter-cropping based system approach through University and State department.(10ha)	KVKs & DDAs	4x5x10000=2.0 lacs 100x5x3000= 15.0 lacs

	❖ 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 evalu-ated to arrest rate of gro-und water decline due to less use of ground water. Switching from rice-wheat cropping system to multiple land use system with			250 units x3.6 lac = 900/2 = 450 lacs (50% subsidy)

	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, 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 alleviate labour 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 utilize for the	KVKs 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 & DDAs	Demonstration 10 hax5x5000=2.5 lacs 10000x500x5 = 250 lacs

	residue on the surface.			
(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.	DDAs will lay out demonstrations on coarse rice in each block. DDAs will also record data on water saving. The yield penalty if any will be recorded while recording data on yield.	DDAs	5000x1500x5= 375 lacs/2 = 187.5 lacs (at 50% subsidy)
(v) Laser – Leveling	Laser land leveling for water saving, land saving and improve yields in rice, wheat and sugarcane. The improvement in the productivity of crops	DDAs will organize and monitor the distribution of laser leveler specially on custom hire services. Data on water saving and yield will be recorded. The data will be discussed in joint meeting of KVK and DDAs. The presentation of data finalized in the meeting will be made by DDAs. DDAs will also ensure the exposure visit of farmers on sites already demonstrated by KVKs. Two way subsidy 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.	DDAs & KVKs	10x5000x5= 2.5 lacs

(vi) Green manuring	Improvement in the soil health.	DDAs 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. DDAs and KVKs	DDA	50000x5= 2.5 lacs
(vii) Summer moong	Introduction of summer moong in the rice-wheat cropping system to discourage summer rice.	DDAs will ensure the acceleration of the technology and timely availability of treated seed. The suitability of variety to be ensured through KVKs.	DDAs and KVKs Ten per cent area will be covered.	10x5000x5= 2.5 lacs
	To ensure timely transplanting of rice and to sustain the productivity of summer moong, the sowing should be preferred up to 20th April.	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.	HSDC/DDAs/HAFED/HLRDC	1200 lacs. Cost has been calculated after considering the component of subsidy. 20 ha x5000x5 =5.0 lacs
3. **Water management (Depleting and rising water table)**	➢ Deficit irrigation increase water use efficiency.	Deficit irrigation for 15 days in July or August will be tested for coarse rice.	KVKs & DDAs will jointly lay out demonstrations in ten hectares	50 units of one acre each x 4 lacs = 200 lacs
	➢ Keeping 40-50 per cent area under basmati rice.	Economics of basmati rice in favour of farmers will be ensured through technological interventions and policy frame work.	Agricultural Economist at KVKs or group of KVKs 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.	10 ha x5 x 2.5 lacs = 125 lacs.

	➢ Testing of high yielding basmati varieties.	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.	DDAs will demonstrate and KVKs will collect yield data on successful demonstrations.	10ha x5x5000= 2.5 lacs.
	➢ Salinity/sodicity stress mitigation at farmers' fields	Green manuring and gypsum use. Tolerant varieties.	Subsidy on gypsum and its availability will be ensured. Tolerant varieties like CSR-30 will be evaluated with other candidate varieties.	200 lacs for labs. 2 lacs x 5 = 10 lacs for survey
	➢ Water logging and secondary salinization	Bio-drainage through tree plantation.	ASCO and DDAs will ensure the characterization of water logged areas and plantation of useful tree species.	100 lacs for creating one lab and out sourcing sample analysis from public/private sectors.
	➢ Water harvesting and recharging	Construction of water harvesting structures.	DDAs/concerned departments in consultation with KVKs	50000x5 = 2.5 lacs
	➢ Watershed development in rainfed areas	Sprinkler/drip irrigation after creating facility of community ponds.	DDAs/concerned departments in consultation with KVKs	10ha demonstrations will be laid out on Chickpea 10x5x5000= 2.5 lacs
	➢ Utilization of brackish water.	Alternate/conjunctive use of water.	DDAs/concerned departments in consultation with KVKs	Farm machinery 50 lacs Demonstration 10 ha x 5x 5000 = 2.5 lac
	➢ Ground water testing for nitrate and sulphate contamination.	Survey of marked sites for nitrate and sulphate contamination Characterisation of nitrate and	State level designated lab at Karnal may be strengthened . Another lab may be established at Rewari. (DDAs)	

		sulphate contaminated areas.		
4. 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.	Special provisions need to be made for creating regional level designated labs for quantifying micro-nutrients deficiencies. (DDAs)	10000 ha x 250x5 = 125 lacs
		Fertilizer recommendation will be based on the principles of SSNM. SSNM will include yield gap analysis, guidelines for regional protocol.		10hax 5000x5= 2.5 lacs
		Integrated soil and crop management for rehabilitation of pulse production in rice-wheat cropping system. Surface residue management for improving soil health.	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. (DDAs)	10 field's schools x 5 x50000 = 25 lacs.
	Bio-fertilizers	Improving the efficiency of nutrient utilization.	DDAs 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 abiotic stresses.	50 lacs
		DDAs will demonstrate the recommended technologies at	Happy seeders and other machineries for uniform	10 ha.x5x5000= 2.5 lacs

		farmers field	distribution of residue will be ensured by DDAs.	
5.IPM	Management of bakane disease (Foot rot disease) through nursery management.	DDAs will organize farmer's field schools.	Residue retention machinery, second generation machinery, precision and no-till farming for crops and cropping system.	50000x5 = 2.5 lacs
	Management of Sheath blight through clean cultivation.	KVKs will suggest tolerant varieties.		50 ha x 5 x 5000 =12.5 lacs
	Management of blast in basmati	Strengthening of bio-control lab.	DDAs	50000x5 100 lacs.
	Management of leaf folder, stem borer and white backed plant hopper (WBPH)	Monitoring of resistance development.	DDAs	
	Biological control of pests in sugarcane.	Plant clinic labs for KVKs	KVKs	10ha x5x5000= 2.5 lacs
	Agronomic management of borers in sugarcane.	Strengthening of quality of pesticide lab of state department.	DDAs	50000x5=2.5 lacs
	Quantification, characterization and management of resistance of key pests against insecticides in vegetables.	Demonstration of candidate varieties at farmer's field. Survey & demonstrations	DDAs/KVKs and research scientists	50 ha x 5x5000 = 12.5 lac
	Diversification of	Demonstrations	DDAs/KVKs and research	50000x5= 2.5 lacs

	wheat varieties against rusts. Management of wheat aphids		scientists KVKs	for surveys 10hax5x5000 = 2.5 lacs for demonstrations Spray booms 10000 x 250 = 25 lacs.
6. IWM	Spraying techniques for improving efficiency of herbicides. Monitoring of herbicide resistance.	Survey and demonstrations	DDAs	50000x5 = 2.5 lacs
7. Timely seeding of wheat	Delayed harvesting of Basmati rice, cotton, availability of irrigation, excess/untimely rains	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.	DDAs/KVKs	10,000 locations x100x5=50 lakh
	Zero tillage, short duration varieties of rice, reduced duration of Basmati rice, direct seeding of Basmati, regulation of canal irrigation water supply	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.	DHO and University	40 hax5x5000=10 lakh

8. Vegetable production	Non-availability of high quality/hybrid seeds specially from public sector	Public/private linkage and synergies either through direct testing of existing hybrid seeds of private sector or collaborating with private sector for development of hybrid seeds at the university farm	Regulations regarding disposal of industrial wastes	40 ha x 5000x 5=10 lakh (hybrid)
	Contamination of vegetables with pesticides/heavy metal	Injudious use of pesticides and the use of contaminated groundwater or sewage/canal.	Establishment of state designated pesticide residue lab or outsourcing the residue analysis from other private/pesticides labs.	40 ha x 5000x5= 10 lakh (mechanical transplanter)
		Random sampling of fresh vegetables for quantification of pesticide residues	DHO may collect random samples and outsource the residue analysis alternate arrangement	10 ha x 5000x 5= 2.5 lakh (direct seeded rice)
		Survey of current status of pesticide use on vegetables for recommended or un-recommended	DHO	5 paddy transplanter =10 lakh.
9**. Fruit crops**	Provision of nutritional gardens near/around tubewells.	DHO will ensure the distribution of five grafted plants to farmers for plantation on or around the tubewells. Only one species may be given for each location to facilitate watch and ward	DDA's, KVK's and regional research stations will monitor the level of yield penalty due to irrigation with brackish water in khrif season. Management of such problem through diversification , in favor of Barley or introduction of salt tolerant varieties.	40 ha x 5000x 5= 10 lakh

10. M**anage-ment 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	Rice-wheat, bajra-wheat, guar-wheat, pulses-wheat, cotton-wheat will be studied for salinity/alkalinity buildup from life saving irrigation given in the khrif season.	DDA's and KVK's will jointly demonstrate the virtues of new technologies under the leadership of KVK scientists.	50 % subsidy on bed planter 50x 25000= 12.5 lakh.
	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	The yield of Rabi crops will be recorded for farms where farmers have given variable number of irrigation with brackish water in kharif season.	Linkage and synergies with private sector will be developed for outsourcing hybrid seeds and/or developing MOU for seed production by securing parent lines.	10 ha x 5x 5000=2.5 lakh (Sulphur)
10. **Rice**	Introduction of hybrids for both	DDA's, KVK's and concerned scientists from research will	DDAs, Cane commissioner, sugar mills and KVKs.	10 ha x 5x 5000=2.5 lakh (Green manuring)

	coarse and basmati rice. Fertilizer management in hybrid to avoid lodging and incidence of pest and diseases Mechanical transplanting to avoid labor problem.	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.		
12. **Sugarcane**	Late planting after wheat harvesting, lack of mechanized planting, lack of varieties in early group Less use of potash	DDAs 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 sugarmill	DDAs will demonstrate the virtues of green manuring and sulphur nutrition while KVKs will demonstrate virtues of Orobanche and frost management and painted bug.	10 ha x 5x 5000=2.5 lakh (Orobanche)
13. **Raya/ Sarson**	Less use of sulphur, menace of Orobanche, low green manuring, attack of painted bug, frost management.	Demonstrations will be laid out on each of the issues given in column 2. Frost resistant variety will be targeted for the year 2011-12	DDAs will facilitate the demonstrations on new varieties, early planting, pod borer managemtn andKVK will be involved in p Management.	10 ha x 5x 5000=2.5 lakh(frost management) 10 ha x 5x 5000=2.5 lakh (Painted bug) 900 (cost of 10 bags) x 5000 ha x 5= 225 lakh (subsidy)
15. **Pulses**	Late maturing ahrhar and reduction in wheat yield, late planting of arhar , problem of helicoverpa , pod borer problem, less	New varieties with short maturity will be tested with the help of kvk. Inter cropping of other crops viz sorghum/maize or bajra under bed planting system.	Action DDA DDAs will ensure the availability of quality seeds of castor, sunflower hybrid..	10haX5000x5=2.5 lac (varieties) 10hax5000x5=2.5 lac (inter cropping)

	use of phosphatic fertilizers Chickpea Management of pod borer	Management of pod borer will be demonstrated. Management strategies will be demonstrated at farmer' field		10hax5000x5=2.5 lac Pest management
16. **Sun-flower**	Quality seed of sunflower hybrid,	Linkages and synergies with private sector will be developed for availability of hybrid seed of sunflower.		10hax5000x5=2.5 lac
15. **Farming system through dairy**	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	AHs , lead bank and KVKs 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.		10 ha x 5000 x 5 = 2.5 lacs

	Incentives for fodder crops in summer season.	Special demonstrations for maize/sorghum + cowpea fodder in rice-wheat system		
	Creation of facilities for drinking water.	Village ponds need desilting		
	Promotion of crossbred and buffalo in rice-wheat cropping system areas	In North-East areas, creation of dairies of crossbred cows and their management.		
16. Improving milk productivity	Promotion of murrah buffaloes.	In North-West part, buffalo conservation be promoted.		
	A.I. and natural service through community bulls (Private Public interface)	Private Public linkage and synergies be created. Retail outlets may also be associated with productivity improvement through A.I. and natural services.		
17. Disease management in diary animals	Reduction of calving period – by adopting mineral mixture feeding and balanced feeding, deworming, summer management, unestrus management, free hormone therapy for repeat breeder of resource poor.	DDAHs and KVKs will jointly demonstrate the usefulness of technologies detailed in column 2. Creation of facilities for cattle feed, mineral mixture through co-operatives.		
	Diagnostic kits for diseases, vaccination	DDAHs and disease diagnostic labs to formulate common		

	as regular feature, survey and surveillance of diseases and creation of drug banks for common ailments.	strategies for disease forecasting and management. Procurement of special kits like crytoscopes, mastitis diagnostic kit, foot and mouth diagnostic kit etc.		
18. Bee-keeping	Promotion of beekeeping for employment generation	Financial aid will be provided for establishment of i) honeybee unit (10 boxes) ii) honey processing unit	DHO DHO	10unit x 25000 x 5=1.25 lacs 2 units x 20 lacs = 40 lacs
19.Vermi-Composting	Promotion of vermi-composting for employment generation and soil health improvement	Financial aid will be provided for establishment of Vermi-compost units (500 sq.ft.)	DHO	20units x 30000 x 5= 30 lacs
20. Mushroom production	Promotion of mushroom production for employment generation	Financial aid will be provided for establishment of i) mushroom unit (14'x10'x9') ii) mushroom processing unit	DHO DHO	10 unit x 50000 x 5=25 lacs 2 units x 20 lacs = 40 lacs

Recommended interventions for the district

Demonstrations

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Seed Planning						
Ia) 50 demonstrations @ Rs. 5000 per demo.	2.5	2.5	2.5	2.5	2.5	12.5
Ib) Monitoring 2 crops @ Rs. 50,000	1.0	1.0	1.0	1.0	1.0	5.0
RCT (Resource conservation Technology)						
Ia) Demonstrations on zero tillage in 20 ha. @ Rs. 5000/ha.	1.0	1.0	1.0	1.0	1.0	5.0
Ib) Exposure visit	1.0	1.0	1.0	1.0	1.0	5.0
2) Demons on Bed planting in 20 ha @ Rs. 5000	1.0	1.0	1.0	1.0	1.0	5.0
3) 50 Demons on Direct Seeded @ Rs. 10000 per ha.	5.0	5.0	5.0	5.0	5.0	25.0
4) 50 Demons on Alternate wetting and drying @ Rs. 3000/demo.	1.5	1.5	1.5	1.5	1.5	7.5
5)20 demo. Laser leveling @ Rs. 5000 /ha.	1.0	1.0	1.0	1.0	1.0	5.0
Water Management						
1) 20 demo. of deficit irrigation, use of problematic water.@ Rs. 5000/demo.	1.0	1.0	1.0	1.0	1.0	5.0
Site specific nutrient management (SSNM)						
I) 40 demo. on SSNM @ Rs. 10000 per demon.	4.0	4.0	4.0	4.0	4.0	20.0
2)20 demo. on bio fertilizer @ Rs. 5000 per demo.	1.0	1.0	1.0	1.0	1.0	5.0
Integrated Weed Management (IWM)						
1)20 demon. On spraying techniques @ Rs. 5000 / demo.	1.0	1.0	1.0	1.0	1.0	5.0
2)400 spray booms @ 250 booms for each year.	10.0	10.0	10.0	10.0	10.0	50.0
3) Survey & demo. on herbicide resistance.	1.0	1.0	1.0	1.0	1.0	5.0
Wheat Extension activities on timely sowing i.e. Campaign, Camp, Hoarding, Posters, Gosthis & Field days to reduce the productivity gaps.	5.0	5.0	5.0	5.0	5.0	25.0
Paddy						
1) 20 demon. On hybrid rice @ Rs. 5000 / demo.	1.0	1.0	1.0	1.0	1.0	5.0

2)20 demon. On Mechanical transplanter @ Rs. 5000/ha.	1.0	1.0	1.0	1.0	1.0	5.0
3)Two paddy transplanter @ Rs. 2 lac /paddy transplanter	4.0	4.0	4.0	4.0	4.0	20.0
4) Fertility evaluation through 30 permanent sites (Dhaindha/ Moong – Rice – Wheat cropping pattern) Stubble incorporation in both paddy and wheat	1.2	1.2	1.2	1.2	1.2	6.0
Sugarcane						
1)20 demon. On planting technique @ Rs.20000/demo.	4.0	4.0	4.0	4.0	4.0	20.0
2)20 demon. On nutrient management @ Rs.10000/demo.	2.0	2.0	2.0	2.0	2.0	10.0
3)Survey of insect-pest and biological control	2.0	2.0	2.0	2.0	2.0	10.0
Sunflower						
40 demonstrations hybrid sunflower @ Rs. 5000/ demo.	2.0	2.0	2.0	2.0	2.0	10.0
Seed treatment						
1)Paddy	20.0	20.0	20.0	20.0	20.0	100.0
2)Wheat	180.0	180.0	180.0	180.0	180.0	900.0
3)Sugarcane	265.0	265.0	265.0	265.0	265.0	1325.0
Integrated Nutrient Management (INM)						
1)40 demon. In paddy @ Rs. 5000/demo.	2.0	2.0	2.0	2.0	2.0	10.0
2)40 demon. In wheat @ Rs. 5000/demo.	2.0	2.0	2.0	2.0	2.0	10.0
3)20 demon. In sugarcane @ Rs. 10000/demo.	2.0	2.0	2.0	2.0	2.0	10.0
4)20 demon. In vegetable crops @ Rs. 5000/demon.	1.0	1.0	1.0	1.0	1.0	5.0
Integrated Pest Management (IPM)						
1)Paddy 20 demo. @ Rs. 5000 / demo.	1.0	1.0	1.0	1.0	1.0	5.0
2)Sugarcane: 20 demon @ Rs. 10000/ demo.	2.0	2.0	2.0	2.0	2.0	10.0
3)Ten field school @ 50000/ school	5.0	5.0	5.0	5.0	5.0	25.0
4)Establishment of plant clinical lab at KVK	5.0	-	-	-	-	5.0
Total budget on demonstrations	539.2	534.2	534.2	534.2	534.2	2676.0

Capacity building of agriculture staff

In-service trainings

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1)No. of Trainings of Agriculture staff	10	10	10	10	10	50
2) No. of Trainees (25 per training)	250	250	250	250	250	1250
3) Budget (Rs. 600 per trainee per day)	1.5	1.5	1.5	1.5	1.5	7.5

Capacity building of farmers

Farmers Scientists Interaction

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1) No. of trainings	10	10	10	10	10	50
2)No. of trainees (30 trainees per training)	300	300	300	300	300	1500
3)Cost (Rs. 20000 per training)	2.0	2.0	2.0	2.0	2.0	10.0

Farmers field school projections

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1) No. of field schools (Six in paddy, six in wheat , three in sugarcane, three in sunflower.	18	18	18	18	18	90
2) Village covered (Five villages per school)	90	90	90	90	90	450
3) Budget @ Rs. 20000 per school	3.6	3.6	3.6	3.6	3.6	18.0
Total budget on trainings	**7.1**	**7.1**	**7.1**	**7.1**	**7.1**	**35.5**

Chapter V

Development of Allied Sectors

Proposals for Animal Husbandry (In lacs)

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1)**Artificial insemination proposed**						
i)No. of cows for A.I.	20000	20000	20000	20000	20000	100000
ii)No. of bufalloes for A.I.	40000	40000	40000	40000	40000	200000
2)**Proposed expenditure**	60.0	60.0	60.0	60.0	60.0	300.0
3)Health care aspect expenditure	250.0	250.0	250.0	250.0	250.0	1250.0
4)Vaccination expenditure	150.0	150.0	150.0	150.0	150.0	750.0
5)Upliftment of B.P.L. families.	10.0	10.0	10.0	10.0	10.0	50.0
6)Infertility management.	100.0	100.0	100.0	100.0	100.0	500.0
7)Commercial dairy of 200 milch animals (25% subsidy).	35.0	35.0	35.0	35.0	35.0	175.0
Subsidy proposals						
8)Trainings on Animal Husbandry	2.5	2.5	2.5	2.5	2.5	12.5
Total	**607.5**	**607.5**	**607.5**	**607.5**	**607.5**	**3037.5**

Proposals for Horticulture and Vegetable Development

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1a)No. of Horticulture demonstrations	40	40	40	40	40	200
b)Funds required (Rs. 10000 per demonstration)	4.0	4.0	4.0	4.0	4.0	20.0
2a)No. of vegetable demonstrations	40	40	40	40	40	200
b)Funds required (Rs. 5000 per demonstrations	2.0	2.0	2.0	2.0	2.0	10.0
3a)No. of trainings of horticulture staff	5.0	5.0	5.0	5.0	5.0	25.0
b)Expenditure	0.50	0.50	0.50	0.50	0.50	2.5
4a)No. of training of vegetable staff	5.0	5.0	5.0	5.0	5.0	25.0
b)Expenditure	0.50	0.50	0.50	0.50	0.50	2.5
Total	**7.0**	**7.0**	**7.0**	**7.0**	**7.0**	**35.0**

Proposal for Bee-keeping

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1a)No. of training of three days duration	2	2	2	2	2	10
b)No. of trainees. (25 trainees per training)	50	50	50	50	50	250
c)Cost	0.3	0.3	0.3	0.3	0.3	1.5
2a)No. of units to be established	10	10	10	10	10	50
b)Cost for units development.	2.5	2.5	2.5	2.5	2.5	12.5
Total	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**	**14.0**

Proposal for Mushroom cultivation

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1a)No. of trainings of 5 days duration	2	2	2	2	2	10
b)No. of trainees (25 trainees per training)	50	50	50	50	50	250
c)Budget for trainings	0.5	0.5	0.5	0.50	0.50	2.5
2a)No. of units to be established	10	10	10	10	10	50
b)Cost @ Rs. 1 lac per unit.	10.0	10.0	10.0	10.0	10.0	50.0
Total	**10.5**	**10.5**	**10.5**	**10.5**	**10.5**	**52.5**

Proposal for Vermi-compost

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
1a)No. of trainings of 3 days duration.	2	2	2	2	2	10
b) No. of trainees (25 trainees per trainings.	50	50	50	50	50	250
c)Budget for trainings.	0.3	0.3	0.3	0.3	0.3	1.5
2a)No. of Units to be established.	25	25	25	25	25	125
b)Financial help @ Rs.20,000 per unit.	5.0	5.0	5.0	5.0	5.0	25.0
Total	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**26.5**

CHAPTER – VI

District Plan

6.1 Introduction

The proposed district plan includes agriculture, horticulture, forestry, animal husbandry and fisheries as the major activities undertaken in the district Karnal. The existing status of these sectors have been issued in detail in the preceding chapters with the proposed outlay 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, sugarcane and high yielding hybrids in sunflower.

b) Adoption of resource conservation technologies at large scale.

c) Mechanization for increasing water use efficiency.

d) Increasing seed replacement rate.

e) IPM, INM and IWM.

f) Enrichment of technical know how through demonstration, training and farmer participatory approach

g) Human resource development.

h) Promotion of Agro- Processing Industries.

6.2.2 Horticulture

a) Availability of good quality saplings.

b) Awareness regarding proper fertilization in orchards.

c) Need to work on cost sustainable combination of Horticulture – Agro forestry crops.

d) Rejuvenation of neglecting old orchards with yielding varieties.

e) Marketing Avenues for Horticulture crops.

f) Development of Eco-friendly IPM strategies for major horticulture crops.

6.2.3 Forestry

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

b) Free supply of forest plants for creating interest in forestry.

c) Increasing area under value added forestry trees.

6.2.4 Animal Husbandry

a) Establishing new Govt. Veterinary Hospitals and dispensaries for early access to livestock farmers.

b) Encouraging artificial insemination (A.I.) for breed improvement and ultimately increasing the milk yield per animal per unit time.

c) Health care services by providing medicines and free health check camps in villages.

d) Enhancing vaccination programmes to escape the animals from seasonal diseases.

e) Infertility vaccination programmes to escape the animals from seasonal diseases.

f) Establishing commercial dairy farming for income and employment generation.

g) Supply seed of forage crops o provide fodder round the year.

6.2.5 Fisheries

a) Development of water resources for fisheries.

b) Making availability of good quality fish seed by strengthening of existing fish seed farm in district.

c) Encouraging fish farmers for fish seed production to meet the requirement.

d) Promoting assistance to farmers in the beginning of fisheries as an enterprise.

e) Education and training to farmers and human resource development technical staff of fisheries department.

6.3 Innovative schemes/ projects

6.3.1 Agriculture

Subsidy proposals in C-DAP (In lacs)

Project on Underground pipelining

Purpose :- To increase water use efficiency and to save underground water

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area to be covered (ha)	5000	5000	5000	5000	5000	25000
Subsidy proposed @ Rs. 30000/- per (ha.)	1500	1500	1500	1500	1500	7500

Seed grading Machine

Purpose:- To produce the seed at farmers field and to improve seed quality.

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
No. of Seed grading machines required	6	6	6	6	6	30
Cost @ Rs 8 lac	48	48	48	48	48	240
Subsidy required @ 50 % (Rs. In lac)	**24**	**24**	**24**	**24**	**24**	**120**

Zero till machine

Purpose:- Energy conservation and field preparation in time

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**

Bed Planter

Purpose:- To increase water use efficiency and productivity

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**Total**
No. of bed planter required for farmers	50	50	50	50	50	250
Cost @ 50000 (Rs. In lac)	25.0	25.0	25.0	25.0	25.0	125.0
Subsidy required @ 50 % (Rs. In lac)	**12.5**	**12.5**	**12.5**	**12.5**	**12.5**	**62.5**

Laser leveler

Purpose:- To increase water use efficiency and save underground water

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**Total**
No. of laser leveler required	20	20	20	20	20	100
Cost @ Rs. 3.6 lacs	72.0	72.0	72.0	72.0	72.0	360.0
Subsidy required @ 50 % (Rs. In lac)	**36.0**	**36.0**	**36.0**	**36.0**	**36.0**	**180.0**

Green manuring

Purpose:- To increase soil fertility and to save chemical fertilizers

Description	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**Total**
Area (ha)	15000	15000	15000	15000	15000	75000
Seed required @ 30 kg/ha (q)	4500	4500	4500	4500	4500	22500
Fin. Asstt. Required (75% subsidy) @ Rs.1500/qtls.	**67.5**	**67.5**	**67.5**	**67.5**	**67.5**	**337.5**

Summer moong

Purpose:- To increase soil fertility and to raise pulse production

Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
Area (ha)	5000	5000	5000	5000	5000	25000
Seed required @ 25 kg/ha (q)	1250	1250	1250	1250	1250	6250
Cost of seed @ Rs. 5000/q (lacs)	62.5	62.5	62.5	62.5	62.5	312.5
Subsidy required @ 50 % (Rs. In lac)	**31.25**	**31.25**	**31.25**	**31.25**	**31.25**	**156.25**

Consolidated District Plan

Summary of Projected Proposals (Rs. In Lacs)

S.N.	Description	2007-08	2008-09	2009-10	2010-11	2011-12	Total
I. Projects proposals							
i)	Underground pipe lining	1500	1500	1500	1500	1500	7500
ii)	Seed grading machines	24	24	24	24	24	120
iii)	Zero till machine	6.25	6.25	6.25	6.25	6.25	31.25
iv)	Bed planter	12.5	12.5	12.5	12.5	12.5	62.5
v)	Laser leveller	36	36	36	36	36	180
vi)	Green manuring through dhaincha	67.5	67.5	67.5	67.5	67.5	337.5
vii)	Summer moong cultivation	31.25	31.25	31.25	31.25	31.25	156.25
II. Demonstrations		539.2	534.2	534.2	534.2	534.2	2676.0
III. Trainings		7.1	7.1	7.1	7.1	7.1	35.5
IV. Animal Husbandry		607.5	607.5	607.5	607.5	607.5	3037.5
V. Bee-keeping		2.8	2.8	2.8	2.8	2.8	14.0
VI. Mushroom cultivation		10.5	10.5	10.5	10.5	10.5	52.5
VII. Vermi Compost		5.3	5.3	5.3	5.3	5.3	26.5
Grand Total		2849.9	2844.9	2844.9	2844.9	2844.9	14229.5

7. Concluding Remarks

There is need to increase the farm income in a holistic manner in district Karnal like other parts of the state. Enhanced productivity can be achieved by adoption of improved environment friendly technologies in a sustainable manner linked with good market potential. The present comprehensive district agriculture plan has been prepared keeping in view the current and future aspects concerning livelihood security of farming community of the district with the following remarks.

1. Rice and wheat are major crops of the district. The evolution of green revolution varieties and their management, creation of favorable infrastructure of irrigation, fertilizer industry and assured marketing coupled with minimum support price policy augmented the area as well as productivity of rice and wheat. During the last few years the growth in cereal production (rice and wheat) has been due to agronomic management and free market economy by giving good prices of agricultural produce to its farmers. The continuous dominance of rice-wheat cropping system has depleted underground water resources and resulted in nutrient mining. The recent debate on falling water table and deteriorating soil health has prompted the scientists to rethink. The extension functionaries and scientists are now advising the farmers to adopt conservation agriculture, judicious use of irrigation water, balance use of fertilizers and need based pesticides. Under condition of food shortage, it would be very difficult to shift area RWCS to other system even may be desirable from ecological point of view. The scientists and even farmers prefer diversification within rice-wheat cropping system with technologies that are less costly and allow savings in the natural resources. Thus, the issue of diversification needs to tackle in different perspective while resource conservation still remains the topmost priority. There is need of strong linkages and synergies with the public and private sectors for hybrids/varieties to improve productivity while conserving the resources.

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 Karnal district must be done for planning for the next season.

(a) 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.

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 projected targets in terms of productivity gain are quite modest and likely to be achieved under average weather condition. 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.