

# **Doubling of Farmers' Income by 2022**

## **Strategy Document for Uttarakhand**



सत्यमेव जयते

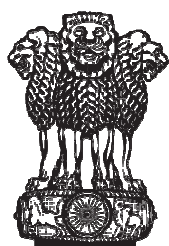
**Indian Council of Agricultural Research**  
**Department of Agricultural Research and**  
**Education**  
**Ministry of Agriculture & Farmers'**  
**Welfare, New Delhi**





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Department of Agricultural Research and  
Education  
Ministry of Agriculture & Farmers'  
Welfare, New Delhi**







## **STRATEGY DOCUMENT ON DOUBLING FARMERS' INCOME UTTARAKHAND**

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19. Krishi Vigyan Kendra, Gaina Ancholi, District Pithoragarh
20. Krishi Vigyan Kendra, Jahdhar, Via Guptakashi, District Rudrapur
21. Krishi Vigyan Kendra, Ranichauri, District Tehri Garhwal
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## Preface

Based on the recommendations of National Commission on Farmers, Government of India announced a change in its approach of measuring agricultural progress by real income of farmers, and not by gross production of agricultural commodities. The Hon'ble Prime Minister while addressing a farmers rally at Bareilly on February 28, 2016 stated that "I wish to double the income of farmers by 2022 when India will celebrate 75 years of its Independence". This goal has enthused and fuelled motivation among the stakeholders and channelized the efforts in a holistic manner. All major programs for agricultural development are then revisited to achieve this objective following a Seven-point Strategy. Much of the success in doubling Indian farmers' income will however rest on action and involvement of States and UTs.

India, under its National Agricultural Research and Education System (NARES) has a vast network of Institutes of the Indian Council of Agricultural Research (ICAR) working under aegis of Ministry of Agriculture and each State has Agricultural Universities for generating technologies for agricultural growth. The surfeit of technologies generated by NARES need to be taken to the farmers through cooperation amongst stakeholders of the Indian agriculture - central and state departments, NGOs and farmers - for achieving the goal of doubling farmers' income. To this effect, ICAR constituted State Level Coordination Committees (SCC) on March 6, 2017.

The SCC for State of Uttarakhand consisting of Vice Chancellor, G.B. Pant University of Agriculture & Technology, Pantnagar as the Chairman and Director, ICAR-Indian Institute of Soil and Water Conservation, Dehradun as the Convener was constituted with ten Members comprising of Directors of ICAR Institutes and Uttarakhand State Departments and nominees from Central Departments. The SCC convened several meetings in which there was good participation from representatives of other research institutes, Krishi Vigyan Kendras, NGOs and farmers of the State. Strategy specific to Uttarakhand State was eventually chalked out and documented in the form of this document. For making the strategy document more versatile, important documents from various sources available on the subject (NIAP, Dr. M.S. Swaminathan's presentation to the Hon'ble Prime Minister, Dr. Ramesh Chand's presentation), as well as other sources of information (Uttarakhand State Perspective and Strategic Plan) and data, including the Internet (Wikipedia etc.) were utilized.

The document is culmination of the contributions of large number of R&D organizations and farmers of Uttarakhand. The vast but scattered knowledge lying with these stakeholders of Indian agriculture that has the potential to bring about a sea change in the fortunes of the Uttarakhand farmer has been brought together in a structured format. We hope, the strategies presented in this document will certainly be able to accelerate the progress of farmers and agricultural growth of the Uttarakhand State, enabling doubling of farmers' income by 2022.

Place: **Dehradun**

Date: **01.01.2018**



**Convener**  
**(P.K. Mishra)**  
**Director, ICAR-IISWC**  
**Dehradun**



**Chairman**  
**(A.K. Misra)**  
**Vice-Chancellor, GBPUA&T**  
**Pantnagar**

**State Level Coordination Committee**



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## **Abbreviations**

<b>AI</b>	<b>-</b>	<b>Artificial Insemination</b>
<b>AICRP</b>	<b>-</b>	<b>All India Coordinated Research Project</b>
<b>APMC</b>	<b>-</b>	<b>Agricultural Produce Market Committee</b>
<b>ASSOCHAM</b>	<b>-</b>	<b>The Associated Chambers of Commerce &amp; Industry of India</b>
<b>CHC</b>	<b>-</b>	<b>Custom Hiring Centre</b>
<b>DARE</b>	<b>-</b>	<b>Department of Agricultural Research &amp; Education</b>
<b>DFI</b>	<b>-</b>	<b>Doubling Farmers' Income</b>
<b>FYM</b>	<b>-</b>	<b>Farm Yard Manure</b>
<b>FLD</b>	<b>-</b>	<b>Front Line Demonstration</b>
<b>GBPUAT</b>	<b>-</b>	<b>G.B. Pant University of Agriculture &amp; Technology</b>
<b>GI</b>	<b>-</b>	<b>Geographical Indicator</b>
<b>GSDP</b>	<b>-</b>	<b>Gross State Domestic Product</b>
<b>ICAR</b>	<b>-</b>	<b>Indian Council of Agricultural Research</b>
<b>ICT</b>	<b>-</b>	<b>Information and Communication Technology</b>
<b>IDM</b>	<b>-</b>	<b>Integrated Disease Management</b>
<b>IISWC</b>	<b>-</b>	<b>Indian Institute of Soil and Water Conservation</b>
<b>INM</b>	<b>-</b>	<b>Integrated Nutrient Management</b>
<b>IPM</b>	<b>-</b>	<b>Integrated Pest Management</b>
<b>IWMP</b>	<b>-</b>	<b>Integrated Watershed Management Programme</b>
<b>KVK</b>	<b>-</b>	<b>Krishi Vigyan Kendra</b>
<b>LDPE</b>	<b>-</b>	<b>Low-Density Polyethylene</b>
<b>MGNREGA</b>	<b>-</b>	<b>Mahatma Gandhi National Rural Employment Guarantee Act</b>
<b>NABARD</b>	<b>-</b>	<b>National Bank for Agriculture and Rural Development</b>
<b>NHM</b>	<b>-</b>	<b>National Horticulture Mission</b>
<b>NITI</b>	<b>-</b>	<b>National Institution for Transforming India</b>
<b>PMKSY</b>	<b>-</b>	<b>Pradhan Mantri Krishi Sinchayee Yojana</b>
<b>PMO</b>	<b>-</b>	<b>Prime Minister Office</b>
<b>PPP</b>	<b>-</b>	<b>Public Private Partnership</b>
<b>RKVK</b>	<b>-</b>	<b>Rashtriya Krishi Vikas Yojana</b>
<b>SAUs</b>	<b>-</b>	<b>State Agricultural Universities</b>
<b>SCC</b>	<b>-</b>	<b>State Level Coordination Committee</b>
<b>UKUMP</b>	<b>-</b>	<b>Uttarakhand Krishi Utpadan Mandi Parisad</b>
<b>UMMB</b>	<b>-</b>	<b>Urea Molasses Mineral Block</b>
<b>VPKAS</b>	<b>-</b>	<b>Vivekananda Parvatiya Krishi Anusandhan Sansthan</b>



## **1. Introduction**

The State of Uttarakhand is located in the North-Western Himalayan region which spreads to an approximate area of 33.13 million ha, comprising of Himachal Pradesh (HP), Jammu & Kashmir (J&K) and Uttarakhand (UK), which is 10% of country's total geographical area. Uttarakhand is located between 28° 43' – 31° 27' N latitudes and 77° 34' – 81° 02' E longitudes. The river Tons separates the State from Himachal Pradesh in the north-west, and the river Kali separates it from Nepal in the east. The Greater Himalayas is the northern boundary of the State and is also the international border with China (Tibet). Foot-hills in the south are bound by Uttar Pradesh. The region, being situated centrally in the long sweep of the Himalayas, forms a transitional zone between the per-humid eastern and the dry to sub-humid western Himalayas. Uttarakhand became the 27<sup>th</sup> state of the Republic of India on November 9, 2000. The Uttarakhand State has total geographical area (TGA) of 53,483 sq.km (5348.3 thousand ha), out of which about 86% is mountainous and the rest 14% is plain, comprising two districts of the State. The State comprises two administrative divisions – Garhwal and Kumaon, with 13 districts – Dehradun, Uttarkashi, Chamoli, Pauri Garhwal, Tehri Garhwal, Rudrapur, Haridwar (in Garhwal Division), Almora, Pithoragarh, Nainital, Bageshwar, Champawat and Udham Singh Nagar (in Kumaon Division). It is further divided into 102 tehsils, 95 development blocks, 7950 Gram Panchayats, and 670 Nyay Panchayats and 16,793 villages (15,745 inhabited). The population of the State over a period of 10 years (2001-2011) has increased by 18.8% and that of rural population over the same period has increased by 11.5%.

As per Census (2011), the Uttarakhand State has a population of 10.1 million of which 60% is living in the hills. BPL population in rural area is 11.62% and the State average is 11.26%; BPL population percentage is higher in hills than in the plains. The major portion of the State's population is living in rural area (more than 69%), and are engaged in agriculture. There are 1.046 million and 0.535 million main and marginal cultivators, respectively. Only 13.2% of the TGA of the State is cultivated, of which 53% is rainfed. The average size of land holding in Uttarakhand is 0.89 ha (Table 1), which is less than the national average of 1.15 ha. The average land holding is around 0.68 ha in hills and 1.77 ha in plains. Though the region is thinly populated, the actual pressure on agricultural land is high since the net cultivated area is low. Thus, land holdings are small, and also fragmented. Over the years, the proportion of small and marginal farmers out of total farmers has increased in the State. Whereas it was 89% in 2005-06; it increased to 91% by 2010-11. As a result, the proportion of total cultivated area owned by marginal and small farmers, which was 57% in 2005-06, became 64% in 2010-11. However, the cropping intensity of the State (159.2%) is much better than that of India (138.7%).

The State accounts for only 0.93% of the total livestock population of the country. However, animal husbandry is an integral part of hill agriculture as it is required for various purposes – milk, meat, wool, fur, hide, manure and transportation. Livestock rearing is mostly with open grazing system. Dependency on forests and commonly owned grazing lands is very high. Cattle are the major components of livestock population of the State (42%), followed by sheep and goat (37%), and buffalo (21%). Poultry of the State accounts for 0.63% of the total population of the kind in the country. Fish production, being only inland kind, is only 0.04% of the country's production.

**Table 1: Average size of holdings by size group (2010-11) and proportion of marginal and small farmers (%) and cultivated area owned by them in Uttarakhand**

Marginal (ha)	Small (ha)	Semi-Medium (ha)	Medium (ha)	Large (ha)	Average size of holding (ha)	Proportion of Marginal and Small Farmers (%) out of Total Farmers		Proportion of Total Cultivated Area owned by Marginal and Small Farmers (%)	
						2005-06	2010-11	2005-06	2010-11
0.44	1.43	2.71	5.45	23.11	0.89	89	91	57	64

Agriculture and allied sectors provide direct employment to substantial work force in the State. Agriculture being a source of livelihood for a majority of the people of the State, the land is being used intensively, but agriculture and allied sectors contribute only 14% of total GSDP of Uttarakhand State. However, due to various natural and human reasons, the land productivity is below the national average.

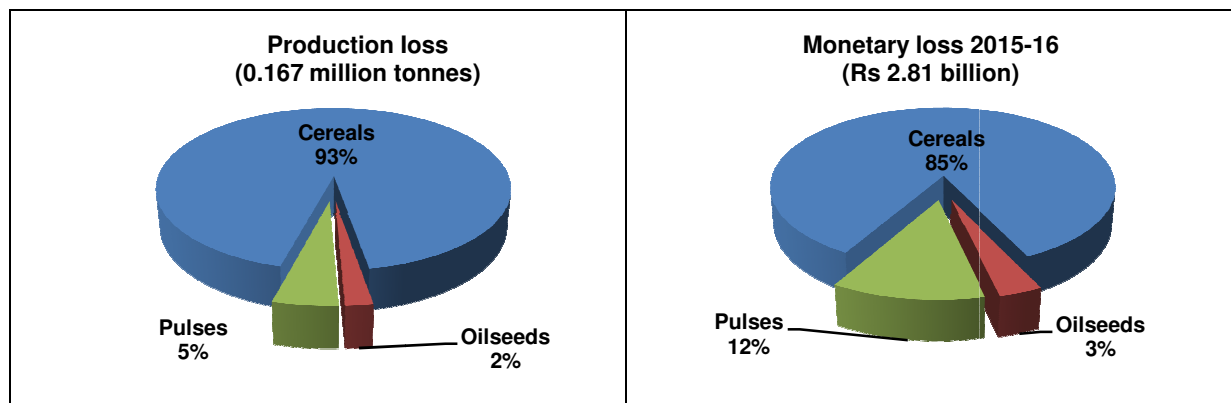
Due to hill and mountainous topography, the State differs from plains in respect to weather and soil parameters, biodiversity, ethnic diversity, land use systems and socio-economic conditions. The dominant features of hill and mountain farming in Uttarakhand State are small and fragmented land holdings, poor water management and lack of irrigation coupled with poor water harvesting plans, non-availability of proper pesticides, low level of mechanization, non-availability of marketing infrastructure, sloping marginal farmlands, poor socio-economic conditions of farmers, wild animal (monkey, boars etc. menace) and cultivation under rainfed farming. The land due to steep slopes, fragile geology and intense high storms are intrinsically prone to soil erosion, which is further aggravated by development activities. Unscientific use of natural resources has resulted into severe land degradation problems and paradoxical water scarcity under plenty availability. Since agricultural income cannot sustain the families for more than four months in a year, each family has almost one or two persons working outside the state that remits regular money to sustain the family for the rest of the year.

Soil erosion by rainwater, with soil erosion rate of more than 10.0 t ha<sup>-1</sup> yr<sup>-1</sup>, is a major problem in hill region of Uttarakhand due to steep slopes (making it less and less fertile). As per an estimate done by ICAR-IISWC, the State suffers an annual production loss of 0.167 million t from rainfed cultivated cereals, oilseeds and pulses with an average production loss of 20%. The major contribution to the losses is by rainfed cereals (93%). As a result of the production loss, the equivalent monetary loss is ₹ 2.81 billion at minimum support prices of 2015-16. The contribution of cereals is 85% and of pulses is 12% (Fig. 1).

The State has a unique climate which offers tremendous opportunities for production of high quality temperate fruits, vegetables and flowers, which have commercial significance besides distinct nutraceutical and medicinal properties. The area under fruit crops in the State accounts for 10.1% of the total area under these crops in the country (Table 1). The agro-climatic conditions of the State are suitable for growing temperate to sub-tropical fruits, such as apple, pear, peach, plum, apricot, persimmon,



cherry, grape, almond, walnut, pecan nut, pistachio nuts, citrus, litchi, guava, kiwi, strawberry, banana, mango, olive, and aonla etc. The contribution of the State to the national fruit basket is very low as the cultivation is at a small scale. The productivity of fruits is low, considering the range of niche available for their cultivation in the State. The State is also suitable for cultivation of ancillary horticultural crops like flowers (orchids, gladiolus, marigold, chrysanthemum, cut flowers etc.), spices (ginger, saffron, chilly, cardamom, black pepper), mushroom, honey etc. The State also has the advantage for cultivation of off-season vegetables and flowers.



**Figure 1: Production and monetary losses from rainfed cereal, pulse and oilseed crops due to water erosion in Uttarakhand**

For doubling of farmers' income in the State, a State Level Coordination Committee (SCC) was constituted under the Chairmanship of the Vice-Chancellor of G.B. Pant University of Agriculture & Technology (Pantnagar) by the Hon'ble Secretary (DARE) & Director General (ICAR) on March 6, 2017:

1.	Vice Chancellor, G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand	Chairman
2.	Director, ICAR-Indian Institute of Soil and Water Conservation (IISWC), Dehradun, Uttarakhand	Convener
3.	Director, ICAR-Project Directorate, AICRP on Foot and Mouth Disease (PD-FMD), Mukteshwar, Uttarakhand	Member
4.	Director, ICAR-Directorate of Cold Water Fisheries Research (DCFR), Bhimtal, Uttarakhand	Member
5.	Director, Agriculture, Govt. of Uttarakhand	Member
6.	Director, Animal Husbandry, Govt. of Uttarakhand	Member
7.	Director, Horticulture, Govt. of Uttarakhand	Member
8.	Director, Fisheries, Govt. of Uttarakhand	Member
9.	Director, ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Almora, Uttarakhand	Member
10.	Nominee of Secretary, DAC&FW, New Delhi	Member
11.	Nominee of Secretary, DAHDF, New Delhi	Member
12.	Nominee of Secretary, Ministry of Food Processing Industries, New Delhi	Member

Several meetings of the State Level Coordination Committee (SCC) were held for development of the Action Plan for Doubling of Farmers' Income (DFI) in the Uttarakhand State:

- DFI SCC Meetings - 22 & 29 March, 2017 with all Stakeholders at GBPUAT, Pantnagar
- Group Meeting of DFI SCC with Hon'ble Secretary (DARE) & Director General (ICAR) on 7 April, 2017 at ICAR-IISWC, Dehradun
- Several Meetings with KVKs and State Departments Officers, Chief Minister, Agriculture Minister and Secretary (Agriculture) of Uttarakhand by GBPUAT
- ICAR Meeting – 10 October, 2017 at New Delhi
- ICAR Meeting with Hon'ble Professor M.S. Swaminathan and Hon'ble Secretary (DARE) & Director General (ICAR) on 3 November, 2017 at New Delhi
- Sensitization Workshop “New India Manthan – Sankalp Se Siddhi - DFI by 2022” organized by Uttarakhand State Department of Agriculture on 15 December, 2017 at Dehradun; participation by State's various R&D organizations' Members of thirty-five constituted Expert Committees constituted for formulation of implementation plan of the Uttarakhand DFI Action Plan

During the meetings, with the participation of whole State Coordination Committee and different stakeholders, including thirteen Krishi Vigyan Kendras, ICAR-National Bureau of Plant Genetic Resources, Research Centre, Bhowali, Uttarakhand; ICAR-Central Institute of Temperate Horticulture, Research Centre, Mukteshwar, Uttarakhand; Himalayan Environmental Studies & Conservation Organization (HESCO), Dehradun, Uttarakhand; People's Science Institute (PSI), Dehradun, Uttarakhand; Himmotthan, Sir Ratan Tata Trust, Dehradun, Uttarakhand; and Progressive Farmers of Uttarakhand, the various problems of the State that are impediment to growth in farmers' income were discussed, and available technologies, techniques and strategies that need to be upscaled as per suitability i.e. location specific manner (especially as per altitude and concentration of prevalent production systems) were discussed. These available tested technologies, techniques and strategies that are lying unutilized as per their potential for benefit of the farmers were brought to the table by the different stakeholders for putting together in form of an Action Plan, which also included inputs from experts and R&D organizations from outside Uttarakhand State. Current estimates of farmers' income in Uttarakhand State along with targeted income for 2022 were provided by ICAR-National Institute of Agricultural Economics and Policy Research (New Delhi).

The broad objective of the above exercise was increasing income of the farmers of Uttarakhand which is practicing hill farming suffering from small and fragmented land holdings, poor water management and lack of irrigation coupled with poor water harvesting plans, non-availability of proper pesticides, low level of mechanization, non-availability of marketing infrastructure, sloping marginal farmlands, poor socio-economic conditions, wild animal (monkey, boars etc.) menace and cultivation under rainfed farming. The average income of a farm household / farmer of Uttarakhand was ₹ 4701/month during the period July 2012 to June 2013. This included income from wages (₹ 1150), net receipt from cultivation (₹ 2531), net receipt from farming animals (₹ 848), and net receipt from non-farm business (₹ 253). Therefore, the annual income was ₹ 56,412. The same income in 2015-16 (the base year for DFI) is ₹ 61,833/annum, including farm income of ₹ 18,862/annum and non-farm income of ₹ 42,971/annum. This total income at constant prices of 2015-16 in the terminal year (2022-23), @ 5% inflation, needs to be targeted to ₹ 81,095 which at current 2022-23 prices should be ₹ 1,14,108/annum, including farm income of ₹ 46,552/annum and non-farm income of ₹ 67,556/annum.

The strategy adopted to achieve the objective is addressing the following broad themes:

- ❖ Productivity Enhancement
- ❖ Livestock, Goatry, Poultry, Fisheries
- ❖ Reducing post harvest losses and value addition
- ❖ Waste land development & waste water management
- ❖ Reduced cultivation cost
- ❖ Off-farm income
- ❖ Enabling policies
- ❖ Marketing and value addition
- ❖ Online monitoring and evaluation

For the Action Plan for Doubling of Farmers' Income in Uttarakhand, the State has been divided into four zones based on altitude. In each zone, the action plan has been generated by addressing the above broad themes.

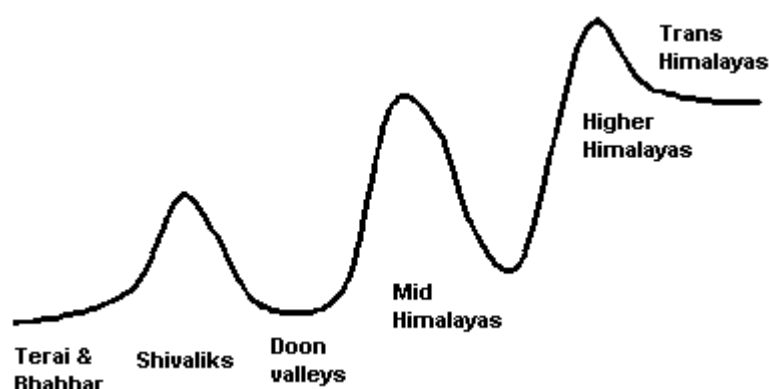
The document structure consists of the State Profile (Chapter 2) describing the agro-ecologies; land use and cropping pattern; natural resource endowments; and, important development indicators of Uttarakhand State. Chapter 3 describes the infrastructure available for agriculture and government programmes. Productivity gaps and major constraints are described in Chapter 4. The State has tremendous potential for development of agriculture, horticulture, livestock, fisheries, agro-forestry, post-harvest processing, agro-industry, etc. This has been described in Chapter 5. The major content of the document is in Chapter 6 which describes summary of the voluminous action plan for enhancing production, cost reduction, quality improvement, generating additional income with information and packages of technologies validated / successfully demonstrated. Chapter 7 describes value chain development, market linkages and trade potential. Chapters 8, 9 and 10 describe policy and investment requirements and role of the government; implementation plan and institutional responsibilities; and, summary recommendations, respectively.



## 2. Profile of the State

### A. Agro-ecologies in the State

The Uttarakhand State lies mostly in the Agroclimatic Region No. 1, namely Western Himalayan Region. Within the State of Uttarakhand, there are two zones, namely the Hill Zone and Bhabhar & Terai Zone. Within an altitudinal variation ranging from 200 m to more than 8000 m above msl, the state comprises five lithotectonically and physiographically distinct subdivisions, namely, the Outer Himalaya comprising Terai & Bhabhar, Sub-Himalayan belt of Shivaliks (300-1000 m), the Lesser/Mid Himalaya (1000-3000 m), the Great/Higher Himalaya (3000-7000 m), and the Trans-Himalaya or Tethys (> 7000 m).



#### a. Non-montane

i. **Bhabhar:** This is a level surface zone at the foothills of the Himalayas 34 km wide where the Himalayan torrents rush down from the steep slopes and disappear under boulders and gravels due to the extremely porous soil type of Bhabhar.

ii. **Tarai:** Situated below the Bhabhar and parallel to it, the Tarai is a marshy and damp tract (once 80-90 km wide) containing fertile soils with good water retention capacity.

#### b. Montane

i. **Sub-Himalayas:** Called Sub-Himalayas because it possesses the least of Himalayan features. It consists of two zones, the **Shivaliks** - the youngest of the Himalayan ranges and the **Doon** (flat longitudinal structural valleys) to the north of Shivaliks. The Shivaliks extend in a narrow varying width of 6 to 30 km with altitudes of 300 to 1000 m.

ii. **Mid Himalayas:** This zone extends in a varying width of 60-90 km in an abrupt rise in elevation between 1000 m to 3000 m. It contains two types of physiographic sub-units

- The Himachal ranges
- The Himachal valleys and lake basins

iii. **Greater Himalayas:** This zone has a varying width of 40-60 km. The altitude varies between 3000-7000 m. Except for lower valleys, this zone is perpetually covered with snow hence called Himadri. The region covers glacial landforms above 3000 m.

**iv. Trans-Himalayas:** Also known as the Tethys Himalayas and Indo-Tibet plateau, the region is in the rain-shadow of the Greater Himalayas and is therefore a cold desert. It slopes down to the Yarlungtsangpo (Brahmaputra) river valley in Tibet.

The total geographical area of the State is distributed in altitude zones as given below:

Altitudinal Zone	Percentage of area
Below 1000 metre	26%
1000 - 2000 metre	33%
2000 - 3000 metre	13%
Above 3000 metre	28%
Uttarakhand State	100%

Human habitation is found up to an altitude of 3500 m above msl; however, the zone between 1200 - 2000 m, largely falling in the Lesser Himalaya is densely populated. In light of this, for the Action Plan for Doubling of Farmers' Income in Uttarakhand, the State has been divided into four zones based on altitude (Table 2).

**Table 2: Physiographic zones of Uttarakhand, their attributes, major produces and livestock**

S. No.	Zone	Farming situation	Soil	Rainfall (mm/Y)	Major Districts	Principal farm produces and Livestock
1.	Zone A upto 1000 m	Tarai irrigated	Alluvial	1400	U.S. Nagar, Haridwar	Rice, wheat, sugarcane, lentil, chickpea, rapeseed-mustard, mango, litchi, guava, peach and plums. Livestock: Buffalo and cattle.
		Bhabar irrigated	Alluvial mixed with boulders and shingles	2000-2400	Nainital, Dehradun and Pauri Garhwal	Rice, wheat, sugarcane, rapeseed-mustard, potato, lentil, mango, guava, and lithi. Livestock: Buffalo and cattle
		Irrigated lower hills (600-1000 m)	Alluvial sandy soil	2000-2400	Champawat, Nainital, Pauri Garhwal, Dehradun	Rice, wheat, onion, chillies, peas, potato, radish, cauliflower, pulses, oilseeds, soybean, mango, guava, plums, and peaches. Livestock: Buffalo and cattle
		Rainfed lower hills (600-1000 m)	Residual sandy loam	2000-2400	Champawat, Nainital, Pauri Garhwal, Dehradun,	Finger millet, maize, rice, wheat, pulses, mango, guava, plums, and peaches. Livestock: Buffalo, cattle and goat.
2.	Zone B 1000-1500 m	Mid hills south aspect (1000-1500 m)	Sandy loam	1200-1300	Champawat, Nainital, Almora, Dehradun, Tehri Garhwal, Bageshwar, Pauri Garhwal	Rice, finger millet, wheat, potato, tomato, peas, Cole crops, pulses, peach and plums. Livestock: Cattle, Sheep and goat.

S. No.	Zone	Farming situation	Soil	Rainfall (mm/Y)	Major Districts	Principal farm produces and Livestock
3.	Zone C 1500-2400 m	High hills (1500-2400 m)	Red to dark black clay	1200-2500	Pithoragarh, Almora, Chamoli, Champawat, Bageshwar, Tehri Garhwal, Dehradun, Pauri Garhwal, Rudraprayag, Uttarkashi	Amaranth, finger millet, French-beans, Cole crops, potato, peas, peaches, plums, pear, apple, stone fruits. Livestock: Cattle, sheep and goat.
4.	Zone D >2400 m	Very high hills	Red to dark black clay	1300	Pithoragarh, Chamoli, Uttarkashi, Bageshwar, Rudraprayag	Amaranth, buckwheat, peas, Cole crops, apple and potato. Livestock: Sheep, goat

Due to hill and mountainous topography, the State differs from non-Himalayan States located in plain area of the country in respect to weather and soil parameters, biodiversity, ethnic diversity, land use systems and socio-economic conditions. It exhibits a diverse climate, topography, vegetation, ecology and land use pattern. The Himalayas due to steep slopes, fragile geology and intense high storms are intrinsically prone to soil erosion, which is further aggravated by the numerous road construction ("cut and fill" method), mining and hydro-power projects. Over-exploitation of natural resources has resulted into severe land degradation problems and paradoxical water scarcity under plenty availability in the Uttarakhand State.

## B. Natural Resource Endowments

The State's major natural resources are water, forests, floral and faunal biodiversity. The Ganga river basin, which originates in the form of Ganga and Yamuna rivers from the State, supports nearly 43% of India's population. The State, however, itself supports only 0.83% (10.1 million) human and 0.93% (4.7 million) livestock populations of the country. The State is rich with forest resources. About 61% of the State's total geographical area is under forests. Therefore, forests enjoy lion's share in the State's land use. The area under permanent pastures is about 3%, which is a support to livestock production system. Area under trees is 7% out of the total reported area.

The annual average rainfall of Uttarakhand State is 1631 mm, ranging from 1200 mm to 2500 mm. The State, particularly in high hills, suffered a natural disaster in 2013 due to unprecedented excessive rains of 847% deviation from weekly normal rainfall during four days of June 14 to 17 resulting into floods, stream bank erosion, landslides, and massive loss of both human and animal life as well as property. High runoff and soil erosion caused extensive damage to agricultural production, biodiversity, loss of revenue and infrastructure. The rescue and rehabilitation measures consisted of constitution of a Joint Action Group by ICAR (Secretary, DARE & Director General, ICAR) consisting of representatives from ICAR Institutes/Stations; Director, ICAR-IISWC, Dehradun; Director, ICAR-VPKAS, Almora; and Director (Agriculture), State Govt. of Uttarakhand as members of Action Group to support the planning of rehabilitation measures. Technical inputs were provided to State Agriculture Department for



preparation of rehabilitation plan for implementation by Govt. of Uttarakhand. Advisories, action plan and follow-up measures for the State Departments were prepared for a comprehensive disaster management plan relating to agriculture and allied sectors in Uttarakhand state.

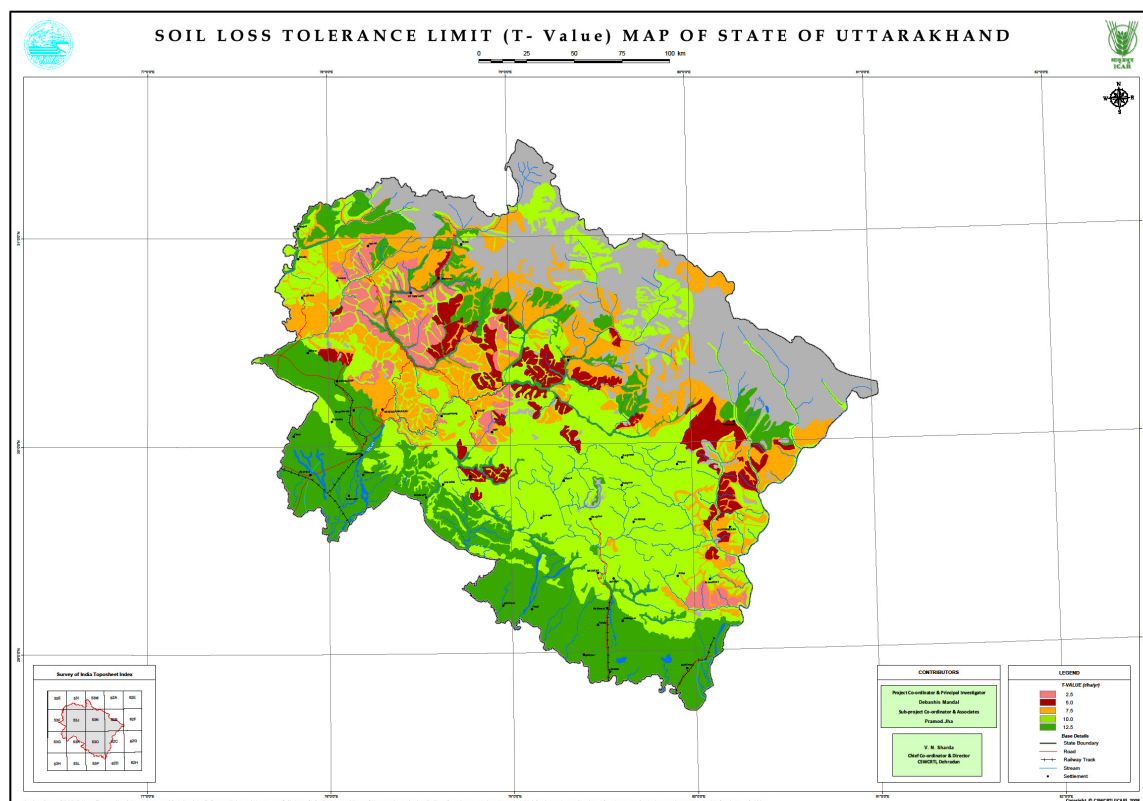
Soil erosion by rainwater is a major problem in North West Himalayan region with soil erosion rate of more than  $10.0 \text{ t ha}^{-1} \text{ yr}^{-1}$ . The soil of the hill region of Uttarakhand is prone to constant soil erosion due to steep slopes (making it less and less fertile; on the other hand, the soil of *tarai* region of the State is very fertile and supports number of crops). Recent estimates indicate that out of total extent of degraded land area in a state of north-western Himalayan region, Uttarakhand has highest (21.19%) under water erosion (Table 3) compared to Himachal Pradesh and Jammu & Kashmir. Soil Loss Tolerance Limit (T) tolerance limits data indicated that T-values in the North West Himalayan region vary between 2.5 and  $12.5 \text{ t ha}^{-1} \text{ yr}^{-1}$  depending on soil depth and soil resistivity to erosion. The Soil Loss Tolerance Limit (T) map of Uttarakhand State is given as Fig. 2. The areas where the prevailing erosion rate is more than the permissible limits need to be addressed on priority through appropriate conservation measures for bringing the erosion rate within the permissible rate. In the North West Himalayan region, the highest area under priority class 1 ( $E-T > 35 \text{ t ha}^{-1} \text{ yr}^{-1}$ ) is recorded in Uttarakhand state (4.34% of TGA) followed by Himachal Pradesh. Similarly, the highest area under priority class 2 ( $E-T 25-35 \text{ t ha}^{-1} \text{ yr}^{-1}$ ) also falls in Uttarakhand (29.30% of TGA) followed by Himachal Pradesh.

**Table 3: Extent of land degradation area (%) in Uttarakhand State**

Classes										
1	2	3	4	5	6	7	8	9	10	11
14.57	3.31	0.00	3.31	3.31	1.99	0.66	1.32	18.54	12.58	40.40
S. No.	Classes					S. No.	Classes			
1.	Exclusively water erosion ( $>10 \text{ t ha}^{-1} \text{ yr}^{-1}$ )					7.	Waterlogged and marshy (permanent)			
2.	Water erosion under open forest ( $<40\%$ canopy)					8.	Barren / stony waste			
3.	Exclusively acid soils ( $\text{pH} < 5.5$ )					9.	Snow covered & glacial area			
4.	Acid soils under water erosion					10.	Area not surveyed			
5.	Acid soils under open forest					11.	Others			
6.	Exclusively open forest									

#### **a. Critical areas with respect to soil erosion and tolerance**

Soil erosion risk of land depends upon difference between the prevailing soil erosion rates and permissible rate or tolerance limit of the soil. It is of paramount importance to preserve soil's productivity potential and ensure sustainable land use. The area with high soil erosion risk is considered to be the high priority class which needs immediate attention by applying appropriate soil and water conservation interventions to bring down erosion losses. District wise priority areas are calculated considering potential soil erosion rate and tolerance limit of the soil for Uttarakhand State. Agriculture area, forest area and degraded forest area (Table 4) of Uttarakhand State falling under the erosion risk zone were measured district wise to be considered for suitable soil and water conservation measures for reducing soil erosion. The priority classes for erosion control map of Uttarakhand State are given as Fig. 3.



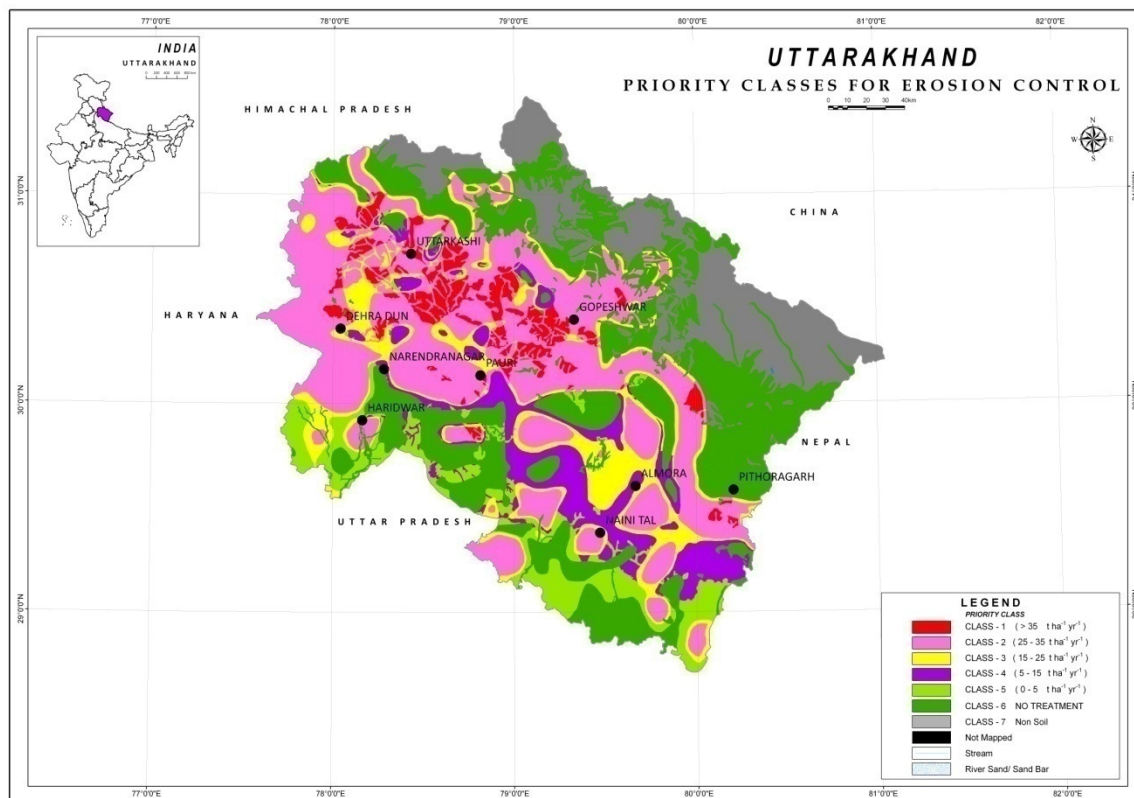
**Figure 2: Soil loss tolerance (T-value) map of Uttarakhand**

**Table 4: Priority area statistics of various land uses falling under soil erosion risk zone**

District	Agriculture area (ha)	Forest (ha)	Degraded forest (ha)
Pauri Garhwal	100178.50	181089.70	74360.64
Tehri Garhwal	91866.97	166732.60	69870.74
Almora	68668.51	148633.70	66618.95
Nainital	65988.39	143463.00	60090.56
Haridwar	57771.31	114449.50	35732.62
Dehradun	57377.54	99428.37	35059.00
Champawat	46051.29	81816.20	33609.81
Chamoli	25789.49	66290.07	27836.95
Uttarkashi	20652.88	65649.64	26310.62
Bageshwar	17238.14	38252.19	18781.81
Udham Singh Nagar	15467.83	29725.06	16579.77
Rudraprayag	6591.78	14400.74	10348.86
Pithoragarh	4804.13	13354.29	10205.35

Total degraded lands account for 1,435 thousand ha affecting 26% of the TGA of the state. Highly degraded districts are: Tehri Garhwal (257 thousand ha), Pauri Garhwal (189 thousand ha), Haridwar (187 thousand ha), Udham Singh Nagar (186 thousand ha) and Dehradun (176 thousand ha). It has been observed that 1,009 thousand ha (about 18% of the TGA) of the State is affected by water erosion. Haridwar district is worst affected with 187 thousand ha, and others affected districts are Udham Singh Nagar (178 thousand ha), Dehradun (143 thousand ha), Pauri Garhwal (133 thousand ha) and Tehri Garhwal (96 thousand ha). Soil acidity has remained the second major

factor causing degradation. Approximately 8% of TGA of the State (400 thousand ha) is affected by acidity. Tehri Garhwal has acidic soils in 161 thousand ha, followed by Uttarkashi (52 thousand ha), Pauri Garhwal (56 thousand ha), Chamoli (52 thousand ha) and Dehradun (35 thousand ha). Waterlogging is a problem in Udham Singh Nagar, Chamoli, Naini Tal, Bageshwar, Almora, Champawat and Pithoragarh.



**Figure 3: Priority classes for erosion control map of Uttarakhand**

## **b. Status of water resources**

### ***1. Hydro-geology***

The predominantly hilly state of Uttarakhand has a varied hydro geological setup and can be divided broadly into two distinct hydro geological regimes or example the Gangetic alluvial plain and the Himalayan mountain belt. The former is covered with a vast expanse of alluvium and unconsolidated sedimentary material of varying size fractions (ranging from boulder to clay). It is a promising zone for ground water development. The latter zone, being predominantly hilly, offers much less potential for large-scale development of ground water. Ground water in the hilly region occurs mostly in fissures/fractures and emerges as springs. The springs are amenable to small-scale development of ground water resources in the State. The yield of tube wells in the Shivalik formation ranges from 50.4 m<sup>3</sup>/h to 79.2 m<sup>3</sup>/h; and, in the Bhabhar formations, the yield is up to 332.4 m<sup>3</sup>/h. In the Tarai belt, the yield of tube wells ranges from 36 m<sup>3</sup>/h to 144 m<sup>3</sup>/h and in the Indo-Gangetic plains, the yield varies from 90 m<sup>3</sup>/h to 198 m<sup>3</sup>/h.

## ***II. Major river basins and sub-basins***

The main drainage system of Uttarakhand has been grouped into the following six catchments:

- (i) **Yamuna Catchment:** The Yamuna river originates from the base of Bandar Punchh Peak. It has carved a deep V-shaped gorge. The Yamuna cuts across the Nag Tibba range and Mussoorie range near a place called Yamuna Bridge. The rivers Tons, Pabar and Aglar are its important tributaries. It passes through the Doon valley at its western boundary.
- (ii) **Bhagirathi Catchment:** This is one of the two rivers that join to form the river Ganga. It originates from the snout of the Gangotri glacier at Gaumukh, which is at the base of Chaukhamba peak. The Bhagirathi River has cut a deep gorge across the granitic rocks of the higher Himalaya of Garhwal. Its main tributaries are the river Janhavi and the Bhilangna.
- (iii) **Alaknanda Catchment:** The Alaknanda River joins the river Bhagirathi at Devprayag to form the river Ganga. It originates from the eastern slopes of Chaukhamba, from the Bhagirathi Kharak and Satopanth glaciers. The river flows by the side of the Badrinath temple. Its main tributaries are the Khiraonganga, Pindar Dhauliganga, Birahi, Nandakini, Mandakini, etc. It has formed a broad valley at Srinagar (Garhwal).
- (iv) **Mandakini Catchment:** It comes out from the Mandakini glacier near Kedarnath. It cuts through a gorge of glacial debris. The river has formed road terraces at Augustmuni and Tilwara. At Tilwara, it is joined by the river Lastar Gad. The river Mandakini joins the river Alaknanda at Rudraprayag.
- (v) **Pindar Catchment:** The river Pindar originates from the Pindari Glacier, which is located between Nanda Devi and Nanda Kot peaks. The Sundardhunga River joins the Pindar near Dhakuri. The Pindar joins the river Alaknanda near Karanprayag.
- (vi) **Kali Catchment:** The river Kali forms the boundary between Kumaon and Nepal. The Kali river forms the border between Nepal and the border districts of Pithoragarh and Chamoli. The main tributaries of the Kali are the Ladiya, Sarayu-Ramganga East, Goriganga, Dhauliganga East and Kuti Yangte.

The Land Survey Directorate (LSD) has divided Uttarakhand into eight catchments, which are divided into 26 watersheds. These are divided into 110 small watersheds and finally there are 1, 110 micro watersheds.

## ***III. Natural lakes and reservoirs***

Uttarakhand has 31 natural lakes covering an area of about 300 ha. The State is endowed with eight large-sized man-made reservoirs in Tehri and Udham Singh Nagar districts, covering an area of 20,075 ha. The Tehri dam is the largest dam in Uttarakhand, followed by Sharda Sagar reservoir, with a water area of 6,880 ha and Nanak Sagar reservoir, with a water area of 4,084 ha. These reservoirs are owned by

the Irrigation Department. Additionally, there are a total of 1,545 small ponds/tanks covering an area of 604 ha in the state. The reservoirs are generally used for irrigation.

#### **iv. Natural springs**

Western Himalayan watersheds are rich in natural resources and provide fundamental basis for the existence of life in mountains and also provide water to millions in downstream through its perennial river system. Even then some times the availability of natural resources at hills reduces to acute shortage due to its uneven distribution in space and time. Especially, during summer and low flow years, the people face acute shortage of water. In recent years, more than 50% of the natural springs have dried exacerbating acute shortage for drinking water besides creating irrigation scarcity. A recent census of district-wise natural spring sources has been compiled in Table 5 along with agricultural area deprived of irrigation in each of the districts.

**Table 5: District-wise natural spring sources**

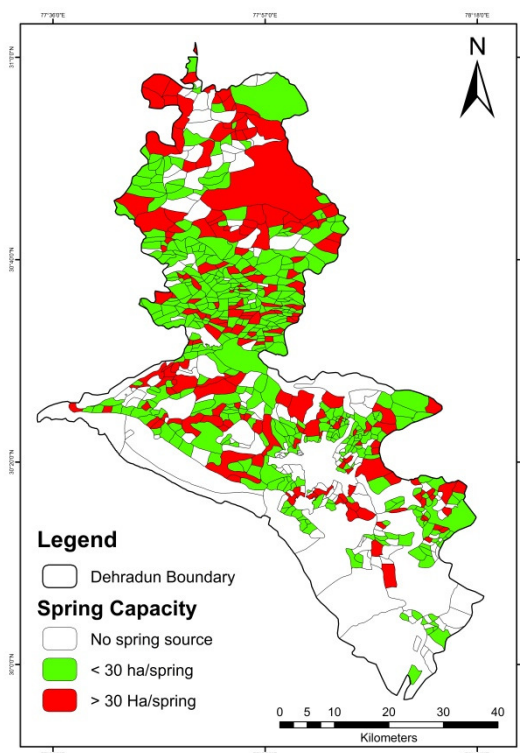
<b>District</b>	<b>Total No. of Springs (Nos.)</b>	<b>Total Rainfed Area (ha)</b>	<b>Area Served by Each Spring (ha/nos.)</b>
Almora	2012	81668	40.59
Bageshwar	1355	24383	17.99
Chamoli	1803	45755	25.38
Champawat	664	13206	19.89
Dehradun	1155	32565	28.20
Haridwar	1002	20681	20.64
Nainital	1689	28824	17.07
Pauri Garhwal	3571	91533	25.63
Pithoragarh	1524	74659	48.99
Rudraprayag	981	19144	19.51
Tehri Garhwal	NA	NA	NA
Udham Singh Nagar	NA	NA	NA
Uttarkashi	652	28546	43.78

If we cater to the irrigation water demand from these springs with a minimum of 6 litre per second capacity diverted for irrigation purpose, about 30 to 35 ha area can be brought under lifesaving/ supplementary irrigation throughout the year per spring with a normal rainfall year with both summer and winter distributions. District-wise statistics of natural spring sources' ability to serve a cluster of area for irrigation is presented in Table 12 which shows most of the springs ability to cater the unirrigated areas is sufficient in absence of other competing sectors such as domestic water needs. In that way, the distribution of spring sources and their proximity to agricultural area is important. In each district, village-wise census data of spring sources and other irrigation infrastructure is also essential to find exact position of agricultural area in the proximity of a spring source. A typical distribution of springs with a unit serving capacity more than and less than 30 ha is depicted in Fig. 4.

#### **c. Status of forests in Uttarakhand**

Major forest types occurring in the state are Tropical Moist Deciduous, Tropical Dry Deciduous, Sub Tropical Pine, Himalayan Moist Temperate, Sub Alpine and Alpine Forests. Forests are largely distributed throughout the state with conifers and Sal being major forest formation.

Uttarakhand is a hill state. Thus, about 66 % of the total geographical area (TGA) of the state is required to be under forest cover to keep the ecosystem functioning properly. FSI (2015) reveals that forest cover accounts for about 24,240 sq. km, which is 45.32% of TGA of Uttarakhand. Thus, it can be said Uttarakhand is far from a healthy ecosystem and forest cover. The study reveals that about 8.88% of the geographical area of Uttarakhand is under Very Dense Forests (VDF), 25.43 per cent under Moderate Dense Forests (MDF), 11.0% is under Open Forests (OF) and 0.57% is under Scrubs. Analysis of the present forest cover of Uttarakhand at district level reveals that all the districts have more proportion of forest cover with respect to their geographical area than national average (20.6%). Districts which are located in Shivalik Himalayas and at the junction of Shivalik and middle Himalayas; such as Haridwar, Udham Singh Nagar and Dehradun, have fewer forests as 24.92%, 19.91% and 51.88%, respectively when compared with other districts. These districts are densely populated and have been facing intense pressure from anthropogenic activities. Therefore, forest cover of these districts has been reduced significantly. While, on the other end, a large area of districts of Uttarkashi, Chamoli and Pithoragarh is well above the tree-line and do not support growth of trees and forests due to which forest cover in these districts are well below the state average (45.32%). A large area of these districts is under glaciers. Thus, environmental conditions are little harsh for the forest growth. All other districts such as Tehri Garhwal, Pauri Garhwal, Almora, Nainital, Champawat and Bageshwar have their forest cover above the state average. Only Nainital and Champawat are close to ecological threshold of mountain areas of 66 % forest cover.



**Figure 4: Example case of distribution of springs as per serving capacity in Dehradun district of Uttarakhand**

Recorded forest area in the State is 38000 km<sup>2</sup>. Of these 70% are owned by State forest department, 15.73% as van panchayats, 13.76% under State Revenue Department as civil soyams forests are very small (0.46%) under other institutions or privately owned.

### C. Land Use and Cropping Pattern

About 61% of the State's total geographical area is under forests. Therefore, forests enjoy lion's share in the State's land use (Table 6). About 8% area has been put to non-agricultural uses. The area under permanent pastures is about 3%, which is a support to livestock production system. Area under trees and area as culturable waste are 7% and 6%, respectively leaving only a small amount of land i.e. 706 thousand hectares (12%) for cultivation out of the total reported area. Thus, net sown area, though, constitutes the second largest land use, it is low in comparison to that of the country (46%). Further, out of the net sown area, 53% is rain dependent. Despite abundance of water in the hilly region of the State, which is major area of the State, only 12% out of net irrigated area is in hills as irrigation facilities are minimal due to limited scope of irrigation (about 88% of net irrigated area is in plains; thus irrigation is available mostly in plains and valleys).

**Table 6: Land Use (%) by type in Uttarakhand**

Year	Forest (%)	Non-agri-cultural use (%)	Permanent pastures & other grazing lands (%)	Trees etc. (%)	Culturable waste (%)	Total fallow (%)	Net sown area (%)
2007-08	61	8	4	7	5	2	13
2012-13	61	8	3	7	6	2	12

There has been a decline of 0.82% in forest area over a period of 10 years (Table 7). The second largest land use as net sown area has declined by 6.5% over a same period, and total cropped area also has experienced a decline of 5.3% over a period of 5 years. Along with reduction in cultivated area, there has been increase in culturable waste (Table 6), which is as a result of heavy outmigration, as the younger rural population is reluctant to take up agriculture as their source of livelihood. Among the land use for agricultural purpose, the net and gross irrigated areas have declined by 3.5% and 4.5%, respectively (Table 7). This is another reason for fall in sown area. So there is a need to generate more alternative sources of irrigation to increase the net irrigated area, which in turn shall also increase the cropping intensity of the State. These alternative sources can be rainwater harvesting ponds, tanks, check dams, etc. Along with creation of more water resources, the water itself needs to be managed better by technologies like drip irrigation, sprinklers etc.

Though yields of major cereals, pulses and foodgrains as a whole along with oilseeds have increased over the years, the areas under the same, except under pulses, have decreased (Table 8). As a result, the production of some of them has fallen, except of rice as well of all cereals together. Pulse production has significantly increased by 88% due to increase in both area and productivity (Table 8). The decrease in area of some crops despite increase in their yield indicates that there has been a shift in area under these crops to other crops because of reason other than fall in productivity, which most likely will be better farm income.

Area under fruit crops has increased significantly by 18% as a result of which the fruit production increased by 5.7% over a period of 7 years (Table 7). This positive change has also been evident during the recent past 5 years (Table 9). This indicates that there has been shift towards cultivation of more fruit crops. A similar scenario is evident in case of vegetables. Therefore, these are the sectors in which lies potential for



increasing farmers' income as the farmers have taken up fruits and vegetable cultivation readily due to remunerative nature of these crops. Moreover, there exists great untapped natural potential of horticulture production in the State, which has distinct agro-climatic condition favourable for horticulture. The soil conditions are good for production of fruits and vegetables. The climatic and soil conditions allow growing sub-tropical and temperate fruits, vegetables and ornamentals.

**Table 7: An overview of selected forest and agricultural indicators of Uttarakhand**

Item	Period of comparison	Uttarakhand		Change (%)
Forest area ('000 ha)	2005 vs 2015 (10 Years)	2444	2424	-0.82
Net sown area ('000 ha)	2007-08 vs 2012-13 (10 Years)	755	706	-6.49
Total cropped area ('000 ha)	2007-08 vs 2012-13 (5 Years)	1187	1124	-5.31
Net irrigated area ('000 ha)	2008-09 vs 2013 -14 (6 Years)	340	328	-3.50
Gross irrigated area ('000 ha)	2008-09 vs 2013 -14 (6 Years)	570	544	-4.55
Area under fruit crops ('000 ha)	2007-08 vs 2014-15 (7 Years)	171	202	18.1
Production of fruit crops ('000 t)	2007-08 vs 2014-15 (7 Years)	717	758	5.7
Cattle ('000)	2007 vs 2012 (5 Years)	2235	2006	-10.2
Buffaloes ('000)	2007 vs 2012 (5 Years)	1220	988	-19.0
Sheep ('000)	2007 vs 2012 (5 Years)	290	369	27.2
Goats ('000)	2007 vs 2012 (5 Years)	1335	1367	2.4
Total livestock ('000)	2007 vs 2012 (5 Years)	5141	4795	-6.7
Poultry ('000)	2007 vs 2012 (5 Years)	2602	4642	78.4
Fish production ('000 t)	2004-05 vs 2014-15 (10 Years)	2.57	3.94	53.3

A similar potential exists in other horticultural crops, namely flowers and spices, which increased by 5% and 23% in terms of area, respectively. Significantly, flowers production increased by 41% indicating tremendous potential. In case of spices, it was 6% increase in terms of production (Table 10).

**Table 8: Change in average yield, area and production of food crops in Uttarakhand**

Item	Year	Rice	Maize	Wheat	Coarse Cereals	Total Cereals	Total Pulses	Total Foodgrains	Total Oilseeds
Yield (kg/ha)	2003-04	1906	1478	1877	1320	1714	690	1672	919
	2012-13	2206	1437	2396	1355	2040	841	1962	1236
	2013-14	2289	1400	2425	1335	2083	891	2001	1125
	2014-15	2307	2070	1902	1428	2876	821	1823	938
	% change	21	40	1	8	68	19	9	2
Area ('000 ha)	2003-04	293	46	397	299	989	42	1030	37
	2012-13	263	28	358	250	871	61	932	32
	2013-14	253	25	348	225	826	65	891	32
	2014-15	262	25	350	220	818	67	900	32
	% change	-11	-47	-12	-26	-17	58	-13	-15
Production ('000 qt)	2003-04	5585	680	7452	3947	16951	290	17222	340
	2012-13	5797	402	8580	3383	17760	513	18278	398
	2013-14	5787	350	8434	3003	17197	579	17821	358
	2014-15	6037	509	6650	3140	23035	546	16400	296
	% change	8	-25	-11	-20	36	88	-5	-13

**Table 9: Area and production of fruit and vegetable crops in Uttarakhand**

Year	Fruits		Vegetables	
	Area ('000 ha)	Production ('000 tonne)	Area ('000 ha)	Production ('000 tonne)
2010-11	179.3	718.9	85.8	1030.9
2011-12	200.7	802.1	89.3	1066.7
2012-13	200.9	805.7	88.0	1059.6
2013-14	171.6	678.5	88.3	1016.8
2014-15	202.2	758.3	91.0	1083.0
% Change	13	5	6	5

**Table 10: Area and production of flowers and spices in Uttarakhand**

Year	Flowers (Loose)		Spices	
	Area ('000 ha)	Production ('000 tonne)	Area ('000 ha)	Production ('000 tonne)
2011-12	1.5	1.8	6.6	38.8
2012-13	1.6	1.8	8.1	41.1
2013-14	1.4	2.0	8.1	41.1
2014-15	1.6	2.6	8.1	41.1
% Change	5	41	23	6

Animal husbandry is an integral part of hill agriculture. Among the livestock population of the State, on one hand, the cattle and buffalo population decreased by 10% and 19%, respectively over a period of 5 years (Table 7), during the same period the population of

sheep (27%) and goats (2%) increased. Among the cattle, the fall was of indigenous cattle population (20%), whereas of crossbred cattle increased by 46% (Table 11), indicating that farmers are now rearing less number of cattle but which is of higher milk yielding quality. The increase in sheep and goat population indicates that the farmers want to keep these animals as they are easy to rear and can give faster returns. The poultry population has been increasing over the years in Uttarakhand State (Table 11), which indicates its highly remunerative nature as well as good source of animal protein for the farmer. Another good source of animal protein and income of the farmer is fishery. Fish production increased by 53% over a period of 10 years in the State (Table 7).

**Table 11: Livestock Population in Uttarakhand over the Years**

S. No.	Species \ Year	1997	2003	(+/-) %	2007	(+/-) %	2012	(+/-) %
1.	Cattle - crossbred	1.03	2.28	121.36 %	3.39	49.12%	4.98	46.6%
2.	Cattle - indigenous	19.27	19.61	1.76 %	18.96	(-)3.31%	15.08	(-)20.4%
3.	Total cattle	20.30	21.89	7.83 %	22.35	2.14%	20.06	(-)10.3%
4.	Buffalo	10.94	12.28	12.25 %	12.20	(-)0.71%	9.88	(-)19.0%
5.	Total cattle & buffalo	31.24	34.17	9.38%	34.55	1.12%	29.94	(-)13.34%
6.	Sheep	3.11	2.96	(-)4.82%	2.90	(-)1.84 %	3.69	26.98%
7.	Goat	10.86	11.58	6.63 %	13.35	15.29 %	13.67	2.40%
8.	Horse / pony	0.23	0.17	(-)26.09%	0.15	(-)11.37%	0.16	5.94%
9.	Mule	0.24	0.22	(-)8.33%	0.24	10.89%	0.27	11.68%
10.	Donkey	0.01	0.007	(-)30.00%	0.01	78.00%	0.02	19.57%
11.	Pig	0.32	0.33	3.13 %	0.20	(-)39.40 %	0.20	0.43%
12.	Dog	2.31	2.66	15.15%	2.52	(-)5.10%	2.21	(-)12.31%
13.	Rabbit	0.06	0.07	16.67%	0.05	(-)31.61%	0.06	26.88%
14.	Total livestock (except dog & rabbit)	46.09	49.43	7.25%	51.41	4.00%	47.95	(-)6.74%
15.	Total livestock (including dog & rabbit)	48.46	52.16	7.64%	53.98	3.49%	50.22	(-)6.97%
16.	Poultry	9.72	19.84	104.12 %	26.02	31.14%	46.42	78.41%

As a result of increase in populations of cross bred cattle, poultry, goats and sheep, the production of milk, eggs, meat and wool increased in the Uttarakhand State by 13%, 41%, 86% and 30%, respectively (Table 12). Therefore, livestock and poultry enterprises have a great potential in the State for increasing farmers' income through better marketing.

**Table 12: Production of milk, eggs, meat and wool in Uttarakhand**

Year	Milk ('000 Tonnes)	Eggs (lakh nos.)	Meat ('000 Tonnes)	Wool ('000 kg)
2010-11	1383	2614	14	362
2011-12	1417	2712	16	371
2012-13	1478	3079	22	400
2013-14	1550	3370	24	440
2014-15	1565	3697	26	469
% Change	13	41	86	30

#### **D. Important Development Indicators**

- The poverty ratio of Uttarakhand State is 31.8% (2004-05) which much higher than the national average of 21.8%.
- The literacy rate of the State is 78.82% (2011) which is higher than the national average of 74.04%.
- Uttarakhand state is the second fastest growing state in India. It's gross state domestic product (GSDP) (at constant prices) more than doubled from ₹ 24,786 crore in FY 2005 to ₹ 60,898 crore in FY 2012.
- The real GSDP grew at 13.7% (CAGR) during the FY 2005 – FY 2012 period.
- Per capita income in Uttarakhand is ₹ 1,03,000 (FY 2013) which is higher than the national average of ₹ 74,920 (FY 2013)
- Share of agriculture and allied sectors in Gross State Domestic Product at 2004-05 constant prices is 14.42% (2014-15).

### 3. Infrastructure

Adequate infrastructure boosts farm productivity and lowers farming cost, and its rapid expansion accelerates agricultural and economic growth rate as well. It is universally acknowledged that infrastructure plays a catalytic role in producing larger multiplier effects in the economy with agricultural growth. It has been globally observed that a 1% increase in the stock of infrastructure is associated with a 1% increase in GDP across all countries.

One of the essential infrastructures required for agriculture to develop is the **institutional infrastructure** i.e. formal and informal institutions. The Uttarakhand State has two state agricultural universities, along with two Institutes, one directorate, three regional stations and one project directorate of Indian Council of Agricultural Research (ICAR). The State Government has separate Departments for agriculture, horticulture, animal husbandry and fisheries.

1. Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttarakhand
2. Veer Chandra Singh Garhwali Uttarakhand University of Horticulture & Forestry, Bharsar, Uttarakhand
3. ICAR-Indian Institute of Soil and Water Conservation (IISWC), Dehradun, Uttarakhand
4. ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Almora, Uttarakhand
5. ICAR-Directorate of Cold Water Fisheries Research (DCFR), Bhimtal, Uttarakhand
6. ICAR-Indian Veterinary Research Institute (IVRI) Regional Station, Mukteswar, Nainital, Uttarakhand
7. ICAR-National Bureau of Plant Genetic Resources (NBPGR) Regional Station, Bhowali, Nainital, Uttarakhand
8. ICAR-Central Institute of Temperate Horticulture (CITH) Regional Station, Mukteswar, Nainital, Uttarakhand
9. ICAR-Project Directorate, AICRP on Foot and Mouth Disease (PD-FMD), Indian Veterinary Research Institute Campus, Mukteswar, Nainital, Uttarakhand
10. Department of Agriculture, Govt. of Uttarakhand
11. Department of Animal Husbandry, Govt. of Uttarakhand
12. Department of Horticulture, Govt. of Uttarakhand
13. Department of Fisheries, Govt. of Uttarakhand

In addition to these, under the Swarn Jayanti Gram Swarajgar Yojna, 42,662 Self Help Groups (SHG) have been formed, out of which 18,381 (till 31.03.2015) have been financed by banks since inception of the scheme (Table 13). Under horticultural services, there are Horticulture Mobile Teams (289), Fruit Preservation Centres (49) and State Nurseries/Orchards (95). Under veterinary services, there are veterinary hospitals (323), 'D' category veterinary hospitals (10), livestock centres (770) and A.I. centres/sub centres (682). There are 12 departmental fish farms and 72 government sericulture farms in the State (Table 13).

- In the Department of Agriculture of Uttarakhand State, Group-3 employees are posted at nyay-panchayat level, responsible for implementation of ongoing schemes and programs at village level.

- At the block level, Group-1 employees are posted for monitoring of the programs implemented at village level. Coordination among different departments at the block level is negligible.
- At the district level, Chief Agriculture Officer is posted who is responsible for overall monitoring and implementation of governmental schemes and programmes in the districts. At the district level, coordination among different Departments is being done by DM and CDO.

Under **resource based infrastructure** (i.e. water/irrigation, farm power/energy), the major infrastructure is *gool* (cement lined channels) for bringing water to the fields from a natural water source (30,217) and *hauj*/tanks (37,521) mainly in the hills. Hydrum (1477) are also installed in the hills for lifting water for irrigation. Rest of the irrigation infrastructure is mainly in the plains (Table 13). Electrification of 15,571 villages along with 334,420 Kuteer Jyoti connections exists in the State. There are 28,936 energized pump sets/tube wells. **Physical infrastructure** includes rural roads maintained by PWD (19537.38 km), district panchayats (992.95 km), and by other departments (5845 km).

**Table 13: Infrastructure for Agriculture and Government Programmes in Uttarakhand**

S. No.	Items	Year	Unit	Statistics
(A)	<b>Self Help Groups (SHG) under Swarn Jayanti Gram Swarajgar Yojna</b>			
1.	SHGs formed (as on 31.03.2016)	2015-16	No.	42662
2.	SHGs financed by banks inception of the scheme	2015-16	No.	18381
(B)	<b>Horticultural Services Infrastructure</b>			
1.	Horticulture Mobile Teams	2015-16	No.	289
2.	Fruit Preservation Centres	2015-16	No.	49
3.	State Nurseries/Orchards	2015-16	No.	95
(C)	<b>Veterinary Services Infrastructure</b>			
1.	Veterinary Hospitals	2015-16	No.	323
2.	'D' Category Veterinary Hospitals	2015-16	No.	10
3.	Livestock Centres	2015-16	No.	770
4.	A.I. Centres/Sub Centres	2015-16	No.	682
(D)	<b>Departmental Fish Farms</b>	2015-16	No.	12
(E)	<b>Government Sericulture Farms</b>	2015-16	No.	72
(F)	<b>Irrigation Infrastructure</b>			
1.	Length of Canals	2015-16	Km.	12421
2.	Length of Lift Canals	2015-16	Km.	281
3.	Tube Wells	2015-16	No.	1478
4.	Pump Sets (Boring/Free Boring)	2015-16	No.	55783
5.	Hauj	2015-16	No.	37521
6.	Gool	2015-16	Km.	30217
7.	Hydrum	2015-16	No.	1477

S. No.	Items	Year	Unit	Statistics
<b>(G)</b>	<b>Rural Electrification</b>			
1.	Electrified Inhabited Revenue Villages			
(i)	Uttarakhand Power Corporation	2015-16	No.	15254
(ii)	U.R.E.D.A.	2015-16	No.	317
2.	Energized Pump Sets/Tube Wells	2015-16	No.	28936
3.	Kuteer Jyoti Connections	2015-16	No.	334420
<b>(H)</b>	<b>Rural Roads</b>			
1.	Motor Roads Maintained by PWD	2015-16	Km.	19537.38
2.	Motor Roads Maintained by District Panchayats	2015-16	Km.	992.95
3.	Roads maintained by other departments			
(i)	Irrigation	2015-16	Km.	741
(ii)	Cane Development	2015-16	Km.	883
(iii)	Forest	2015-16	Km.	3270
(iv)	U.K.U.V.B.	2015-16	Km.	951





#### 4. Productivity Gaps and Major Constraints

In Uttarakhand, more than 69% of the population depends on agriculture for their livelihood. The average size of holding in the State is around 0.89 ha. The plains and hills present different scenarios for agriculture. While commercial agriculture is practiced in the plains, the hill farmers mainly practice subsistence farming. The hills practice mixed cropping, while in the plains mostly a single crop is cultivated in a given season. Irrigated land is freely available in the plains, with over 88% of irrigated land as against a mere 12% in the hills. The seed replacement rate for the plains stands at 15-20 per cent, while for the hills it is 3-4 per cent. Productivity across same crops also differs greatly between the hills and plains. Another feature typical of hill farming is the small and scattered land holdings.

Rural livelihood security in north-western Himalayas has become a great challenge in recent years. The region has only 6% (2 m ha) land under agriculture, and due to increasing population, the per-capita availability of land in the region is approximately half of the national average. Unmanaged natural resources lead to drying up of water streams and eroded soils. Lack of growth in agriculture, increase in human population, depleting forest cover and increase in marginal and waste lands affected the development of allied sectors and progress of employment generation, which causes danger to livelihood security.

The crop production systems throughout the Uttarakhand hill region are based on agriculture (field crops), olericulture, and horticulture or agri-horticulture system. Livestock is an inseparable part of the system in the region. Wheat, rice, maize, finger millet and barnyard millet are the major cereal crops. Black gram, horse gram, ricebean, *rajma* and *bhat* (a variant of soybean, which is used as a pulse and has better quality fats and proteins and is more digestible than the common soybean) are the major pulse crops. Mustard and soybean constitute the major oilseed crops. Among vegetables - cole crops, cucurbits, capsicum, tomato, radish, pea, French bean, potato and onions are the major crops.

The region is riddled with many problems. From agriculture point of view, these can be categorized as regional and agriculture-related problems. Among regional problems, the major ones are - difficulty in access, low water retention capacity and high erodibility of soil, sloping terrain and thin soil cover leading to slow recovery of the ecosystem from natural and human disturbances, relatively low temperature throughout, and high rate of migration from villages.

The agriculture-related problems are - small and fragmented land holdings; low risk bearing capacity due to poor economic condition; largely rainfed agriculture (the net irrigated area in hills of Uttarakhand is only 40,822 ha compared to 2,96,874 ha area in plains, i.e. hills enjoy only 12% of the total net irrigated area in the state), modest soil fertility; age-old farming practices; low input use (the fertilizer consumption in hill districts ranges from 65 to 666 thousand tonnes against 31,851 and 73,768 thousand tonnes in Haridwar and Udham Singh Nagar, respectively, which are plain districts); negligible farm mechanization; relatively low awareness about improved technologies; High Yield Gap II; insufficient marketing base; etc. Livestock are one of the main components of hill farming, but there is a great paucity of green and dry fodder; poor transport facilities and processing units, etc.

The climate change has put forth an entirely different scenario of biotic and abiotic stresses, e.g. (i) heavy incidence of brown plant hopper (*Nilaparvata lugens*) was noticed for the first time in some rice-growing areas of Uttarakhand during 2010 (ii) high severity of yellow rust was observed during late-February to mid-March in wheat in 2011, (iii) a very low winter rainfall had resulted in a dismal wheat crop in many rainfed areas during past five years, (iv) adverse effect of increasing maximum temperature and sunshine hours of February months on wheat yield, and (vi) the damage caused by wild animals, like monkeys and boars, has assumed menacing proportions during recent years.

Yield Gap I & II in various crops are presented in Table 14. Among the field crops, Yield Gap I is highest in maize followed by rice. Yield Gap I is very high in vegetable crops, especially in capsicum and onion. Yield Gap II is more than 20% in all crops. Among the field crops, it is highest in maize (63.66%) followed by Finger millet (56.2%). It is lowest in Black soybean (23.01%) followed by rice (29.20%). However, it is worthwhile to mention here that Yield Gap II in upland rice is more than 50%. Among the vegetable crops, Yield Gap II is highest in garlic (933.33%) followed by onion (65.67%) and capsicum (63.33%). It is lowest in case of French bean (27.3%).

**Table 14: Yield Gap – I and II in major crops of Uttarakhand**

Crop	Yield Gap I (q/ha)	Yield Gap II ( q/ha)	Yield Gap II (%)	Increase in income if YG II is bridged (Rs/ha)
<b>Field Crops</b>				
Wheat	6.10	11.24	42.58	15736
Rice	8.20	12.20	29.20	15982
Maize	15.00	22.28	63.66	29186
Soybean	6.10	8.89	43.75	22758
Bhat	Nil	2.98	23.01	7450
Finger Millet	8.80	9.10	56.20	13650
<b>Vegetable Crops</b>				
Garden pea	2.50	40.00	40.00	60000
Frenchbean	10.00	27.30	27.30	54600
Capsicum	100.00	95.00	63.33	190000
Tomato	12.50	175.00	58.33	262500
Onion	75.00	197.00	65.67	295500
Garlic	25.00	136.00	933.33	544000

Yield Gap I = Average yield in AICRP – FLD yield

Yield Gap II = Average FLD yield – State average yield

Uttarakhand, in spite of being a small state, has certain key features that make it distinct from other states of the country and highlight its potential for development. However, development has predominantly been in the plains, and the hill districts have been left behind. All the hill districts have subsistence farming as their main economic activity. Due to subsistence livelihood, migration and a remittance economy operate in the hill districts. They are land-locked with huge distances between markets and resources. Because of these constraints, traditional agriculture cannot be the lead sector for development. Thus, the state faces the challenge of promoting livelihoods to minimize migration through local employment and income generation, and to enhance

the quality of life of people living in villages. The positive features of these hill districts are that they have an enormous potential for off-farm income through eco-tourism and a suitable climate for high-value agriculture. These must be harnessed for a development strategy.

Recently, the study conducted by ASSOCHAM jointly with the research firm RNCOS said, "The performance of Uttarakhand in agriculture and allied activities has not been up to the mark as its share in the gross state domestic product (GSDP) had declined sharply from over 22% in 2004-05 to just over 9% in 2014-15," Therefore, Uttarakhand needs to promote a separate hill farming policy as the State has a meager 14% net sown area, more so as three-fifth of the State's total working population is engaged in agriculture. Low level of land holdings is a key challenge in the farm sector as 73.6% of the State's farmers hold less than one hectare of land.

The agriculture sector in the state recorded just about 3% Compound Annual Growth Rate between 2004-05 and 2014-15 (ASSOCHAM).



## 5. Potential for Development

Uttarakhand has the potential to be ranked among the top ten for fruits and vegetables production by adopting appropriate cultivation technologies and agronomic practices. Area under horticulture can be increased particularly if a way is worked out towards utilization of cultivable wastelands and the farms belonging to absentee landowners. Rejuvenation of old senile orchards through canopy management should be adopted by the state. State owned gardens should be developed and strengthens them into “Centers of excellence” for supply of quality planting material. Creation of water sources should be promoted.

High yielding varieties of major vegetable crops, fruit crops, medicinal crops and ornamental crops should be promoted. The focus should be on high density plantation to increase production from senile orchards. While cultivation of exotic fruits such as blackberry with the objective of serving international markets should be promoted. Greater thrust should be on the stone crops like peach, pear, nectarine and apricot and pomegranate in the mid hills and guava, aonla and strawberry in the lower regions. Pea & tomato in hills and flowers, cucumber & capsicum, etc in plains hold great potential and a ready market exists locally as well as nationally for them. Due to rising demand for the ornamental flowers like gervera floriculture should be popularised. Production of major area specific vegetable crops (tomato, vegetable pea, okra, french bean, onion, garlic etc.) should be done with the use of proper crop rotation. Cultivation of kafal, hishalu, wild walnut, mahal and other wild fruits in different pockets in forest areas should be promoted.

Livestock farming forms an integral part in the economy of the Uttarakhand Himalayas and plays an important role in the mixed crop farming system. In addition, high diversity in livestock composition is the characteristic feature of the mainland of Uttarakhand. The state obtains high potential of milk production because of availability of fodder in the form of extensive grasslands, which are locally known as *bugyals* or *kharaks* and fodder trees. High milk, meat, wool & egg yielding breed of different cattle's, buffaloes, sheep, goat and poultry birds, should be promoted. Cross Heiffer should be introduced and promoted by Artificial Insemination (AI) for increasing income of marginal farmers at block level in the state. More numbers of veterinary experts should be selected at *Nyay panchayat* level. Hatcheries for need of broilor / croilor should be established at block level in the state.

Fodder Bank shuold be introduced at each block / *Nyaypanchayat* level to meet fodder/feed block and mineral blocks requirement particularly during lean period. *Gaushalas* should be established at block level to rear unproductive cattles to avoid the damage crops in cultivated areas. Milk chilling plants should also be established at block level in the state.

Fishery resources of Uttarakhand comprise of fast flowing rivers and their tributaries, high and low altitude natural lakes, ponds and doggies. Out of total stream length of approximately 2686 km, 725 km. is suitable for food and game fishes like minor carps, trout, asaila and mahseer. Available area of natural lakes in Uttarakhand is above 297 ha which offers huge potential for development of fisheries Good nurseries of fishes should be developed and availability of good species of fingerlings is required. Traditional water bodies/ rivulets should be strengthened with Mahaseer or Carps.

To reduce the post harvest losses integrated farming system should be adopted. Custom Hiring Centre (CHC) should be established for the use of power tillers, power weeders, paddy threshers, wheat threshers, mandua/ madira threshers, maize sheller, wheel hand hoe, manual/ power operated, wheat/paddy reapers ,power sprayer, mechanical fruit harvester at clusters on *Nyaypanchayat* level. Larger facilities of infrastructure should be created for reducing post harvest losses in horticultural commodities viz. long term storage, warehouses etc. Mini fruit grading plant for fruits should be established at block level. Food processing units/ value addition centre at fruit/vegetable belt for pickle, jam and jellies making should be established. More refrigerating van/reefers for quick transportation for perishable commodities like flowers and vegetables should be introduced. Cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks should be promoted. Packaging infrastructure at village level with packaging, sewing, sealing and labeling facilities should be established.

#### **a. Potential for development of Agriculture in Uttarakhand**

Himalayan hills harbour rich genetic diversity in the form of landraces, farmers' varieties, ecotypes, weedy and wild relatives, which offers opportunities for discovery of novel genes, expanding the gene pools for further improvement in crops, fruits, trees, livestock, etc. and exploring the potential geographical indicators (GI).

- Development of specialty crop varieties like QPM, sweet corn and popcorn in maize, product-specific wheat, finger millet, rajmash (pulse french bean), horsegram (as a remedy for kidney stones) and *bhat* (a variant of soybean with high level of protein and healthy fats) generate great opportunities.
- As there is a wide gap between demand and production of pulses and oilseeds in the region, a lot of scope exists to improve pulse and oilseed production to bridge this gap.
- Bio-fortification to extenuate malnutrition also presents a key area to ensure nutritional security in hilly areas.
- Popularization of profitable crop rotations, utilization of fallow land with a short-duration crop like *toria* for increasing cropping intensity, adoption of watershed approach for holistic development and high-value crop production in assured input areas put forth a suitable strategy for enhancing crop production in hills.
- Organic farming is increasingly becoming popular because of the perceived health and environment benefits. The traditional knowledge and practices of organic farming have almost sustained in Himalayan regions, although, it is eroded from many parts of India due to the influx of modern “green revolution” technologies. For many (especially small and marginal) farmers in Himalayas, the purchase of manufactured fertilizers and pesticides is and will continue to be constrained by their high costs and unavailability. This may be a profitable venture as the organic produce can be marketed within and outside the country with premium price. In addition, organic agriculture will emit less green house gases than intensive modern agriculture that will be helpful in mitigating climate change.
- Comparatively cooler climate in hills provides congenial environment for cultivation of high value off-season and European vegetables, medicinal, aromatic plants and flowers. With the development of IT based marketing infrastructure, market intelligence, intensive agriculture, storage capacities, secondary agriculture interventions, these enterprises may attract the youth workforce, check migration and bring prosperity in hills.

- Niche specific potential of hills can be exploited by setting up seed industry in hills for export of high-value low volume crops like temperate vegetables. This will generate huge employment opportunities; engage the local workforce and higher economic returns.
- Protected cultivation has a great scope being ideal for small and marginal farmers of hills due to lower running cost as compared to plains. In higher hills, this is one of the viable solutions during extreme winter months.
- Himalayan ecosystem is enriched with many *Apis* (honey bees) and non-*Apis* (bumble, little, orchid, blue, carpenter bees etc.) pollinators, which has a great role in pollinating the crops and fruits. Presently, a great scope exists for other bees and non-*Apis* pollinators to be exploited commercially after exploring the suitable techniques for their domestication. Promoting apiculture for a two-pronged advantage of procuring honey along with an increased level of pollination in crops is also a viable proposition to the groups of farmers.
- Mushroom production and its value addition are profitable ventures for farmers having small land holdings. This enterprise has comparative advantages in hills due to lesser cost of production, longer supply duration as compared to plains owing to favorable climatic conditions in hills. In addition, some entrepreneurs may indulge in mushroom compost production at block or district level and provide employment to others too
- Due to non-suitability to the large-scale mechanization, hill agriculture is drudgery prone. Therefore, there is huge scope for the design and development of small and light-weight farm implements for farm mechanization in hills and consequent, drudgery reduction. Devising equipment to drive away the rogue wild animals will attract a lot of farmers back to agriculture who has left it just because of devastating wild animal damage to the crops.
- In future, management of natural resources for sustainable crop production is going to play a very important role. Therefore, developing strategies for resource conservation, their efficient management for sustainability and remuneration must be given due importance. Exploring and tapping the potential of locally available bio-agents and botanicals to combat pests will also be an important area to reduce the pesticide load and will be a boon to organic farming. Besides, integrated plant nutrient and pest management modules have also to be devised for optimizing the production.
- Livestock is one of the most important components and practiced as a profitable venture in rocky mountain ranges of the world. In NW hills, there is a huge gap between demand and supply of fodder. This gap is going to be wider in the future, particularly in view of shrinking land and other resources. The technologies like production of Hybrid Napier on terrace risers, wasteland and forest floor to elevate fodder availability, development of dual (grain-cum-fodder) crop varieties will help to bridge this gap.
- Water use efficiency in hills is a matter of concern. Though endowed with plenty of water resources and ample rainfall but most of it goes unutilized for several reasons. In such situation, water harvesting and use of the micro-irrigation system (MIS) become crucial to enhance water use efficiency and production.
- Value addition will be an instrumental area of operation to make hill agriculture a viable profitable venture and generate employment. There is a huge scope for design and development of small processing units for value addition and reduction of post-harvest losses and packaging units to extend shelf life and make goods more presentable.

- Application of information and communication technology (ICT) for extension of agricultural technology and farmer's help is going to play a pivotal role in times to come. Therefore, development of suitable models for technology dissemination opens a new vista. Replication of successful models, like integrated village development program in Bhagartola (District Almora, Uttarakhand), to the greatest possible extent in the region and creation of an efficient cooperative system for marketing of vegetables, flowers and specialty goods such as organic produce and locality specific commodities like Munsyari *rajma* and Dunagiri *mooli* will also help to convert hill agriculture into a lucrative venture.
- Under changing climate scenario, IPCC has predicted elevated temperature and carbon-di-oxide in Himalayan ecosystem. This would be playing a major role in increasing productivity of most hill crops. However, the chilling requirement of apple will not be fulfilled in the mid Himalayas. The sub-tropical fruits may occupy these areas. These changed climatic conditions will further provide opportunities for enhancing cultivation of vegetable, medicinal, aromatic, spices, flowers, etc. as new crops to these areas along with more productivity.
- Further, the elevated temperature would be more congenial in rearing of goats and poultry farming in hills, which is being hampered by low temperatures, especially in winter seasons, at present. Improved soil quality would be the snowball effect of this, leading to climate resilient organic agriculture.
- Plausible and implementable hill specific policies for land consolidation, crop insurance and micro-credit need to be devised for hill agriculture. Evolving pathways to tap the potential of public-private-partnership, involvement of line departments, NGOs, SHGs and farmer groups for effective and wider diffusion of research output will contribute immensely to the growth of hill agriculture.

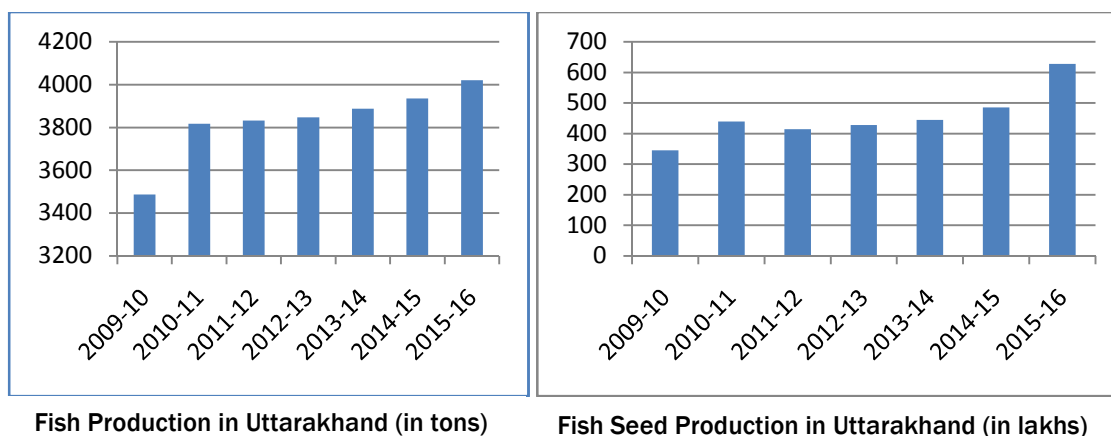
## **b. Potential for development of Fisheries in Uttarakhand**

The mountain areas are land-locked, hence the fish of lakes, streams, rivers and reservoirs are an important source of animal protein, always in short supplies in the hill regions. While there are certain limitations of cold water fisheries such as accessibility, difficult hilly terrain, lack of proper market but recent success of developing aquaculture in mountain areas of India shows that fish farmers in the rural areas are the direct beneficiaries of the implementation of inexpensive aquaculture technologies, and as a consequence achieve significant improvement in their standard of living. This is not enough to reach the landmark; there is a need of horizontal and vertical expansion for doubling the income of fish farmers. Major occupation in the state is agriculture based activities. The land holding in the hill area is smaller (700-900 m<sup>2</sup>) as compared to the national average (1370 m<sup>2</sup>). The farmers in the hill region have integrated type of farming pattern. Fish can serve as an additional source of income if integrated with the water conservation, horticulture and animal husbandry. Keeping in view the squeezing land and burgeoning human ratio, mountain fish resource base is of great relevance for better livelihood. Hence, different technological approach and support services are needed for the fishery development of Uttarakhand state.

The mountainous region of the state bestowed with vast and varied water resources in the form of rivers, rivulets, streams, streamlets, lakes, ponds, tanks and reservoirs. The diverse aquatic habitats of the hills region harbor rich piscine diversity. A total of 83 fish species belonging to 39 genera, 12 families, and 3 orders are reported in the state, out of these 5 species are of sports and angling purpose and rest are for food and



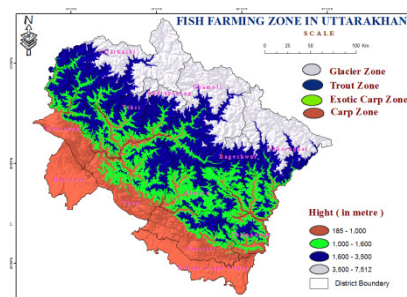
ornamental importance. Total pond area is comprised as 728.841 ha (3386 no. of pond) with maximum number of ponds in Haridwar, U.S.Nagar and Champawat districts. Only 0.09% of the total agriculture land area is under aquaculture practice. The present exploitation of fishery resources in the state comes mainly from capture fisheries (2120 tons), though fish production through culture practices is gaining momentum (1900 tons). At present the total fish production (4020 tons) from state (Fig. 5) forms about 4.4% of total fish production (90540 tons) of hill states, which forms a very small contribution to the total fish production of Himalayan uplands. The aquaculture production potential of the state has not been exploited to its fullest extent.



**Figure 5: Fish and fish seed production in Uttarakhand**

Package of practices suitable for higher, mid and foot hill region have a positive impact on the employment generation and doubling the farmers' income. There is a scope for location & situation specific fish farming practices such as Integrated Fish Farming (IFF) in foot hill areas up to an elevation of 1000 m, polyculture of carps in polytanks with integration of horticulture/floriculture practice in mid altitudinal region of the elevation of 1000-2000 m and trout farming in high altitudinal area of the elevation of more than 2000 m, where cool, clean and continuous flowing water is available

(Fig. 6). Reducing the input cost by using locally available feed ingredients and reuse of waste of one commodity for the production of fish in integrated fish farming will also be helpful for getting better return in fish farming.



**Figure 6: Fish farming zones in Uttarakhand**

Enhancement of capture production of commercially indigenous species such as golden mahseer and snow trout by regular ranching programmes and seed ranching in river streams/reservoirs/lakes will also be helpful for increasing revenue/farmers subsistence from the available natural resources and promotion of fish based ecotourism in the form of sport fishery/fish watches.

Fish sale in the fresh condition has been a bottleneck in development of coldwater fisheries, since many of the culture ponds are not approachable to the market. In such circumstances the farmers are either forced to sell the production locally on low price or to perish the produce since the transportation of the fresh fish is very difficult. There is a need of introducing value addition and processing of the produce in order to get higher

returns. These would not only prevent post harvest losses, but also would increase the net profit. Branding of the produce will also increase the profit margin to farmers in the main markets.

The fish can play a vital role in supplementing protein requirement to the poor people located in remote Himalayan region and to provide source of income to a section of people who because of resource constraints in terms of cultivable lands in hills overexploit natural resources. At high altitudes tremendous scope exists for development of low-volume, high-value species such as trout. Similarly areas of mid-altitudinal regions can also be harnessed for promoting carp based aquaculture. Foot hill area provides opportunity of bulk production. Coldwater fisheries would play important role in doubling the farmers' income by integrated approach of diversified produces in the form of crop, vegetables, milk, poultry and fish.

**c. Unique opportunities for high value interventions specific to Uttarakhand for doubling farmers' income**

- Off-season vegetable cultivation in Hills for marketing in Plain areas:
  - Pea, Cabbage, Cauliflower, Capsicum (High hills), Chillies (Low and Mid Hills)
  - Potato Kufri Giriraj, Radish (Niti and Mana Valleys, Chamoli; Munshiyari, Pithoragarh; Harsil, Uttarkashi)
  - European Onion (Uttarkashi with cluster approach)
- High Altitude Soft Rajma - purified local variety with improved agronomic practices (Harsil, Uttarkashi; Munshiyari, Pithoragarh; Niti and Mana Valleys, Chamoli)
- Maize - Green Cob and Floriculture (Char Dham Yatra Marg - Uttarkashi, Chamoli, Rudraprayag)
- Wild Rose (Kunja) – for essential oil, rose water and bio-fencing (Takula Block, Almora)
- Fruits
  - Mango – harvested in August (Bageshwar)
  - Kiwi – free from wildlife menace (Almora, Pithoragarh)
- Medicinal Plants
  - Cordiceps (*Kidajadi* - high value medicinal mushroom) – with improved cultivation practices (Milan and Johar Blocks, Munshiyari, Pithoragarh)
  - Other Medicinal Plants (Pithoragarh, Uttarkashi)
- Coarse Cereals – Mandua (Finger millet), Jhingora (Barnyard millet) (Mid hills rainfed areas)
- Pashmina and Angora wool (Uttarkashi)
- Introduction of Exotic Jersey Cow and promotion of Indigenous Badri Cow
- Promotion of Goatry by Pantja Goat
- Cold water fishery – Trout farming (Uttarkashi, Champawat)

## **6. Role of Technology**

### **A. Strategy and action plan for enhancing production, cost reduction, quality improvement, generating additional income**

#### **Components of District Action Plan Strategies for DFI - Uttarakhand State**

**STRATEGY-1:** Productivity Enhancement – Varieties: HYV of crops and vegetables; Water: Storage, harvesting, conservation, rejuvenation etc.; Cluster Approach: Location specific mass cultivation of crops, seed etc.; Wild Animal Problem Management: cultivation, fencing, legislative measures; Farm Mechanisation: Specific farm tools, machines; Efficient Irrigation: Micro irrigation techniques; Soil Health Management: crop rotations, cultivation, inputs, soil testing; Plant Protection

**STRATEGY-2:** Livestock, Goatry, Poultry, Fisheries – Milk, breeds, fodder bank, green fodder crops, community pasture, UMMB, milk chilling plant, broiler / croiler hatcheries, cross heifers by A.I., vaccination, feeding, *Gaushala*, water bodies/rivulets for fishery

**STRATEGY-3:** IFS - modules for different land holding sizes

**STRATEGY-4:** Reducing post harvest losses and value addition – procurement centres, marketing chains, cluster approach, packaging infrastructure, custom hiring

**STRATEGY-5:** Waste land development and waste water treatment – Land reformation and management, afforestation, plantation, waste water treatment

**STRATEGY-6:** Reduced cultivation cost – FYM / vermi-compost / bio-fertilizers, seed rate, spacing and depth, need based inputs application, hand tools, machines, mulching, pressurized irrigation

**STRATEGY-7:** Off-farm/ other income – Subsidiary occupations, strengthening of SHG / Federation for specific skill development in women and youth

**STRATEGY-8:** Enabling Policies – Institutional support, organic certification mechanism, Udhyam / Krishak / Soil Health / Kissan Credit Cards, Crop Insurance, Farmer Health Insurance

**STRATEGY-9:** Marketing and value addition in specific agro-ecological region – Transportation facilities, linkages, procurement/collection centre, labelling, mini grading machines etc.

**STRATEGY-10:** Online Management and Evaluation – Internet connectivity, mobile apps/software, e-Marketing kiosk, monthly review meetings, radio / TV talks, Whatsapp etc.

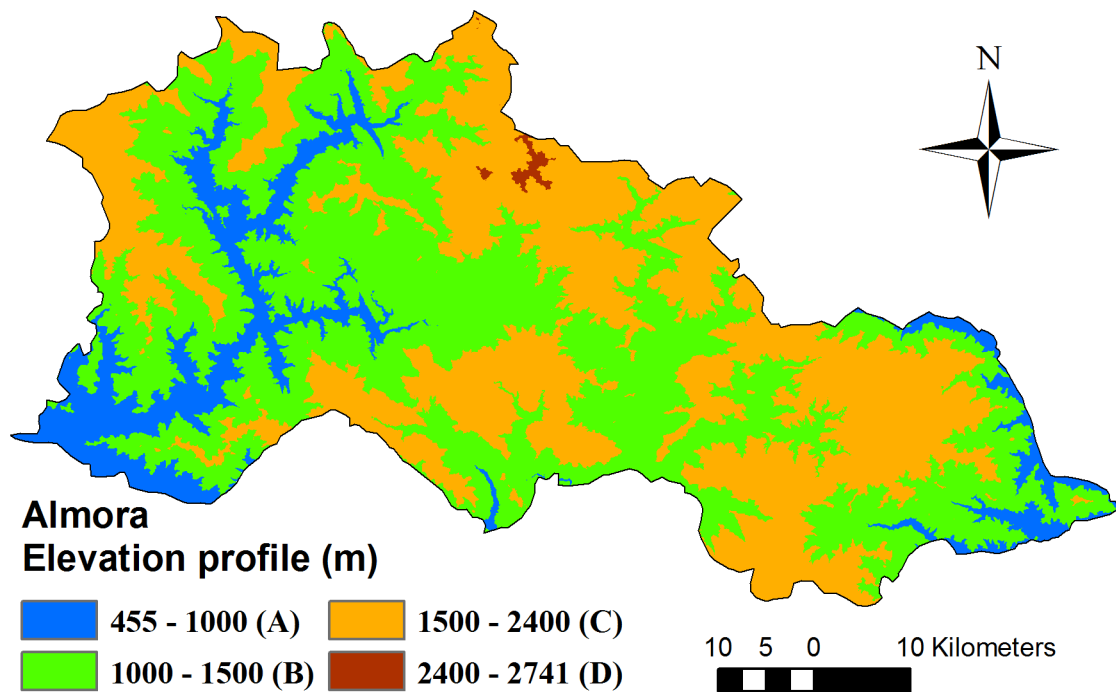
### **B. Potential contribution to farmers' income and strategy for scaling out these technologies**

**(Technology information/packages validated/successfully demonstrated be included as examples to be replicated in different agro-ecologies)**

**Technology Intervention Success Stories:** Examples of such success stories have been given at the end of each District Action Plan. There are many such examples of each district for doubling of farmers' income in the State of Uttarakhand.



**DISTRICT: ALMORA**



**Figure 7: District Almora elevation profile**



**District: Almora**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Popularisation of high yielding varieties of major crops viz.</li> <li>2. Finger millet (VL Mandua 324, and VL Mandua 352) in Syaldey, Sult and Tarikhet blocks.</li> <li>3. Barnyard millet (VL Madira 172 and VL Madira 207) in Syaldey, Sult and Tarikhet blocks.</li> <li>4. Soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) in Syaldey, Sult and tarikhet blocks.</li> <li>5. Horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19) in Syaldey, Sult and tarikhet blocks.</li> <li>6. Spring rice (VL Dhan 208 and VL Dhan 209 ) in Syaldey block</li> <li>7. Jethi rice (Vivek Dhan 154 and VL Dhan 157) in Bhikiasen and Syaldey blocks</li> <li>8. Irrigated Rice (VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pusa Basmati 1509 and PRH 10) in Syaldey and Chaukhutia</li> <li>9. Wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572) in Syaldey and Chaukhutia</li> <li>10. Barley (VL Jau 118 and VLB 94) in Syaldey, Sult and Tarikhet blocks.</li> <li>11. Lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514, PL 5, PL 7, PL 8) Syaldey and Sult blocks.</li> <li>12. Pili sarson (PPS1) Syaldey and Sult blocks.</li> <li>13. Vegetable pea (Vivek Matar 10, and Vivek Matar 12) in Tarikhet block.</li> <li>14. French bean (VL Bauni Bean 1 and VL Bean 2) in Tarikhet block.</li> <li>15. Tomato (VL Tamatar 4) in Tarikhet and Syaldey block.</li> <li>16. Onion (VL Piaz 3) in Tarikhet block.</li> <li>17. Garlic (VL Lehsun 1) in Tarikhet block.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Creation of additional water storage tanks in Sult, Dwarahat, Syaldey and Tarikhet block for lean season.</li> <li>2. Promotion of rain water harvesting and drip-fertigation system in vegetable clusters in this zone.</li> <li>3. Creation of trenches for high percolation of water in slope/ terraces in all blocks of this zone.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip for juvenile plants in Dwarahat, Syaldey, Sult and Tarikhet blocks of this zone.</li> <li>5. Popularisation of roof water harvesting system in all blocks of this zone.</li> <li>6. Rejuvenation and popularisation of traditional water harvesting systems (Naula) in all blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of old fruit belt of Syaldey, Sult and Chaukhutia belts by introduction of new cultivars of stone fruits and pickling type mango (Late maturity).</li> </ol>
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	<ol style="list-style-type: none"> <li>2. Mass cultivation of Cinnamon plants at low hills in Sult, Dwarahat and Chaukhutia block.</li> <li>3. Promotion of Ginger/Turmeric cultivation in rainfed areas in all blocks of this zone.</li> <li>4. Promotion of off season vegetable such as tomato, capsicum, radish, potato, onion, garlic (protected/openfield) cultivation in all blocks of this zone.</li> <li>5. Organic cultivation of chilli in Sult, Tarikhet, parts of Bhikiyasen areas of this zone.</li> <li>6. Promotion of organic cultivation of traditional crops (finger millet, Barnyard millet, horse gram, bhatt) through the use of HYVs in Sult Block.</li> <li>7. Fallow land development under agro-forestry in all blocks of zone.</li> <li>8. Promotion of hybrid/basmati rice particularly in irrigated areas of Chaukhutiya, Bhaisiyachanna, Someswar valley, Dwarahat, Syaldey valleys and pulses, oilseeds in rainfed areas of all blocks.</li> <li>9. Irrigated areas of Syaldey, Chaukhutia, Someswar valley and Seraghat should be used for seed production of rice and wheat.</li> <li>10. Promotion of common minimum programme technology in vegetables to reduce the cost of cultivation and quality produce.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of lime/lemon in fruits, okra in vegetable, chilli, ginger or turmeric in spices, dual purpose varieties of barley, wheat and oats or Lemon grass at larger scale in cultivated field in all blocks to minimize the damage from wild boars, monkeys and cows.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation in all blocks.</li> <li>4. Promotion of bio fencing on trench bunds.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, small reaper, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of manually operated mini crop harvesters for rice, wheat and millets.</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Organic cultivation of traditional crop viz., fingermillet, barnyard millets, black soybean, horsegram, traditional rice in all blocks of this zone.</li> <li>2. Promotion of Bio-fertiliser/soluble fertiliser based farming especially in rainfed areas of this zone.</li> <li>3. Adoption of pulse based crop rotation and maximum use of value added compost/FYM in all blocks of this zone.</li> <li>4. Making available the required recommended nutrients/ micro-nutrients at right time, place and quantity.</li> <li>5. Adoption of integrated nutrient management in irrigated areas of rice and wheat for Chaukhutiya, Bhaisiyachanna, Someswar valley, Dwarahat, Syaldey valleys.</li> </ol>
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	6. Popularization of soil and water conservation measures by pulse based intercropping, contour farming and shoulder bunds in particular rainfed areas of all blocks. 7. Promotion of soil testing kits in all blocks of this zone.
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	1. Selection of high milk breeds in buffaloes (Murrah) and cattle (Jersey, Red Sindhi, Gir and Shaiwal). 2. Establishment of Fodder Bank in each block to meet fodder requirement of area. 3. Establishment of milk chilling plant at Sult/Syaldey block of this zone. 4. Establishment of Mollases/Multinutrient feed block at Tarikhet 5. Promotion of Urea, Mollasses, Multinutrient Blocks at Nyaypanchayat level. 6. Establishment of hatcheries for need of broiler or croiler at block level like at Sult and Chaukhutiya. 7. Introduction and promotion of cross Heiffer by Artificial Insemination (AI) for increasing income of marginal farmer in all blocks. 8. Improvement of cattle health through vaccination and proper feeding. 9. Strengthening of traditional water bodies/rivulets with Mahaseer or carps at Mohan areas and Gaggas areas. 10. Popularisation of green fodder crops ie sorghum, lobia, maize, oat, berseem in all blocks. 11. Community pasture development at village level. 12. Planning for establishment of Gaushala at block level to rear unproductive cattles to avoid the damage crops in cultivated areas.
<b>Strategy 3 : Integrated Farming system</b>	<b>Promotion of different Integrated Farming System modules for 20 nali's or 0.4 ha such as :</b> <b>Vegetable based – 18 nali protected cultivation + 2 nali composting and Goatry/ Poultry</b> 1. 18 nali Protected cultivation (100 m <sup>2</sup> low cost polyhouse / shadenet/poly tunnel ) Capsicum, cucumber, Tomato, nurseery raising and cole crops/ off season vegetable/ growing vegetable seedling + 2 nali Composting (30 m <sup>2</sup> ) + Goatry (4F+1M) /backyard poultry (50 birds) <b>Live stock based- 10 nali green fodder + 5 nali Dairy, composting and Goatry/ Poultry+ 5 nali Protected cultivation</b> 1. Fodder production (10 nali; Sorghum, lobia-Oat in rainfed or berseem in irrigated) + Mini dairy (Cross bred 05) + Composting (50 sqm) + Protected cultivation; 5 nali <b>Crop based- 15 nali crop and vegetable+ 5 nali Dairy, composting and Goatry/ Poultry.</b> 1. 15 nali Truthfull seed production (Jethi rice, horsegarm,bhatt, Lentil, onion, radish, frenchbean, Pea); + Planting material supply 2 nali + Mushroom + Composting 2. Crop 14 nali (Gahat, madua, soyabean, lentil- 7 nali + vegetable- Cucurbits, French bean, veg pea, tomato, capsicum and leafy vegetables (7 nali) - 5 nali dairy/backyard poultry; +composting (50 sq.m).

<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of processing units for pickle making in Chaukhutia/ Sult/ Sayldey/ Bhikiasein block of this zone.</li> <li>2. Establishment of Food and Processing Units /Value addition centre at fruit/vegetable belt of the block Tarikhet, Sult and Syaldey</li> <li>3. Establishment of procurement centre for efficient marketing of surplus fruit, vegetables in Chaukhutia, Sult,Saylde, Tarikhet block of this zone.</li> <li>4. Establishment of marketing chain for efficient/timely supply of produce/product.</li> <li>5. Promotion of common resources on custom hire basis viz. Mini thresher / mini tractor in Syaldey, Chaukhutia and Sult block of this zone.</li> <li>6. Establishment of packaging infrastructure at village level with packaging, sewing, sealing and labeling facilities.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Sult and other area.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% sloppy area of this zone.</li> <li>3. Popularization of plantation of mulberry, wild fruit plants and fodder trees (Grewia, Bauhinia, Alnus, Celtis, Quercus etc.).</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland.</li> <li>5. Popularization of trenches for percolation of water to avoid surface run off.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in marginal and denudated areas.</li> <li>7. Construction of tank/ poly tanks for storage of water for lean season.</li> <li>8. Storage of rain water in monsoon season.</li> <li>9. Development of silvi pastoral/ pasture on waste land.</li> <li>10. Plantation of improved grasses with legume.</li> <li>11. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, vermi-compost and bio-fertilizers to minimize the use of costly chemical fertilizers.</li> <li>2. Promotion of line sowing and recommended dose of fertilizers application in crops.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Promotion of hand tools in agricultural and horticultural operations.</li> <li>6. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers in all blocks of this zone.</li> <li>7. Adoption of mulching (bio or degradable plastic) in vegetable and fruit crops to maintain moisture and reduce intercultural operation cost.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>Promotion of tillers and other garden tools for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>Promotion of subsidiary occupations like handicraft articles (aipen, jute bags, and woollen clothes), candle making, squash, pickles, mushroom production, home made/ value added products (bari, papad, namkeen, biscuit).</li> <li>Promotion of apiculture for small and landless farmers in Chaukhutia and Sult block of this zone.</li> <li>Promotion of sericulture in Chaukhutia and Sult block of this zone.</li> <li>Promotion of cultivation and collection of medicinal plants.</li> <li>Strengthening of SHG/ Federation for specific skill development in income generation activities in women and youth and also for better price realization.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>Labelling of organic inputs and certification mechanism for various crops.</li> <li>Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>Compulsion of Soil Health Card Scheme, Kisan Credit Card and Crop Insurance for all farmers.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Creation of better transportation facilities with cool chain van at Block level.</li> <li>Creation of direct linkages with food processing industries for better prices.</li> <li>Establishment of strong linkages with various stake holders to furnish information on crop produce and surplus.</li> <li>Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>Installation of mini grading machines at village level.</li> <li>Establishment of cold room in different clusters in Chaukhutiya and Sult.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>Strengthening of internet connectivity.</li> <li>Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>Promotion of use of radio, TV talks and Whatsapp and other social networking media for effective implementation of program.</li> </ol>

**District: Almora**  
**Zone: B (1000-1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p>Popularisation of high yielding varieties of major crops viz.</p> <ol style="list-style-type: none"> <li>1. Finger millet (VL Mandua 324, and VL Mandua 352) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>2. Barnyard millet (VL Madira 172 and VL Madira 207) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>3. Soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>4. Horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>5. Spring rice (VL Dhan 208 and VL Dhan 209) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>6. Jethi rice (Vivek Dhan 154 and VL Dhan 157) in Bhikiasen, Dhaula Devi, Hawalbagh, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>7. Irrigated Rice (VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pusa Basmati 1509 and PRH 10) in irrigated area of Takula, Chaukhutiya, Bhaisiyachanna, Dwarahat, Syaldey and Hawalbagh blocks.</li> <li>8. Wheat ( VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572) in irrigated/ rainfed area of Takula, Chaukhutiya, Bhaisiyachanna, Dwarahat, Syaldey, and Hawalbagh blocks.</li> <li>9. Barley (VL Jau 118 and VLB 94) in rain fed area of Takula, Bhaisiyachanna, Dwarahat, Syaldey, Sult, Lamgara and Hawalbagh blocks.</li> <li>10. Lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514, PL 5, PL 7, PL 8) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat blocks.</li> <li>11. Pili sarson (PPS1) in Dhaula Devi, Hawalbagh, Bhasiachanna, Dwarahat blocks.</li> <li>12. Vegetable pea (Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat, Tarikhet blocks.</li> <li>13. French bean (VL Bauni Bean 1 and VL Bean 2) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat, Tarikhet blocks.</li> <li>14. Tomato (VL Tamatar 4, Manisha, Himsona, Navin 2000) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat, Tarikhet and Syaldey blocks.</li> <li>15. Capsicum (VL Shimla Mirch 3, California wonder, Bharat, Indra, Tanvi) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat, Tarikhet and Syaldey blocks.</li> </ol>
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	<p>16. Cabbage (Varun, Pragati, Golden acre) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat and Tarikhet blocks.</p> <p>17. Potato (Kufri Jyoti, Kufri chandramukhi, Kufri Giriraj, Kufri Chipsona 1, Kufri chipsona 3) in Dhaula Devi, Lamgara, Takula, Dwarahat, and Tarikhet blocks.</p> <p>18. Goal Muli (Dunagiri goal) in Dwarahat, Tarikhet and Syaldey blocks,</p> <p>19. Onion (VL Piaz 3) in Dhaula Devi, Hawalbagh, Lamgara, Bhasiachanna, Takula, Dwarahat and Tarikhet blocks.</p> <p>20. Garlic (VL Lehsun 1 and VL Lahsun 2) in Dhaula Devi, Hawalbagh, and Lamgara, blocks.</p> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Creation of additional water storage tank for particular vegetable areas of Tarikhet, Hawalbagh, Takula, Lamgara, Bhaisiyachanna, Sult and Syaldey for lean season.</li> <li>2. Promotion of rain water harvesting and drip-fertigation system in vegetable clusters in this zone.</li> <li>3. Creation of trenches for high percolation of water in slope/terraces in all blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in particular vegetable growing areas viz. Tarikhet, Hawalbagh, Takula, Lamgara, Bhaisiyachanna, Sult and Syaldey.</li> <li>5. Popularisation of roof water harvesting system in all villages.</li> <li>6. Rejuvenation and popularisation of traditional water harvesting systems (Naula) in all blocks.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of old fruit belt of Lamgara, Hawalbagh, Dunagiri, Dwarahat, Syaldey and Chaukhutia belts by introduction of new cultivars of stone fruits and pickling type mango (Late maturity).</li> <li>2. Mass cultivation of Cinnamon plants at low hills in Sult, Syaldey, Dhauladevi and Dwarahat block.</li> <li>3. Promotion of Ginger /Turmeric cultivation in shady areas in all blocks.</li> <li>4. Promotion of hybrid/basmati rice particularly in irrigated areas of Takula, Chaukhutiya, Bhaisiyachanna, Syaldey, Hawalbagh and pulses, oilseeds in rainfed areas of all blocks.</li> <li>5. Promotion of off season vegetable/protected cultivation (tomato, capsicum, radish, potato, onion, garlic cucumber, cole crops, leafy vegetable etc.) specially in Tarikhet, Hawalbagh, Lamgara, Deghat, some part of Takula, Dwarahat, Bhikiyasen, Sult, Bhasiachana etc).</li> <li>6. Promotion of off season vegetable such as tomato, capsicum, radish, potato, onion, garlic (protected/openfield) cultivation in all blocks of this zone.</li> <li>7. Organic cultivation of chilli in Tarikhet, Sult, Bhikiyasen areas.</li> <li>8. Irrigated areas of Syaldey, Chaukhutia, Someswar, Seraghat, Barechina should be used for seed production of rice and wheat.</li> </ol>
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	<p>9. Fallow land development under agro-forestry in all blocks.</p> <p>10. Promotion of common minimum programme technology in vegetables to reduce the cost of cultivation and quality produce.</p> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of bio fencing on trench bunds especially in vegetable belts in all blocks.</li> <li>2. Promotion of lime/lemon in fruits, lady finger in vegetable, ginger or turmeric in spices, dual purpose varieties of barley, wheat and oats or Lemon grass at larger scale in cultivated field in all blocks to minimize the damage from wild boars, monkeys and stray animals.</li> <li>3. Enacting legislative measures for protection of crop from wild animals in all blocks.</li> <li>4. Promotion of protected cultivation (low cost polyhouse, polytunnels etc.) in all blocks to ensure some income.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Adoption of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, Vivek mandua thresher for reduction of drudgery in practicing farmers and farm women in all blocks.</li> <li>2. Popularization of manually operated mini crop harvesters, small wheat /paddy thresher in Takula, Chaukhutiya, Takula, Bhaisiyachanna, Syaldey, Hawalbagh.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Organic cultivation of traditional crop viz., finger millet, barnyard millets, black soybean, horsegram, amaranths, traditional rice in all blocks of this zone.</li> <li>2. Promotion of berseem after rice in marshy land of Takula, Chaukhutiya, Takula, Bhaisiyachanna, Syaldey, Hawalbagh.</li> <li>3. Bio-fertiliser/soluble fertiliser based farming in rain fed areas of all blocks especially in Dhauladevi, Sult, Saldyey, Hawalbagh.</li> <li>4. Adoption of pulse based crop rotation and maximum use of value added compost/FYM in all blocks.</li> <li>5. Making available the required recommended nutrients/ micro-nutrients at right time, place and quantity.</li> <li>6. Adoption of integrated nutrient management in irrigated areas of rice and wheat for Takula, Chaukhutiya, Takula, Bhaisiyachanna, Syaldey, Hawalbagh.</li> <li>7. Popularization of soil and water conservation measures by pulse based intercropping, contour farming and shoulder bunds in particular rainfed areas of all blocks.</li> <li>8. Promotion of soil testing kits in all blocks of this zone.</li> </ol>
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<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Selection of high milk breeds in buffaloes (Murrah) and cattle (Jersey, Sahiwal, Gir and Red Sindhi) in all blocks.</li> <li>2. Establishment of Fodder Bank in each block to meet fodder requirement of area.</li> <li>3. Establishment of milk chilling plant at Tarikhet and Dhauladevi (Danya).</li> <li>4. Establishment of Molasses/Multinutrient feed block at Dholadevi and someswar areas</li> <li>5. Promotion of urea, molasses, multinutrient blocks at Nyaypanchayat level.</li> <li>6. Establishment of three hatcheries for need of broiler or croiler at block level like at Dholadevi, Bhikiyasen and Dwarahat.</li> <li>7. Introduction and promotion of cross Heiffer by Artificial Insemination (AI) for increasing income of marginal farmer in all blocks.</li> <li>8. Improvement of cattle health through vaccination and proper feeding.</li> <li>9. Strengthening of traditional water bodies/rivulets with Mahaseer or carps at Mohan, Kosi areas and carp at Gaggas, Vinod areas.</li> <li>10. Popularisation of green fodder crops i.e. sorghum, lobia, maize, oat, berseem etc. in all blocks.</li> <li>11. Community pasture development at village level.</li> <li>12. Planning for establishment of Gaushala at block level to rear unproductive cattles to avoid the damage crops in cultivated areas.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p><b>Promotion of different Integrated Farming System modules for 20 nali's or 0.4 ha such as :</b></p> <p><b>Vegetable based – 18 nali protected cultivation/Offseason vegetable + 2 nali composting and Goatry/ Poultry</b></p> <ol style="list-style-type: none"> <li>1. Protected cultivation (100sqm low cost polyhouse- Capsicum, cucumber, Tomato, nurse raising and cole crops)/ off season vegetable; 17 nali + Composting (30sqm) + Goatry (4F+1M) /backyard poultry (50birds)</li> </ol> <p><b>Live stock based- 10 nali green fodder + 5 nali Dairy, composting and Goatry/ Poultry+ 5 nali Protected cultivation /Offseason vegetable</b></p> <ol style="list-style-type: none"> <li>1. Fodder production (10 nali; Sorghum, lobia-Oat in rainfed or berseem in irrigated) + Mini dairy (Crossbreed05) + Composting (50sqm) + Protected cultivation; 5 nali</li> </ol> <p><b>Crop based- 15 nali crop and vegetable+ 5 nali Dairy, composting and Goatry/ Poultry+ 2 nali Nursery raising Protected cultivation 5 nali</b></p> <ol style="list-style-type: none"> <li>1. Truthfull seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea); 15 nali + Planting material supply 2 nali + Mushroom + Composting</li> <li>2. Crop 14 nali (Gahat, madua, soyabean, lentil- 7 nali + vegetable- Cucurbits, French bean, veg pea, tomato, capsicum and leafy vegetables (7 nali)-dairy/backyard poultry; 5 nali +composting (50 sqm).</li> </ol>

<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant in Lamgara, Dhauladevi, Hawalbagh, Tarikhet.</li> <li>2. Establishment of Food and Processing Units at fruit/vegetable patti i.e. Lamgara, Tarikhet, Sult, Syaldey, Dehghat, Dhauladevi.</li> <li>3. Establishment of Value addition centre at Takula, Hawalbagh, Dwarahat, Chaukhutiya, Bhaisiyachanna.</li> <li>4. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all blocks.</li> <li>5. Establishment of marketing chain for efficient/timely supply of produce/product from nyaypanchayat level.</li> <li>6. Promotion of common resources on custom hire basis viz. Mini thresher, mini tractor, power tiller etc. in Syaldey, Chaukhutia, Someshwar, Bhaisiyachanna.</li> <li>7. Establishment of small processing units for tertiary and value addition of local mango in Bhikhiyasein.</li> <li>8. Establishment of packaging infrastructure at nyaypanchayat level with packaging, sewing, sealing and labeling facilities.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in all blocks including Sult, Tarikhet and Dhauladevi.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in all blocks.</li> <li>3. Promotion of plantation of mulberry, wild fruit plants and fodder trees (Bheemal, Alnus, Celtis, Oak etc.) in all blocks.</li> <li>4. Regular maintenance of soil bunds to save excessive loss of nutrients and minimize the water loss in wasteland in all blocks.</li> <li>5. Popularization of V- notch, trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of Loose check dam in gullies/ nalas, check dams in rivers/nalas, and desired artificial structure to maximize water percolation rate in marginal and denudated areas in all blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Development of pasture and drinking ponds for animals on waste land at nyaypanchayat level.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<p><b>Promotion of different techniques to reduce cultivation cost in all blocks such as:</b></p> <ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, self prepared vermicompost and biofertilizers to minimize the use of costly chemical fertilizers.</li> <li>2. Promotion of line sowing and recommended dose of fertilizers application in crops.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Promotion of hand tools in agricultural and horticultural operations.</li> </ol>



	<ol style="list-style-type: none"> <li>6. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers.</li> <li>7. Promotion of mulching (bio or degradable plastic) in vegetables and fruits to maintain moisture and reduce intercultural operation cost.</li> <li>8. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>9. Promotion of tillers and other garden tools (serrated sickle, wheel hoe, handle fork, handle kutla) for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like handicraft articles (aipen, jute bags, bichhu grass articles, herbal gulal, natural colours from different flowers, squash, pickles, mushroom production, home made / value added products (bari, papad, namkeen, biscuit), sweets (Bal mithai), copper/ iron utensils.</li> <li>2. Promotion of apiculture for small and landless farmers.</li> <li>3. Promotion of sericulture in low hills or valley areas particularly in Takula (Someswar), Saldye, Dhauladevi blocks.</li> <li>4. Promotion of cultivation and collection of medicinal plants in all blocks.</li> <li>5. Promotion of skill development in women and youth in all blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>2. Labelling of organic inputs and certification mechanism for various crops.</li> <li>3. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>4. Establishment of wood bank at Dunagiri and Shaharphatak areas to meet the present and future demand of germplasm in horticultural crops.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Compulsion of Soil Health Card Scheme, Kisan Credit Card and Crop Insurance for all farmers.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Creation of better transportation facilities with cool chain van at Block level (particularly vegetable/fruit/ floriculture).</li> <li>2. Establishment of collection center of fruit/ vegetable processing unit (Tarikhet, Sult, Dhauladevi) and its direct linkage with food processing industries for better prices.</li> <li>3. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>4. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>5. Installation of mini grading machines at village level.</li> <li>6. Establishment of cold room in different clusters i.e Almora,</li> <li>7. Deghat and Sult areas.</li> </ol>

<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Strengthening of internet connectivity.</li> <li>2. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>
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**District: Almora**  
**Zone: C (1500-2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p>Popularisation of high yielding varieties of major crops viz.</p> <ol style="list-style-type: none"> <li>1. Finger millet (VL Mandua 352 upto 2000 m amsl) in Dhaula Devi and Lamgara blocks.</li> <li>2. Barnyard millet (VL Madira 172 and VL Madira 207 upto 2000 m amsl) in Dhaula Devi and Lamgara blocks.</li> <li>3. Wheat (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 (from 1700 to 1700m amsl) and UP 2572) in Dhaula Devi, tarikhet and Lamgara blocks.</li> <li>4. Barley (VL Jau 118 and VLB 94 upto 1700m amsl) in Dhaula Devi, tarikhet and Lamgara blocks.</li> <li>5. Lentil (PL 5, PL 7, PL 8) in Dhaula Devi, tarikhet and Lamgara blocks.</li> <li>6. Vegetable pea (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown) in Dhaula Devi, Hawalbagh, Lamgara, Dwarahat, Tarikhet blocks.</li> <li>7. French bean (VL Bean 2 upto 1800m amsl) in Dhaula Devi, Hawalbagh, Lamgara, Dwarahat, Tarikhet blocks.</li> <li>8. Tomato (VL Tamatar 4 upto 1800m amsl, Manisha, Himsona, Navin 2000) in Dhaula Devi, Lamgara, Takula, Dwarahat and Tarikhet blocks.</li> <li>9. Capsicum (VL Shimla Mirch 3 upto 1800m amsl, California wonder, Bharat, Indra, Tanvi) in Dhaula Devi, Lamgara, Takula, Dwarahat and Tarikhet blocks.</li> <li>10. Cabbage (Varun, Pragati, Golden acre) in Dhaula Devi, Lamgara, Takula, Dwarahat and Tarikhet blocks.</li> <li>11. Potato (Kufri Jyoti, Kufri chandramukhi, Kufri Girriraj, Kufri Chipsona 1, Kufri chipsona 3) in Dhaula Devi, Lamgara, Takula, Dwarahat, and Tarikhet blocks.</li> <li>12. Gol Muli (Dunagiri Gol) in Dwarahat and Tarikhet blocks,</li> <li>13. Onion (VL Piaz 3 upto 2000m amsl) in Dhaula Devi, Lamgara, Takula, Dwarahat, Tarikhet blocks.</li> <li>14. Garlic (VL Lahsun 2) in Dhaula Devi and Lamgara blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Creation of additional water storage tank/ polytank for particular vegetable areas of Tarikhet (Chaubatia), Hawalbagh (Shitlakhet, Kasardevi), Lamgara (Shaharphatak, Motiaphar) and Dhauladevi (Jageshwar) for lean season.</li> <li>2. Promotion of rain water harvesting and drip-fertigation system in vegetable clusters in this zone in all blocks.</li> <li>3. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in particular vegetable growing areas viz. Tarikhet (Chaubatia), Hawalbagh (Shitlakhet, Kasardevi), Lamgara (Shaharphatak, Motiaphar) and Dhauladevi (Jageshwar)</li> </ol>
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	<p>4. Popularisation of roof water harvesting system in all villages.</p> <p>5. Rejuvenation and popularisation of traditional water harvesting systems (Naula) in all blocks.</p> <p><b>Adoption of cluster approach for holistic development</b></p> <p>1. Strengthening of old fruit belt of Tarikhet, Dwarahat (Dunagiri), Lamgara and Hawalbagh by introduction of new cultivars of stone fruits.</p> <p>2. Promotion of Ginger /Turmeric cultivation in shady areas in all blocks.</p> <p>3. Promotion of off season vegetable/protected cultivation (tomato, capsicum, radish, potato, onion, garlic cucumber, cole crops, leafy vegetable etc.) specially in Tarikhet, Hawalbagh, Lamgara, Dunagiri, Jageshwar.</p> <p>4. Fallow land development under agro-forestry in all blocks.</p> <p>5. Promotion of recommended high yielding varieties and organic cultivation in all blocks.</p> <p>6. Promotion of common minimum programme technology in vegetables to reduce the cost of cultivation and quality produce.</p> <p><b>Management of wild animal problem</b></p> <p>1. Promotion of bio fencing on trench bunds especially in vegetable belts in all blocks.</p> <p>2. Promotion of Citrus/ nut fruits, lady finger in vegetable, ginger or turmeric in spices, dual purpose varieties of barley, wheat and oats or Lemon grass at larger scale in cultivated field in all blocks to minimize the damage from wild pigs, monkeys and cows.</p> <p>3. Enacting legislative measures for protection of crop from wild animals in all blocks.</p> <p>4. Promotion of protected cultivation (low cost polyhouse, polytunnels etc.) in all blocks to ensure some income.</p> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <p>1. Adoption of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, Vivek Millet thresher cum pearler Vivek small tool kit for reduction in drudgery of hill farmers.</p> <p>2. Popularization of manually operated mini crop harvesters, small wheat /paddy thresher in Takula, Bhaisiyachanna and Hawalbagh.</p> <p><b>Adoption of efficient irrigation techniques</b></p> <p>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</p> <p>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</p> <p>3. Green House Cultivation for Vegetables</p> <p><b>Management of soil health</b></p> <p>1. Organic cultivation of traditional crop viz., finger millet, ugal, rice bean, barnyard millets, black soybean, horsegram, traditional rice in all blocks of this zone.</p> <p>2. Bio-fertiliser/soluble fertiliser based farming in rain fed areas of all blocks.</p>
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	<ol style="list-style-type: none"> <li>3. Adoption of pulse based crop rotation and maximum use of value added compost/FYM in all blocks.</li> <li>4. Making available the required recommended nutrients/ micro-nutrients at right time, place and quantity.</li> <li>5. Popularization of soil and water conservation measures by pulse based intercropping, contour farming and shoulder bunds in particular rainfed areas of all blocks.</li> <li>6. Promotion of soil testing kits in all blocks of this zone.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Selection of high milk breeds in buffaloes (Murrah) and cattle (Jersey, Sahiwal, Gir and Red Sindhi) in all blocks.</li> <li>2. Establishment of Fodder Bank in each block to meet fodder requirement of area.</li> <li>3. Establishment of milk chilling plant at Lamgara block</li> <li>4. Establishment of Molasses/Multinutrient feed block at Lamgara.</li> <li>5. Promotion of urea, molasses, multinutrient blocks at Nyaypanchayat level.</li> <li>6. Establishment of hatcheries for need of broiler or croiler at block level like at Saharfatak area.</li> <li>7. Introduction and promotion of cross Heifer by Artificial Insemination (AI) for increasing income of marginal farmer in all blocks.</li> <li>8. Improvement of cattle health through vaccination and proper feeding.</li> <li>9. Strengthening of traditional water bodies/rivulets with Mahaseer or carps at Garurabajh and Vishvnathan river areas.</li> <li>10. Popularisation of green fodder crops i.e. sorghum, lobia, maize, oat, berseem (Irrigated only) etc. in all blocks.</li> <li>11. Community pasture development at village level.</li> <li>12. Planning for establishment of Gaushala at block level to rear unproductive cattles to avoid the damage crops in cultivated areas in all blocks.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p><b>Promotion of different Integrated Farming System modules for 20 nali's or 0.4 ha such as :</b></p> <p><b>Vegetable based – 18 nali protected cultivation + 2 nali composting and Goatry/ Poultry</b></p> <ol style="list-style-type: none"> <li>1. Protected cultivation (100 sqm low cost polyhouse- Capsicum, cucumber, Tomato, nurse raising and cole crops)/ off season vegetable; 18 nali + Composting (50 sqm) + Goatry (4F+1M) /backyard poultry (50 birds)</li> </ol> <p><b>Live stock based- 10 nali green fodder + 5 nali Dairy, composting and Goatry/ Poultry+ 5 nali Protected cultivation</b></p> <ol style="list-style-type: none"> <li>1. Fodder production (10 nali; Sorghum, lobia-Oat in rainfed or berseem in irrigated) + Mini dairy (Crossbred 05) + Composting (50 sqm) + Protected cultivation; 5 nali</li> </ol> <p><b>Crop based- 15 nali crop and vegetable+ 5 nali Dairy, composting and Goatry/ Poultry+ 2 nali Nursery raising Protected cultivation 5 nali</b></p> <ol style="list-style-type: none"> <li>1. Truthfull seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea); 15 nali + Planting material supply 2 nali + Mushroom + Composting</li> </ol>

	2. Crop 14 nali (Gahat, madua, soyabean, lentil- 7 nali + vegetable- Cucurbits, French bean, veg pea, tomato, capsicum and leafy vegetables (7 nali)-dairy/backyard poultry; 5 nali +composting (50 sqm).
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant in Saharfatak, Hawalbagh and Chaubatiya.</li> <li>2. Establishment of Food and Processing Units at fruit/vegetable belt in Lamgara, Tarikhet, Jageshwar, Seharphatak and Bhikiasain.</li> <li>3. Establishment of Value addition centre at Takula, Jainti, Jageshwar, Hawalbagh (kasardevi) and Bhaisiyachanna.</li> <li>4. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all blocks.</li> <li>5. Establishment of marketing chain for efficient/timely supply of produce/product from nyaypanchayat level.</li> <li>6. Promotion of common resources on custom hire basis viz. Mini thresher, power tiller etc. in all blocks.</li> <li>7. Establishment of packaging infrastructure at nyaypanchayat level with packaging, sewing, sealing and labeling facilities.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in all blocks.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 35% slope in all blocks.</li> <li>3. Promotion of plantation of mulberry, wild fruit plants and fodder trees (Griwia, Alnus, Celtis, Oak, Buransh, Kaafal etc.) in all blocks.</li> <li>4. Regular maintenance of soil bunds to save excessive loss of nutrients and minimize the water loss in wasteland in all blocks.</li> <li>5. Popularization of V- notch, trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of Loose check dam in gullies/ nalas, check dams in rivers/nalas, and desired artificial structure to maximize water percolation rate in marginal and denudated areas in all blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Development of pasture and drinking ponds for animals on waste land at nyaypanchayat level.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<p><b>Promotion of different techniques to reduce cultivation cost in all blocks such as:</b></p> <ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, self prepared vermicompost and biofertilizers to minimize the use of costly chemical fertilizers.</li> <li>2. Promotion of line/cross sowing and recommended dose of fertilizers application in crops.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of hand tools in agricultural and horticultural operations.</li> <li>Adoption of Power tillers/ Power weeders, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/operated threshers.</li> <li>Promotion of mulching (bio or degradable plastic) in vegetables and fruits to maintain moisture and reduce intercultural operation cost.</li> <li>Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>Promotion of tillers and other garden tools (serrated sickle, wheel hoe, handle fork, handle kutla) for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>Promotion of subsidiary occupations like handicraft articles (aipen, squash, Rambaans products, pickles, mushroom production, home made/ valueadded products (bari, papad, namkeen, biscuit), copper/ iron utensils.</li> <li>Promotion of sericulture in all blocks.</li> <li>Promotion of cultivation and collection of medicinal plants in all blocks.</li> <li>Promotion of skill development in women and youth in all blocks.</li> <li>Promotion of textile based articles.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>Labelling of organic inputs and certification mechanism for various crops.</li> <li>Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>Establishment of wood bank at Shaharphatak and Chaubatiya areas to meet the present and future demand of germplasm in horticultural crops.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>Compulsion of Soil Health Card Scheme, Kisan Credit Card and Crop Insurance for all farmers.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Creation of better transportation facilities with cool chain van at Block level (particularly vegetable/fruit/ floriculture).</li> <li>Establishment of collection center of fruit/ vegetable processing unit (Saharfatak, Tarikhet, Dhauladevi) and its direct linkage with food processing industries for better prices.</li> <li>Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>Installation of mini grading machines at village level.</li> <li>Establishment of cold room in different clusters e.g. Shaharfathak, Chaubatia, Dunagiri, Jageshwar areas.</li> </ol>

<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Strengthening of internet connectivity.</li> <li>2. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>
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## Technology Intervention Success Stories

### Example 1: Prosperity in Village Mahat Gaon through Adoption of Basmati Rice Technology [Krishi Vigyan Kendra (Almora)]

<b>Name of Village</b>	<b>Mahatgaon</b>
<b>Number of farm families</b>	<b>165</b>
<b>Net cultivated area (ha)</b>	<b>12.00</b>
<b>Major crops grown</b>	<b>Rice, Finger millet, soybean, Horse gram, wheat, lentil, pea, oil seed</b>
<b>Altitude &amp; Farming situation</b>	<b>1200 m &amp; irrigated</b>
<b>Technology intervened</b>	<b>Basmati rice-HYV Pusa Basmati 1509</b>
<b>Farmers practice (FP)</b>	<b>Pahari basmati rice, tall plants hence, lodging problem, susceptible to blast, poor yield and least fragrance</b>
<b>Number of farmers involved</b>	<b>22</b>
<b>Total area of rice (ha)</b>	<b>1.34</b>
<b>Area of new tech. i.e. Pusa Basmati 1509</b>	<b>1.00</b>

<b>Impact of Technology</b>	
<b>Replacement from new variety</b>	<b>74 per cent</b>
<b>Yield (kg/ha)</b>	<b>FP :19.00 Demo : 33.50</b>
<b>Per cent increase in yield over FP</b>	<b>76</b>
<b>Net return (Rs/ha)</b>	<b>FP :11600 Demo : 51750</b>
<b>Impact of technology</b>	<b>Horizontal expansion of new technology nearly 25-30 per cent, motivation of farmers towards adoption of new technology, increased income and Agriculture department promoting it in other irrigated valleys of the district</b>
<b>Farmers reaction</b>	<b>No lodging problem, tolerant to disease and pest, increases length of rice grain, full of fragrance and tasty and cattle's eat the straw very quickly.</b>



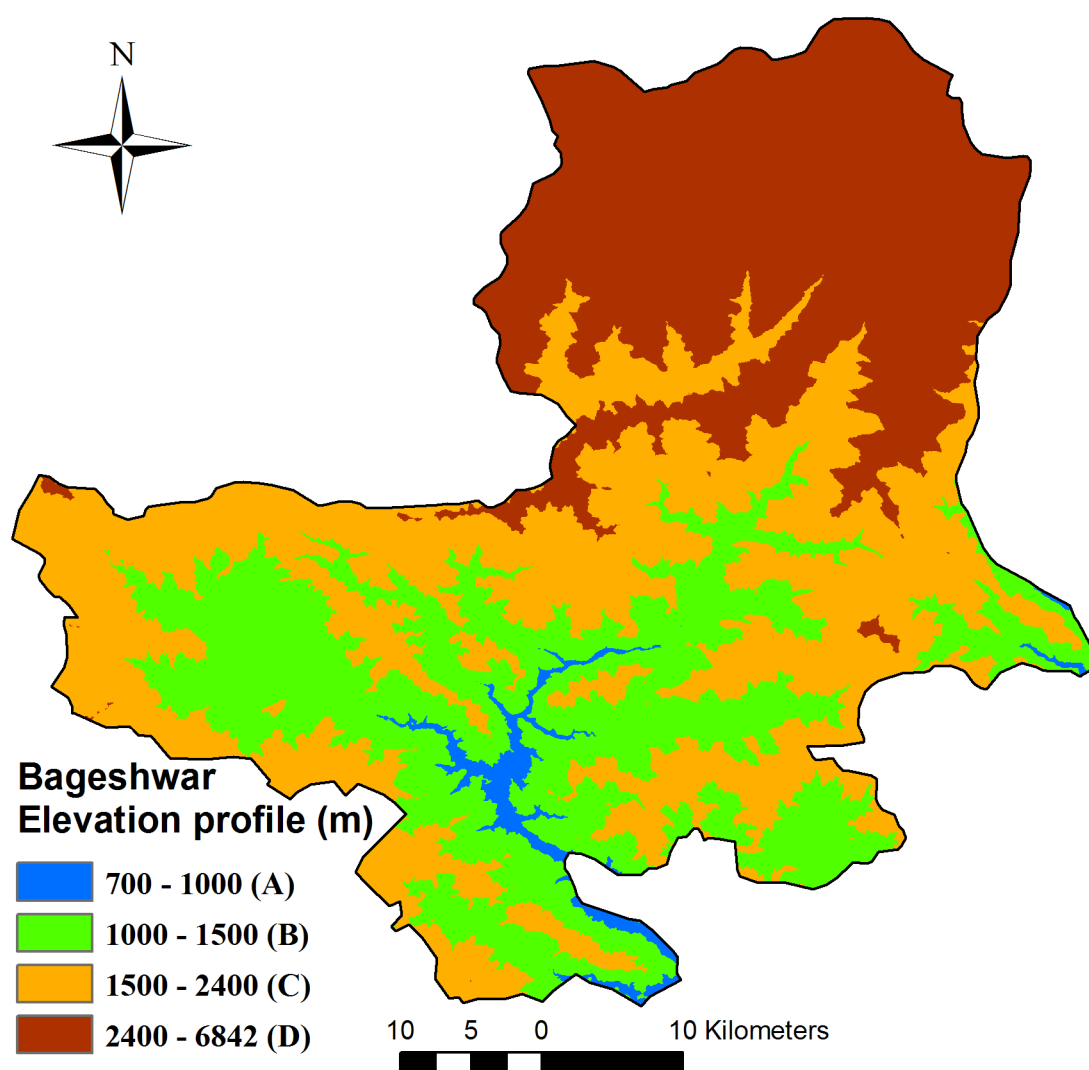
**Example 2: Area Expansion under HYV of French bean and Income Enhancement in Village Bintola [Krishi Vigyan Kendra (Almora)]**

<b>Name of Village</b>	<b>Bintola</b>
<b>No. of farm families</b>	<b>65</b>
<b>Net Cultivated Area</b>	<b>300 nali i.e. 6 ha</b>
<b>Major vegetables grown</b>	<b>Vegetable Pea, French bean, Capsicum, Tomato, Cole Crops and Green leafy vegetables</b>
<b>Technology Introduced</b>	<b>HYV of French bean</b>
<b>Farmers' practice</b>	<b>Locally available varieties</b>
<b>No. of farm families targeted</b>	<b>45</b>
<b>Area under specific crop i.e. French bean before intervention</b>	<b>40 nali i.e. 0.8 ha</b>

<b>Impact of Technology</b>	
<b>Area under specific crop i.e. French bean after intervention</b>	<b>100 nali i.e. 2 ha</b>
<b>Replacement of variety</b>	<b>Approx. 90%</b>
<b>Yield before intervention</b>	<b>25 q/ha</b>
<b>Yield after before intervention</b>	<b>40 q/ha</b>
<b>Net Return before intervention</b>	<b>Rs.62,500/ha</b>
<b>Net Return after intervention</b>	<b>Rs.1,80,000/ha</b>
<b>Percent Increase in Yield</b>	<b>60%</b>
<b>Impact of technology</b>	<b>Area under crop increased and consequently income of farmer increased.</b>



## **DISTRICT: BAGESHWAR**



**Figure 8: District Bageshwar elevation profile**



**District: Bageshwar**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572), Irrigated rice (VL Dhan 65, VL Dhan 85, VL Dhan 68 and Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355, Pusa Basmati 1509 &amp; PRH 10,); Rainfed spring rice (VL Dhan 208 and VL Dhan 209), June sown (Vivek Dhan 154, VL Dhan 157), Barley (VL Jau 118 and VLB 94); Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Bageshwar, Kapkot and Garur blocks.</li> <li>2. Promotion of high yielding varieties of finger millets (VL Mandua 324, VL Mandua 352, PRM1) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) in Bageshwar, Kapkot and Garur blocks.</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 126, VL Masoor 507, VL Masoor 129), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (VLS 47, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1) in Bageshwar, Kapkot and Garur blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, &amp; 12), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (VL Tamatar 4), Onion (VL Piaz 3) and garlic (VL Lehsun 1) in Bageshwar, Kapkot and Garur blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Bageshwar, Kapkot and Garur blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of mango in Bageshwar and Garur blocks.</li> <li>2. Cultivation of Cinnemon (Tejpatta) plants at low hills in Garur block particularly Katyur cluster.</li> <li>3. Promotion of ginger cultivation in all blocks of the zone.</li> <li>4. Promotion of organic cultivation of turmeric in Bageshwar, Kapkot and Garur block.</li> <li>5. Promotion of onion and garlic cultivation in Bageshwar and Garur block.</li> <li>6. Promotion of off season vegetables (tomato, capsicum, cole crops etc.) cultivation in Bageshwar, Kapkot and Garur blocks.</li> </ol>
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	<ol style="list-style-type: none"> <li>7. Promotion of production of tomato cultivation in Bageshwar, Kapkot and Garur block with the use of proper crop rotation.</li> <li>8. Promotion of production of vegetable pea, okra in Bageshwar and Garur block.</li> <li>9. Promotion of production of pigeon pea in Bageshwar, Kapkot and Garur block.</li> <li>10. Promotion of production of lentil in Katyur and Gagrighol cluster of Garur block; Rithagarh valley of Bageshwar block.</li> <li>11. Promotion of organic production of basmati rice in Katyur cluster in Garur block, Rithagarh, Billonasera and Mandalsera clusters of Bageshwar block.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Bageshwar, Kapkot and Garur block.</li> <li>4. Promotion of cultivation of Mehal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, millet thresher &amp; pearler for drudgery reduction of hill farmers in all the blocks of the zone.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Surface irrigation in laser levelled land</li> <li>2. Micro- irrigation system in Citrus, Mango, Litchi, Guava and in Vegetables</li> <li>3. Drip Irrigation in Green House Cultivation for Cut Flowers and Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>3. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp in different blocks.</li> <li>4. Organic cultivation of local grain and millets in different blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> </ol>
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	<p>7. Adoption of moisture conservation practices.</p> <p>8. Promotion to focus on timely weed management.</p>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Bageshwar, Kapkot and Garur block, while promotion of wool yielding breeds of sheep in Kapkot block.</li> <li>2. Establishment of Fodder Bank in Bageshwar, Kapkot and Garur block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Garur and Bageshwar block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Garur block.</li> <li>7. Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>8. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  Rice - Wheat  Maize- Wheat  Horse gram/ Pigeon pea – Lentil  Tomato/ Capsicum – Vegetable Pea  Okra – Potato</p> <p><b>Horticulture</b></p> <ul style="list-style-type: none"> <li>• Mango/Guava/ Citrus (100 plants)</li> </ul> <p><b>Livestock</b></p> <ul style="list-style-type: none"> <li>• Cow (01)/ Buffalo(01) + Backyard Poultry (100)</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• Vermi-composting (20m<sup>2</sup>)</li> <li>• Fodder production in terrace risers and bunds.</li> </ul>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for mango, pear and stone fruits at Bageshwar, Kapkot and Garur blocks.</li> <li>2. Establishment of Food Processing Units for pear at Garur, mango at Bageshwar &amp; Malta at Kapkot blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Bageshwar, Kapkot and Garur blocks.</li> <li>5. Tertiary and value addition of mango, citrus fruits, pear in Bageshwar, Kapkot and Garur blocks by establishment of small processing units.</li> </ol>

	<ol style="list-style-type: none"> <li>6. Establishment of Food and Processing Units at Bageshwar for pickle making using wild Aonla, mango &amp; hill lemon.</li> <li>7. Promotion of common resources on custom hire basis viz. Power tiller in Garur &amp; Bageshwar areas, Mini wheat and Paddy thresher in Garur, Kapkot &amp; Bageshwar blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Sama, Karmi and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phytoremediation technique at sewer drainage points.</li> <li>10. Establishment of waste water treatment plants based on phytoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zinc, Boron, Phosphorus, etc.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Vivek Millet thresher cum pearler, VL Paddy thresher, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/ Paddy reapers and Vivek small tool kit for reduction in drudgery of hill farmers)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation (Drip and Sprinkler Irrigation) techniques in horticultural crops.</li> </ol>



<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks of Bageshwar district.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Garur and Kapkot blocks.</li> <li>3. Promotion of skill development in women and youth in all three blocks.</li> <li>4. Creation of new SHGs in other villages of three blocks.</li> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Land consolidation in Bageshwar district is essentially required.</li> <li>2. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>3. Implementation of Soil Health Card Scheme in each block.</li> <li>4. Increasing institutional support by providing subsidies and incentives to small and marginal farmers in three blocks.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>6. Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>7. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>8. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini mandies at Block level.</li> <li>2. Creation of better transportation facilities with cool chain van at Block level.</li> <li>3. Creation of direct linkages with food processing industries for better prices.</li> <li>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of cold room in Garur and Bageshwar blocks.</li> <li>8. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>9. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Bageshwar**  
**Zone: B (1000 to 1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 832, VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572), paddy (VL Dhan 65, Vivek Dhan 85 and Vivek Dhan154, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355, Pusa Basmati 1509 &amp; PRH 10,); Barley (VL Jau 118 and VLB 94); Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Bageshwar, Kapkot and Garur blocks.</li> <li>2. Promotion of high yielding varieties of finger millets (VL Mandua 324, VL Mandua 352, PRM1) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) in Bageshwar, Kapkot and Garur blocks.</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 126, VL Masoor 507, VL Masoor 129), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (VLS 47, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1) in Bageshwar, Kapkot and Garur blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10&amp; 11), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (VL Tamatar 4), Onion (VL Piaz 3) and garlic (VL Lehsun 1) in Bageshwar, Kapkot and Garur blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Bageshwar, Kapkot and Garur blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of citrus fruit (lime/ lemon/ malta) plants at mid hills in Garur and Kapkot blocks.</li> <li>2. Promotion of ginger cultivation in all blocks of the zone.</li> <li>3. Promotion of organic cultivation of turmeric in Bageshwar, Kapkot and Garur block.</li> <li>4. Promotion of onion and garlic cultivation in Bageshwar and Garur block.</li> <li>5. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Kapkot block.</li> <li>6. Promotion of production of vegetable pea, okra in Bageshwar and Garur block.</li> <li>7. Promotion of production of pigeon pea in Bageshwar, Kapkot and Garur block.</li> </ol>
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	<p>8. Promotion of production of lentil in Katyur and Gagrigol cluster of Garur block; Rithagarh vellay of Bageshwar block</p> <p>9. Promotion of organic production of basmati rice in Katyur cluster in Garur block, Rithagarh, Billonasera and Mandalsara clusters of Bageshwar block.</p> <p><b>Management of wild animal problem</b></p> <p>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</p> <p>2. Enacting legislative measures for protection of crop from wild animals.</p> <p>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Bageshwar, Kapkot and Garur block</p> <p>4. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</p> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <p>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</p> <p>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers in all the blocks of the zone.</p> <p><b>Adoption of efficient irrigation techniques</b></p> <p>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</p> <p>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</p> <p>3. Green House Cultivation for Vegetables</p> <p><b>Management of soil health in low or valley areas</b></p> <p>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</p> <p>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</p> <p>3. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp in different blocks.</p> <p>4. Organic cultivation of local grain and millets in different blocks.</p> <p><b>Others</b></p> <p>1. Cluster approach for holistic development.</p> <p>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</p> <p>3. Cultivation of fodder crops &amp; medicinal plants.</p> <p>4. Adoption of only well decomposed FYM/ value added compost.</p> <p>5. Adoption of efficient and timely use of IPM and IDM practices.</p> <p>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</p> <p>7. Promotion of moisture conservation practices.</p> <p>8. Promotion to focus on timely weed management.</p>
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<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Bageshwar, Kapkot and Garur block, while promotion of wool yielding breeds of sheep in Kapkot block.</li> <li>2. Establishment of Fodder Bank in Bageshwar, Kapkot and Garur block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Garur and Bageshwar block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Garur block.</li> <li>7. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>8. Introduction and promotion of Cross breed and Milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  Rice - Wheat  Maize- Wheat  Horse gram/ Pigeon pea – Lentil  Tomato/ Capsicum – Vegetable Pea  Okra – Potato</p> <p><b>Horticulture</b></p> <ul style="list-style-type: none"> <li>• Citrus fruits (100 plants)</li> </ul> <p><b>Livestock</b></p> <ul style="list-style-type: none"> <li>• Cow (01)/ Buffalo(01) + Backyard Poultry (100)</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• Vermi-composting (20m<sup>2</sup>)</li> <li>• Fodder production in terrace risers and bunds.</li> </ul>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for mango, pear and stone fruits at Bageshwar, Kapkot and Garur blocks.</li> <li>2. Establishment of Food Processing Units for pear at Garur, mango at Bageshwar &amp; Malta at Kapkot blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Bageshwar, Kapkot and Garur blocks.</li> <li>5. Establishment of small processing units for tertiary and value addition of mango, citrus fruits, pear in Bageshwar, Kapkot and Garur.</li> <li>6. Establishment of Food and Processing units at Bageshwar for pickle making using wild Amla, mango &amp; hill lemon.</li> </ol>

	<p>7. Promotion of common resources on custom hire basis viz. Power tiller in Garur &amp; Bageshawar areas, Mini wheat and Paddy thresher in Garur, Kapkot &amp; Bageshwar blocks.</p>
<p><b>Strategy 5 : Waste land development and waste water treatment</b></p>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Sama, Karmi and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak etc.) may be promoted in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<p><b>Strategy 6 : Reduced cultivation cost</b></p>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.).</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation (Drip and Sprinkler Irrigation) techniques in horticultural crops.</li> </ol>
<p><b>Strategy 7 : Off-farm income</b></p>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks of Bageshwar district.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Garur and Kapkot blocks.</li> <li>3. Promotion of skill development in women and youth in all three blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Creation of new SHGs in other villages of three blocks.</li> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Land consolidation in Bageshwar district is essentially required.</li> <li>2. Policies must be implemented for control of wild animal menace in agricultural areas.</li> <li>3. Implementation of Soil Health Card Scheme in each block.</li> <li>4. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>6. Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>7. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>8. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies at Block level.</li> <li>2. Creation of better transportation facilities with cool chain van at Block level.</li> <li>3. Creation of direct linkages with food processing industries for better prices.</li> <li>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of cold room in Garur and Bageshwar blocks.</li> <li>8. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>9. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Bageshwar**  
**Zone: C (1500 to 2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155 and HS 365 (from 1700 to 2400m amsl), Maize (Vivek Sankul Makka 31, Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53 upto 2000m amsl), paddy (VL Dhan 86) in Kapkot and Garur blocks.</li> <li>2. Promotion of high yielding varieties of finger millets (VL Mandua 352 and PRM1), Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) and in Kapkot and Garur blocks.</li> <li>3. Promotion of high yielding varieties of vegetable pea (Vivek Matar 11 &amp; 12), French bean (VL Bean 2), tomato (VL Tamatar 4), Onion (VL Piaz 3) and garlic (VL Lehsun 1) in Kapkot and Garur blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Bageshwar, Kapkot and Garur blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of citrus fruit (lime/ lemon/ malta) plants, Kiwi (Allison/ Haward/ Monty + Tomari) at mid &amp; high hills in Garur and Kapkot blocks.</li> <li>2. Promotion of ginger cultivation in all blocks of the zone.</li> <li>3. Promotion of organic cultivation of turmeric in Bageshwar, Kapkot and Garur block.</li> <li>4. Promotion of onion and garlic cultivation in Bageshwar and Garur block.</li> <li>5. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Kapkot block.</li> <li>6. Promotion of production of vegetable pea in Kapkot and Garur blocks.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Bageshwar, Kapkot and Garur block.</li> </ol>
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	<ol style="list-style-type: none"> <li>4. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> <li>5. Promotion of chestnut and stone fruits.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>3. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp in different blocks.</li> <li>4. Organic cultivation of local grain and millets in different blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices.</li> <li>8. Promotion to focus on timely weed management</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion and up-gradation of local breeds with high milking breeds of cows (Jersey &amp; Holstein friesian), and goats (Sirohi) in Bageshwar, Kapkot and Garur block, while promotion of wool and meat yielding breeds of sheep (Rambouillet and marino) in Kapkot block.</li> <li>2. Establishment of Fodder Bank in Bageshwar, Kapkot and Garur block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Garur and Kapkot block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broilior or croilior at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Strengthening of traditional water bodies/ rivulets with Mahaseer, Rainbow trout in Kapkot block.</li> </ol>



	<p>7. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</p> <p>8. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</p>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  Soybean – Lentil  Cole Crops – Vegetable pea  Maize- Potato  Pea - Wheat</p> <p><b>Horticulture</b></p> <ul style="list-style-type: none"> <li>• Kiwi &amp; Pear fruits (100 plants)</li> </ul> <p><b>Livestock</b></p> <ul style="list-style-type: none"> <li>• Cow (01) + Sheep (10)</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• Bee Keeping and poly tunnels for nursery raising</li> <li>• Vermi-composting (20m<sup>2</sup>)</li> </ul>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for Kiwi, pear and stone fruits at Kapkot and Garur blocks.</li> <li>2. Establishment of Food Processing Units for pear at Garur, Kiwi &amp; Malta at Kapkot blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Bageshwar, Kapkot and Garur blocks.</li> <li>5. Establishment of small processing units for tertiary and value addition of Kiwi, citrus fruits, pear in Kapkot and Garur blocks.</li> <li>6. Promotion of common resources on custom hire basis viz. Power tiller in Garur &amp; Bageshwar areas, Mini wheat and Paddy thresher in Garur, Kapkot &amp; Bageshwar blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Sama, Karmi and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Garur, Kapkot &amp; Bageshwar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Alnus, Quercus, Morus and Bauhinia etc.) may be promoted in Garur &amp; Kapkot blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Garur &amp; Kapkot blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Garur &amp; Kapkot blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>

<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zinc, Boron, Phosphorus, etc. may be provided.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, horticulture improved kits etc.)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Garur &amp; Kapkot blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation (Drip and Sprinkler Irrigation) techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks of Bageshwar district.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Garur and Kapkot blocks.</li> <li>3. Promotion of skill development in women and youth in all three blocks.</li> <li>4. Creation of new SHGs in other villages of three blocks.</li> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Land consolidation in Bageshwar district is essentially required.</li> <li>2. Policies must be implemented for control of wild animal menace in agricultural areas.</li> <li>3. Implementation of Soil Health Card Scheme in each block.</li> <li>4. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>6. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>7. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>8. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini mandies at Block level.</li> <li>2. Creation of better transportation facilities with cool chain van at Block level.</li> <li>3. Creation of direct linkages with food processing industries for better prices.</li> <li>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of cold room in Garur and Bageshwar blocks.</li> <li>8. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>9. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> <li>10. Development of policies to ensure the purchasing of farm produce/ products at farmers field site to encourage the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

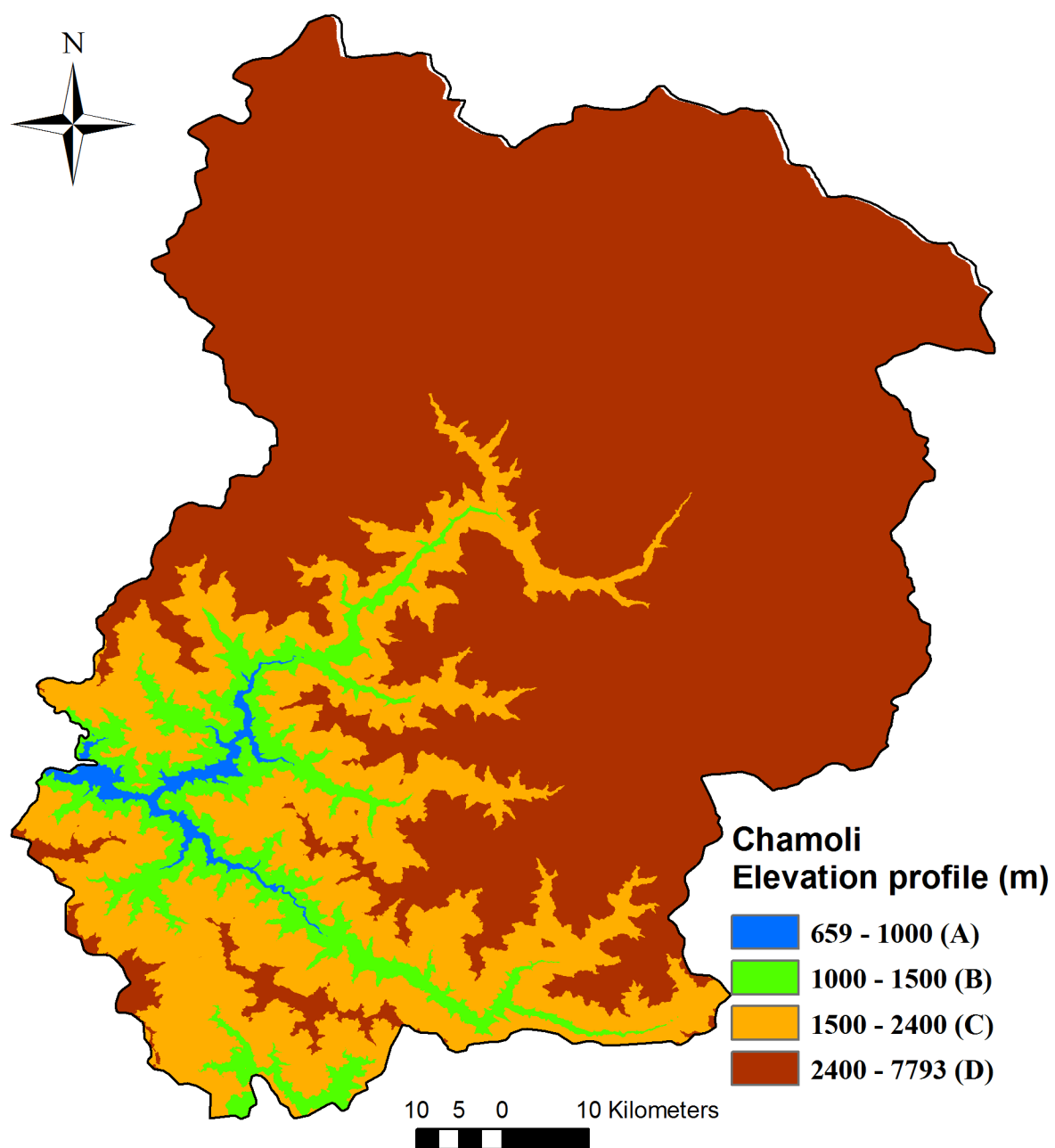
## Technology Intervention Success Stories

### Example 1: Farming Income Doubled through Integrated Farming System - Manoj Singh Bharara (Bageshwar) [Krishi Vigyan Kendra (Bageshwar)]

S. No	Farming component	Area (ha / No.)	Economics during 2012-13			Impact after five years (2016-17)		
			Cost of cultivation (Rs.)	Net income (Rs.)	BCR	Cost of cultivation (Rs.)	Net income (Rs.)	BCR
1	Crop	0.7	37712	28575	1.75	4721700	51011	2.08
2	Vegetables	0.6	88920	62030	1.69	92660-	113340	2.26
3	Livestock	5	144000	120000	1.83	164000	281500	2.71
4	Fodder production	0.08	800	800	2.00	1100	1700	2.54
5	Fish production	0.02	30000	28000	1.93	18000-	36000	3.00
6	Poultry production	50	6000	8000	2.33	7900	10100	2.27
7	Mushroom production	3 kg spawn	490	630	2.28	520	740	2.42
	Total		307772	246585	1.80	331007	495981	2.49



## DISTRICT: CHAMOLI



**Figure 9: District Chamoli elevation profile**



**District: Chamoli**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p><b>Among Cereals</b> promotion of high yielding varieties at block Tharali, Ghat Karnprayag and Gairsain of</p> <ol style="list-style-type: none"> <li>1. <b>Wheat</b> (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572,)</li> <li>2. <b>Paddy (Irrigated condition)</b> VL Dhan 85, VL Dhan 81, VL Dhan 86, Vivek Dhan 62, VL Dhan 65 and VL Dhan 68 <b>Rainfed- Chatki Dhan</b>-VL Dhan 208, VL Dhan 209 <b>Jethi dhan</b> -Vivek Dhan 154, VL Dhan 157, VL Dhan 156, VL Dhan 158, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355 plus)</li> </ol> <p><b>Millets</b> Promotion of high yielding varieties at block Karnprayag and Gairsain of</p> <ol style="list-style-type: none"> <li>1. <b>Finger millets</b> (VL Mandua 324, and VL Mandua 352)</li> <li>2. <b>Barnyard millet</b> (PRJ-1, VL Madira 172 and VL Madira 207)</li> <li>3. <b>Maize</b> Promotion of high yielding varieties (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Mize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Vivek Sankul Makka 31, Surya, Kanchan, Naveen)</li> </ol> <p><b>Pulses</b> Promotion of high yielding varieties at Narayanbagar, Ghat, Pokhari, Karnprayag and Gairsain of</p> <ol style="list-style-type: none"> <li>1. <b>Lentil</b> (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514)</li> <li>2. <b>Horse gram</b> (VL Gahat 10, VL Gahat 15 and VL Gahat 19)</li> <li>3. <b>Urd</b> ( PU-19, PU-35)</li> <li>4. <b>Pigeon pea</b> (VL Arhar 1, Pant Arhar-291, Pant Arhar-3)</li> </ol> <p><b>In oilseed crops</b> promotion of high yield var. rich in oil content of</p> <ol style="list-style-type: none"> <li>1. <b>Toria/sarso</b> ( PT-303, 507, Uttara, PPS-1) at block Karnprayag and Gairsain</li> <li>2. <b>Soybean</b> (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65 PS 1092)</li> </ol> <p><b>In Fruit crops</b> ppromotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. <b>Mango</b> (Dashahari, Langra, Bombay, Amrapali)</li> <li>2. <b>Gauva</b> (Lucknow -49, Allahabad Safeda, Pant Prabhat, Chittidar)</li> <li>3. <b>Citrus</b> (Malta - Blood Red, Valeneia. Lemon &amp; Lime: Pant Lemon - 1, Kagzi lime) at block Karnprayag and Gairsain.</li> </ol> <p><b>Under Vegetable crops</b></p> <ol style="list-style-type: none"> <li>1. <b>Chilli</b> (Agni, Shikha, Kashi Anmol, Pant C-1, Tejaswani, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3)</li> <li>2. <b>Tomato</b> (VL Tamatar 4, Indeterminate hybrid Avinash (A-2), Himsona, Manisha, Naveen 2000+, Badshah, Shensha (Private Sector Varieties) or any other high yielding hybrid resistant to bacterial wilt should be slected for cultivation in hills.</li> <li>3. <b>Brinjal hybrids</b> (Chaya (L), PPL-74 (L), Pant Samrat (L), Pant Rituraj (R), Navkiran (R) and Rajni (R)</li> <li>4. <b>French bean</b> (VL Bauni Bean 1, VL Bean 2 and Anupama)</li> <li>5. <b>Cucumber</b> (1.For open field condition: Pusa Udhay, Pusa Barkha, Shubhangi, Himangi, Punjab Naveen, Tasty, Ruchi, Mandakini,</li> </ol>
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	<p>Kumud, Noori, Alamgir, Rani) 2. For protected condition: Pant Parthenocarpic Cucumber-2 and 3, Hilton, Kian, Isatis, Malini).</p> <p>6. <b>Capsicum</b> (VL Shimla Mirch 3, California wonder, Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, Pusa Dipti, Tanvi + and Swarna )</p> <p>7. <b>Onion</b> (VL Piaz 3, Agrifond Light Red).</p> <p>8. <b>Pea</b> (Vivek Matar 10 and Vivek Matar 12, Pusa Pragati, Pant Sabji Matar 3, Azad Pea 3, GS-10, RS-10 (Priya)</p> <p>9. <b>Cabbage</b> (T-621, Pragati, Indica, Varuna, Pusa Mukta, Sri Ganesh Gol, Green Star, Pride of India)</p> <p>10. <b>Cauliflower</b> Pusa Kartiki, Pusa Early Synthetic (Early season), Pusa Shubhra, Pant Shubhra, Hisar No.1, Snow Crown (Mid Season Var.) Snowball-16 Pusa Shubra, Pusa Snowball-16, PSBK-25 (Late Season Var.) in Karnprayag, Narain Bagar, Ghat, Tharali and Gairsain.</p> <p>11. <b>Radish</b> Dunagiri Gol, Early Mino, Japanese white, Japanese White, Pusa Himani, Pusa Chetki, Pusa Reshmi, Arka Nishant, Punjab Pasand</p> <p>12. <b>Potato</b> Kufri Giriraj, Kufri Chipsona 1, Kufri chipsona 3, K. Khyati, K. Pukhraj K. Ashok, K. Sadabahar, K. Anand</p> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Fodder Crops : Promotion of high yielding varieties of</b></p> <p>1. <b>Berseem</b> :BL-10, UPB-10</p> <p>2. <b>Shorgum</b> (SSG-988, PC-29, MP chari, PCH-106)</p> <p>3. <b>Lobia</b> (UPC-5286, UPC-4200, BL-1)</p> <p>4. <b>Fodder Maize</b> (Ganga-2, Ganga-5, QPM )</p> <p>5. <b>Jai -Oat</b> (JHO-851, UPO-94, OS-6)</p> <p>6. <b>Hybrid Napier</b> (IGFRI-3, IGFRI- 6, IGFRI -10, NB-21) at Gauchar and Maithan in block Karnprayag and Gairsain, respectively.</p> <p><b>Medicinal Plants</b></p> <p>1. <b>Alovera</b> (Sim Sheetal)</p> <p>2. <b>Brahmi</b> (Praja Shakti, Subodhak) at Gauchar and Maithan in block Karnprayag and Gairsain, respectively.</p> <p><b>Flowers</b></p> <p>1. <b>Marigold</b> (African Genda, Pusa Narangi, Pusa Basanti Moonsoth, Merinar French Genda, Tina, Singhnet, Golden boy</p> <p>2. <b>Rose</b> (For Gulabjal and oil- Noorjahan, Ranisahiba, For flowers- First red, Sonia, Noveleze)</p> <p>3. <b>Gladiolous</b> (American buty, Oscar friendship, Shobh Sapna Poonam)</p> <p>4. <b>Rajnigandha</b> (Hybrid varieties Subhashin, and Shringar) at Gauchar and Maithan in block Karnprayag and Gairsain, respectively.</p> <p><b>Live stock Animals and Birds:</b> Promotion of high yielding milk, meat, wool and egg &amp; meat breed of different cattle's, Buffaloes, Sheep and Goat and poultry birds.</p> <p>1. <b>Buffalo</b> (Murraha, Neeli-ravi)</p> <p>2. <b>Cattle</b> (Badri, Cross bred of Jursey, HF, Sahiwal)</p> <p>3. <b>Goatary</b> (Barbari, Jamunapari, Gaddi, Chigu from H.P.)</p> <p>4. <b>Sheep</b> ( Gaddi, Bhakarwal, Gurej, Kashmir, Merino)</p>
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	<p>5. <b>Poultry</b> (Croiler, Kadaknath, Cob, Cari-davendra, cari-nirbheek)</p> <p>6. <b>Fisheries</b> (Silver carp, grass carp and common carp)</p> <p>At Gauchar and Maithan in block Karnprayag and Gairsain, respectively.</p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Construction of rain water harvesting structures (LDPE tank, Cemented tanks) in private as well as government buildings in all blocks.</li> <li>3. Construction of trenches for high percolation of water in valley area in Block Tharali-Chiding state cluster villages and Benauli, at Nauli-Banauli in block Narayan Bagar, Gauchar, Tefna, Langasu, Zilasu &amp; Kaleshwar cluster villages in block Karnprayag, Saitauli, and Bizar cluster villages in block Ghat.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip irrigation system in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Need to introduce new malta specially Brazilian Malta in block Ghat, Gairsain, Dewal, Tharali, Narayan Bagar.</li> <li>2. Popularization and promotion of Zero energy cool chamber among farmer group at Nyay Panchayat level.</li> <li>3. Introduction of small stature mango varieties like Amrapali etc. in the valley of block Tharali, Dewal, Gairsain &amp; Ghat.</li> <li>4. Cultivation of Cinnemon (Tejpatta) plants at low hills in Tharali, Karnprayag, and Ghat block.</li> <li>5. Promotion of ginger cultivation in all blocks of the zone.</li> <li>6. Promotion of organic cultivation of turmeric in low valley areas of Tharali, Ghat, Deval, Karnprayag and Gairsain block.</li> <li>7. Promotion of onion and garlic cultivation in Tharali, Gairsain, Ghat, Naraynan Bagar and Karnprayg blocks.</li> <li>8. Promotion the cultivation of off season vegetables (tomato, capsicum, cole crops etc.) in Tharali, Gairsain, Ghat, Naraynan Bagar and Karnprayg blocks.</li> <li>9. Promotion of production of tomato cultivation in Tharali, Gairsain, Ghat, Naraynan Bagar and Karnprayg blocks with the use of proper crop rotation.</li> <li>10. Promotion of production of vegetable pea, okra and French Bean Tharali, Gairsain, Ghat, Naraynan Bagar and Karnprayg blocks.</li> <li>11. Promotion of production of pigeon pea in Karnprayag, Tharali and Ghat block.</li> <li>12. Promotion of production of lentil in Tharali, Narayan Bagar, Ghat, Gairsain &amp; Karnprayag block.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Promotion of chilli, capsicum &amp; okra in all blocks as these are least affected by monkey menace.</li> </ol>
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	<ol style="list-style-type: none"> <li>3. Enacting legislative measures for protection of crop from wild animals.</li> <li>4. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in all the blocks</li> <li>5. Promotion of cultivation of Kafal, Mango, Hishalu, wild walnut, Mahal and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers in all the blocks of the zone.</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil sampling and soil testing in intensive mode and distribution of soil health card to farmers for judicious use of Manure and fertilisers.</li> <li>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>3. Promotion of pulses crops in crop rotation to improve soil fertility and productivity.</li> <li>4. Organic cultivation of local grain and millets in different blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, oil crops. High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder and forage crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices.</li> <li>8. Promotion to focus on timely sowing and weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Tharali, Narayan Bagar, Karnprayag, Gairsain and Ghat block, while promotion of wool yielding breeds of sheep in Tharali and Deval block.</li> <li>2. Establishment of Fodder Bank at each block /Nayay Panchayat level to meet fodder/ feed block and mineral blocks requirement particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Simli and Nandprayag block of Karnprayag.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of three hatcheries for need of broiler / layer at block level like at Narayan Bagar, Karnprayag and Dewal.</li> <li>6. For need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> </ol>

	<p>7. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Garur block.</p> <p>8. Availability of feed material with low prices &amp; Timely health check-ups of animals.</p> <p>9. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</p>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+Goatry/backyard poultry/Dairy</li> <li>2. Fodder production+ Mini dairy+Composting+ Protected cultivation</li> <li>3. Seed production (Lentil, Radish, Pea)+ Planting material supply+Mushroom</li> </ol> <p><b>Cropping system</b>  Rice - Wheat  Maize- Wheat  Horse gram/ Pigeon pea – Lentil  Tomato/ Capsicum – Vegetable Pea/onion  Potato/Tomato/Pea</p> <p><b>Horticulture</b>  Mango/Guava/ Lemon (100 plants)</p> <p><b>Livestock</b>  Cow (01)/ Buffalo(01) + Backyard Poultry (100)</p> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Vermi-composting (20m<sup>2</sup>)</li> <li>2. Fodder production in terrace risers and bunds.</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for Malta at Block – Tharali, Ghat and Gairsain.</li> <li>2. Establishment of mini fruit grading plant for mango, pear and stone fruits at Simli and Nandprayag at Karnprayag &amp; Narayan Bagar blocks.</li> <li>3. Establishment of Food and Processing Units at each block level in Pokhri &amp; Gairsain for pickle making using Garlic &amp; wild Aonla &amp; hill lemon.</li> <li>4. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>5. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in all the blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour bunding for arable purpose in waste land in all the blocks and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Gairsain, Deval, Tharali, and Narayan Bagar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted in Tharali, Ghat and Karnprayag block</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of check dam and artificial structure to reduce run off and maximize the water percolation rate in Tharali, Karnprayag, Narayan Bagar and Ghat Blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Popularization of roof water harvesting system in different villages in all blocks.</li> <li>10. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of Zero tillage method of sowing in cereals.</li> <li>2. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>3. Promotion of line sowing and fertilizers application in crops.</li> <li>4. Promotion of recommended seed rate, spacing and depth.</li> <li>5. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>6. Promotion &amp; use of tricocard, light trap &amp; pheromones trap for control of insect-pest in different horticulture/vegetable/cereal.</li> <li>7. Use of Bio mulch and black plastic mulch in horticulture &amp; vegetable crops.</li> <li>8. Promotion of hand tools in agricultural and horticultural operations.</li> <li>9. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers.</li> <li>10. Promotion of mulching (bio or degradable plastic) in vegetable fields to maintain moisture and reduce intercultural operation cost/labour cost /irrigation.</li> <li>11. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>12. Promotion of power tillers, power sprayer, mechanical fruit harvester, power weeder and power driven horticultural equipment and tools for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, fish farming and mushroom production.</li> <li>2. Promotion of apiculture for small and landless farmers.</li> <li>3. Promotion of sericulture in low hills or valley areas in blocks of Tharali, and Deval.</li> <li>4. Promotion of cultivation and collection of medicinal aromatic plants in Block-Deval, Ghat, Narayan Bagar and Tharali.</li> <li>5. Promotion of skill development for Nursery raising techniques in fruits and vegetables, Mushroom cultivation, apiculture, sericulture, commercial poultry raising, Handicraft, commercial dairy business, Orchard Management, Processing methods for women and youth in all the blocks.</li> </ol>

	<p>6. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</p>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Consolidation of land holding either forcefully implementation by govt or by mutual understanding at village level</li> <li>2. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>3. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables.</li> <li>4. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>5. Establishment of mother orchard to meet the present and future demand of germplasm in horticultural fruit crops.</li> <li>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material/seedlings in the state.</li> <li>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>8. Promote mechanization through small implement suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility and protected cultivation of vegetables.</li> <li>9. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad.</li> <li>10. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Liliun, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</li> <li>11. Promotion and cultivation of Marigold for meeting the demand of religious places like Badrinath and other religious places in karnprayag, Gairsain and Ghat blocks.</li> <li>12. Implementation of Soil Health Card Scheme at gram panchyat level.</li> <li>13. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>14. Implementation of Soil Health Card Scheme in each block.</li> <li>15. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</li> <li>16. Labelling of organic inputs and their certification mechanism for various crops in all the blocks headquarters.</li> <li>17. Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>18. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>19. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Establishment of cold storage in all the blocks.</li> <li>2. Creation of better transportation facilities with cold chain van at each Block level.</li> <li>3. Creation of direct linkages with food processing industries for better prices.</li> <li>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of mini mandies at Block level.</li> <li>8. Creation of direct linkages with food processing industries for better prices.</li> <li>9. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>10. Installation of mini grading machines at village level.</li> <li>11. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>12. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and mobile app etc. for effective implementation of programme.</li> <li>5. Weather forecasting and contingency plan.</li> </ol>

**District: Chamoli**  
**Zone: B (1000 to 1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p><b>Among Cereals</b> promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li><b>Wheat</b> (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349, UP-2572)</li> <li><b>Paddy</b> (Irrigated VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, PD-11, PD-12 Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209 Jethi dhan – Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158)</li> </ol> <p><b>Under coarse Millets</b> promotion of high yielding varieties at block Narayan Bagar, Tharali, Dewal, Karnprayag, Gairsian and Ghat cluster villages of</p> <ol style="list-style-type: none"> <li><b>Finger millets</b> (VL Mandua 324, and VL Mandua 352)</li> <li><b>Barnyard millet</b> (PRJ-1, VL Madira 172 and VL Madira 207)</li> <li><b>Maize</b> Promotion of high yielding varieties (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Mize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Vivek Sankul Makka 31, Surya, Kanchan, Naveen)</li> <li><b>Barley</b> (VL Jau 118 and VLB 94, PRB-502, UPB-1008)</li> </ol> <p><b>Pulses</b> promotion of high yielding varieties at block Narayan Bagar, Tharali, Dewal, Karnprayag, Gairsian and Ghat cluster villages of</p> <ol style="list-style-type: none"> <li><b>Lentil</b> (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514)</li> <li><b>Horse gram</b> (VL Gahat 10, VL Gahat 15 and VL Gahat 19),</li> <li><b>Mung</b> (Pant Mung-2, Pant Mung-4, Pant Mung-5)</li> <li><b>Chick Pea</b> ( GNG-1969, Aman, GNG-1958)</li> <li><b>Pigeon pea</b> (VL Arhar 1, Pant Arhar-291, Pant Arhar-3)</li> <li><b>Urd</b> (PU-35, PU-19, PU-31, PU-40, PU-6).</li> </ol> <p><b>In oilseed crops</b> promotion of high yield varieties at block Narayan Bagar, Tharali, Dewal, Karnprayag, Gairsian and Ghat cluster villages of</p> <ol style="list-style-type: none"> <li><b>Toria</b>: PT-303, Uttara, PT-508, Pant Hill Toria-1, VL toria-3</li> <li><b>Brown Sarson</b>: VLT- 3</li> <li><b>Yellow sarson</b>: Pant Pili Sarson-1, Pant Sweta</li> <li><b>Soybean</b> (VL S-56,VLS-47, PS-1092, VLS-63, VLS 21, VLS 47, VLS 59, VLS 63)</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>In Fruit crops</b> promotion of high yielding varieties at block Narayan Bagar, Tharali, Dewal, Karnprayag, Gairsian and Ghat cluster villages of</p> <ol style="list-style-type: none"> <li><b>Peach</b> (Alexander, Red June, Red Heaven Red Globe, Crest heaven, Glo Heaven etc, Nectarine- (Snow Queen)</li> <li><b>Pear</b> (Max Bartlette, Red Bartlette, Willium, Starkrimson, Hayward, Hokoi, Sukoi)</li> <li><b>Plum</b> (Italian plum, Ramgarh Menard, Santarosa)</li> <li><b>Apricot</b> (CITH-1, CITH-2, CITH-3, Harcot and New Castle)</li> <li><b>Wal Nut</b> (CITH23, CITH-24, CITH-17, CITHWLO-10, CITHWLO-20)</li> <li><b>Kiwi</b> (Hayward, Allison, Bruno, Abbot, Monti, Tomri)</li> </ol>
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	<p>7. <b>Citrus</b> (Malta Hemleen, Jafa, Mausambi, Blood red, Valacea late &amp; Lime: Pant Lemon -1, Kagzi lime).</p> <p><b>Under Vegetable crops in cluster villages of Karn Prayag, Narain Bagar, Ghat, Tharali, Deval Pokhri, Dasoli and Gairsain blocks</b></p> <ol style="list-style-type: none"> <li>1. <b>Chilli</b> (Agni, Shikha, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3)</li> <li>2. <b>Tomato</b> (Indeterminate hybrid varieties, Avinash (A-2), Himsona, Manisha, Naveen 2000+, Badshah, Shensha (Private Sector Varieties) or any other high yielding resistant to bacterial wilt should be selected for cultivation in hills.</li> <li>3. <b>Potato</b> (Kufri Gurriraj, Kufri Chipsona 1, Kufri chipsona 3, K Girdhari, K Himalini, Kufri Jyoti)</li> <li>4. <b>Brinjal hybrids</b> (Chaya (L), PPL-74 (L), Pant Samrat (L), Pant Rituraj (R), Navkiran (R) and Rajni (R).</li> <li>5. <b>French bean</b> (VL Bauni Bean 1 &amp; VL Bean 2, Anupama),</li> <li>6. <b>Cucumber</b> <ol style="list-style-type: none"> <li>a. <b>For open field condition:</b> <ul style="list-style-type: none"> <li>• Pusa Udhay, Pusa Barkha, Shubhangi, Himangi, Punjab Naveen,</li> <li>• Tasty, Ruchi, Mandakini, Kumud, Noori, Alamgir, Rani, Don.</li> </ul> </li> <li>b. <b>For protected condition:</b> Pant Parthenocarpic Cucumber-2 &amp; 3, Hilton, Kian, Isatis, Malini etc.)</li> </ol> </li> <li>7. <b>Capsicum hybrids</b> (Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, orebelle Tanvi+, Swarna, Pusa Dipti )</li> <li>8. <b>Onion</b> (VL Piaz 3, Agrifond Light Red).</li> <li>9. <b>Pea</b> (Pusa Pragati, Vivek Pea 10, Pant Sabji Matar 3, Azad Pea 3, VL 7, GS-10, RS-10 (Priya)</li> <li>10. <b>Cabbage</b> (Varuna, Hari rani gol, Pragati, Green star)</li> <li>11. <b>Cauliflower</b> Pusa Kartiki, Pusa Early Synthetic (Early season), Pusa Shubhra, Pant Shubhra, Hisar No.1, Snow Crown (Mid Season Var.) Snowball-16 Pusa Shubra, Pusa Snowball-16, PSBK-25 (Late Season Var.)</li> <li>12. <b>Radish</b> (Early Mino, Japanese white, Japanese White, Pusa Himani, Pusa Chetki, Pusa Reshmi, Arka Nishant, Punjab Pasand)</li> <li>13. <b>Leafy Vegetables</b> : All green in Palak, Hathikaan in Rai, Pant Haritma in coriander</li> </ol> <p><b>Fodder Crops</b> : Promotion of high yielding varieties in cluster villages of Karn Prayag, Narain Bagar, Ghat, Tharali, Deval Pokhri, Dasoli and Gairsain blocks of</p> <ol style="list-style-type: none"> <li>1. <b>Shorgum</b> (SSG-988, PC-29, MP chari, PCH-106)</li> <li>2. <b>Lobia</b> (UPC-5286, UPC-4200, BL-1)</li> <li>3. <b>Fodder Maize</b> (Ganga-2, Ganga-5, QPM )</li> <li>4. <b>Jai - Oat</b> (JHO-851, UPO-94, OS-6)</li> <li>5. <b>Hybrid Napier</b> (IGFRI-3,6,10 NB-21)</li> </ol> <p><b>Medicinal Plants</b> (Wild / Local collection) in cluster villages of Karn Prayag, Narain Bagar, Ghat, Tharali, Deval Pokhri, Dasoli and Gairsain blocks</p> <ol style="list-style-type: none"> <li>1. <b>Brahmi</b> (Praja shakti, Subodhak)</li> <li>2. <b>Vajradanti</b></li> <li>3. <b>Chiraita</b></li> <li>4. <b>Ashwagandha</b></li> <li>5. <b>Kuth</b></li> </ol>
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	<p><b>Flower crops</b> in cluster villages of KarnPrayag, Narain Bagar, Ghat, Tharali, Deval Pokhri, Dasoli and Gairsain blocks</p> <ol style="list-style-type: none"> <li>1. <b>Marigold</b> (African Genda, Pusa Narangi, Pusa Basanti Moonsoth, Merinar French Genda, Tina, Singhnet, Golden boy)</li> <li>2. <b>Rose</b> (For Gulabjal and oil_ Noorjahan, Ranisahiba, For flowers_ First red, Sonia, Noveleze)</li> <li>3. <b>Gladiolous</b> (American buty, Oscar friendship, Shobh Sapna Poonam)</li> <li>4. <b>Rajnigandha</b> (Hybrid varieties Subhashin, and Shringar)</li> </ol> <p><b>Live stock Animals and Birds</b> Promotion of high yielding milk, Meat, wool and egg &amp; meat breed of different cattles, Buffaloes, Sheep and Goat and poultry birds.</p> <ol style="list-style-type: none"> <li>1. <b>Buffalo</b> (Murraha, Neeli-ravi)</li> <li>2. <b>Cattle</b> (Badri, Cross bred of Red Sindhi Jursey, HF, Sahiwal)</li> <li>3. <b>Goatary</b> (Barbari, Jamunapari, Gaddi, Chigu from H.P.)</li> <li>4. <b>Sheep</b> ( Gaddi, Bhakarwal, Gurej, Kashmir, Merino)</li> <li>5. <b>Poultry</b> (Croiler, Kadaknath, Cob, Cari-davendra, cari-nirbheek)</li> <li>6. <b>Fisheries</b> (Silver carp, grass carp and common carp)</li> </ol> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Construction of rain water harvesting structure (LDPE Tanks/ Cemented Tanks in private as well as government buildings in all the villages of the zone.</li> <li>3. Construction of trenches for high percolation of water in all blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of citrus fruit (lime/ lemon/ malta) plants at mid hills in Dewal, Tharali, Gairsain &amp; Ghat blocks.</li> <li>2. Promotion of ginger cultivation in all blocks of Gairsain, Tharali, Narayan Bagar, Dewal, Karnprayag blocks.</li> <li>3. Popularization and promotion of Zero energy cool chamber among farmer group at Nyay Panchayat level.</li> <li>4. Promotion of organic cultivation of turmeric in Ghat, Karnprayag &amp; Tharali and Gairsain block.</li> <li>5. Promotion of onion and garlic cultivation in Tharali, Gairsain &amp; Ghat blocks</li> <li>6. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> <li>7. Promotion of potato cultivation in Gwaldam, Ratgaon, Soldungri, Sankot and Kasvinagar in block Tharali.</li> <li>8. Promotion of off-season vegetable Pea in block Tharali (Gwaldam, Kasbinagar) and Joshimath (Mirag, Badagaon), Dewal (Vaan, Mundoli)</li> <li>9. Promotion of production of pigeon pea in Tharali, Ghat, N. Bagar, Gairsain block.</li> <li>10. Promotion of production of lentil in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> </ol>
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	<p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Cultivation of okra and capsicum in as it is least affected by monkey.</li> <li>4. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> <li>5. Promotion of cultivation of Kafal, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers in all the blocks of the zone.</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil sampling and soil testing in intensive mode and distribution of soil health card to farmers for judicious use of Manure and fertilisers.</li> <li>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>3. Promotion of pulses crops in crop rotation to improve soil fertility and productivity</li> <li>4. Organic cultivation of local grain and millets in different blocks</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Adoption of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Promotion of moisture conservation practices.</li> <li>8. Promotion to focus on timely weed management</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk yield breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> <li>2. Establishment of Fodder Bank at each block /Nayay Panchayat level to meet fodder requirement of area</li> <li>3. Establishment of Processing plant at Simli and Nandprayag of Karnprayag block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross breed and Milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed: Promotion of different Integrated Farming System modules such as :</p> <ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>2. Fodder production+ Mini dairy+Composting+ Protected cultivation</li> </ol> <p>Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea)+ Planting material supply+Mushroom</p> <p><b>Cropping system</b> Rice - Wheat Maize- Wheat Horse gram/ Pigeon pea – Lentil Tomato/ Capsicum – Vegetable Pea potato-Tomato-onion/pea</p> <p><b>Horticulture</b> Citrus fruits (100 plants)</p> <p><b>Livestock</b> Cow (01)/ Buffalo(01) + Backyard Poultry (100)</p> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Vermi-composting (20 m<sup>2</sup>)</li> <li>2. Fodder production in terrace risers and bunds.</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for Malta at Block – Tharali, Ghat, Gairsain.</li> <li>2. Establishment of mini fruit grading plant for Pear and stone fruits at Narayan Bagar, Simli and Nandprayag at Karnprayag blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in all the blocks.</li> <li>5. Establishment of Food and Processing Units at block level for pickle making using wild a Aonla and hill leamon at block level.</li> <li>6. Promotion of common resources on custom hire basis viz. Power tiller &amp; Mini thresher at Nayay Panchayat level of different block units.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour bunding for arable purpose in waste land in all the blocks and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Gairsain, Deval, Tharali, and Narayan Bagar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted in Tharali, Ghat and Karnprayag block</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of check dam and artificial structure to reduce run off and maximize the water percolation rate in Tharali, Karnprayag, Narayan Bagar and Ghat Blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Popularization of roof water harvesting system in different villages in all blocks.</li> <li>10. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of Zero tillage method of sowing in cereals.</li> <li>2. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>3. Promotion of line sowing and fertilizers application in crops.</li> <li>4. Promotion of recommended seed rate, spacing and depth.</li> <li>5. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>6. Promotion &amp; use of tricocard, light trap &amp; pheromones trap for control of insect-pest in different horticulture/vegetable and cereal crops.</li> <li>7. Use of Bio mulch and black plastic mulch in horticulture &amp; vegetable crops.</li> <li>8. Promotion of hand tools in agricultural and horticultural operations.</li> <li>9. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers.</li> <li>10. Promotion of mulching (bio or degradable plastic) in vegetable fields to maintain moisture and reduce intercultural operation cost/labour cost /irrigation.</li> <li>11. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>12. Promotion of power tillers, power sprayer, mechanical fruit harvester, power weeder and power driven horticultural equipment and tools for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, fish farming and mushroom production.</li> <li>2. Promotion of apiculture for small and landless farmers.</li> <li>3. Promotion of sericulture in low hills or valley areas in blocks of Tharali, and Deval.</li> <li>4. Promotion of cultivation and collection of medicinal plants in Block-Deval, Ghat, Narayan Bagar and Tharali.</li> <li>5. Promotion of skill development in women and youth</li> </ol>

	<p>6. Promotion of skill development for Nursery raising techniques in fruits and vegetables, Mushroom cultivation, apiculture, sericulture, commercial poultry raising, Handicraft, commercial dairy business, Orchard Management, Processing for women and youth in all the blocks.</p> <p>7. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</p>
<b>Strategy 8 : Enabling Policies</b>	<p>1. Consolidation of land holding either forcefully implementation by govt or by mutual understanding in village.</p> <p>2. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</p> <p>3. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables.</p> <p>4. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</p> <p>5. Establishment of mother orchard to meet the present and future demand of germplasm in horticultural fruit crops.</p> <p>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material/seedlings in the state.</p> <p>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</p> <p>8. Promote mechanization through small implement suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility and protected cultivation of vegetables.</p> <p>9. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad.</p> <p>10. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</p> <p>11. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad</p> <p>12. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</p> <p>13. Promotion and cultivation of Marigold for meeting the demand of religious places like Badrinath and other religious places in karnprayag, Gairsain and Ghat blocks.</p> <p>14. Implementation of Soil Health Card Scheme at gram panchyat level.</p> <p>15. Implementation of policies for control of wild animal menace in agricultural areas.</p> <p>16. Implementation of Soil Health Card Scheme in each block.</p>

	<p>17. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</p> <p>18. Labelling of organic inputs and their certification mechanism for various crops in all the blocks headquarters.</p> <p>19. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</p> <p>20. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</p> <p>21. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</p>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<p>1. Establishment of cold storage in all the blocks.</p> <p>2. Creation of better transportation facilities with cold chain van at each Block level.</p> <p>3. Creation of direct linkages with food processing industries for better prices.</p> <p>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</p> <p>6. Installation of mini grading machines at village level.</p> <p>7. Establishment of mini mandies at Block level.</p> <p>8. Creation of direct linkages with food processing industries for better prices.</p> <p>9. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>10. Installation of mini grading machines at village level.</p> <p>11. Promotion of local Hatt at Tahsil level in all blocks.</p> <p>12. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</p>
<b>Strategy 10 : Online Management and Evaluation</b>	<p>1. Development of Mobile apps/ software for online management and evaluation at district level.</p> <p>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</p> <p>3. Organization of monthly review meeting at district to solve the problems related with farmers.</p> <p>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</p>

**District: Chamoli**  
**Zone: C (1500 to 2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p><b>Among Cereals</b> promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. <b>Wheat</b> (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155 and HS 365 (from 1700 to 2400m amsl), UP-2572</li> </ol> <p><b>Millets</b> promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. <b>Finger millets</b> ( VL Mandua 352 upto 2000m amsl)</li> <li>2. <b>Amranth</b> (PRA 1, PRA 2, PRA 3)</li> <li>3. <b>Barneyard millet</b> (PRJ-1, VL Madira 172 and VL Madira 207 upto 2000m amsl)</li> <li>4. <b>Maize</b> Promotion of high yielding varieties (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Mize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Vivek Sankul Makka 31 (upto 2000m amsl), Surya, Kanchan, Naveen)</li> <li>5. <b>Barley</b> (VL Jau 118 and VLB 94 (upto 1700m amsl), PRB-502, UPB-1008)</li> <li>6. <b>Pulses</b> promotion of high yielding varieties of</li> <li>7. <b>Lentil</b> (PL-4, PL-7, PL-8)</li> <li>8. <b>Urd</b> (PU 35, PU 19, PU 31, PU 40, PU 6)</li> </ol> <p><b>Oilseeds</b></p> <ol style="list-style-type: none"> <li>1. <b>Soybean</b> (PS-1092 and PRS 1). <b>at Soldungari</b>, Talwari state, Lolti in block Tharali. Lawani, Kheta, Mundoli and Vaan in block Dewal, Maath in Vill. Dasoli, Ramni in Vill. Ghat. Bhararisain regiion in Gairsain, Hapla region in block Pokhri, Sankot in block Narayan Bagar</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>In Fruit crops</b> promotion of high yielding varieties at Gwaldam, Soldungari, Talwari state, Lolti in block Tharali. Lawani, Kheta, Mundoli and Vaan in block Dewal, Maath in Vill. Dasoli, Ramni in Vill. Ghat. Bhararisain regiion in Gairsain, Hapla region in block Pokhri, Sankot in block Narayan Bagar of</p> <ol style="list-style-type: none"> <li>1. <b>Apple</b> (Royal Delicious, Red Delicious, Red Chief, Walspur, Oregoen spur, Red spur, Golden Spur, bright and early, Early Red one, Red chief. Rymer, Sweet Banana, Kings Orange Pippins etc)</li> <li>2. <b>Peach</b> (Alexander, Red June, Red Heaven Red Globe, Crest heaven, Glo Heaven etc.)</li> <li>3. <b>Nectarine</b>- (Snow Queen)</li> <li>4. <b>Pear</b> (Max Bartlette, Red Bartlette, Willium, Starkrimson, Hayward, Hokoi, Sukoi),</li> <li>5. <b>Plum</b> (Italian plum, Ramgarh Menard, Santarosa)</li> <li>6. <b>Apricot</b> (CITH-1, CITH-2, CITH-3, Harcot and New Castle)</li> <li>7. <b>Wal Nut</b> (CITH23, CITH-24, CITH-17, CITHWLO-10, CITHWLO-20)</li> <li>8. <b>Kiwi</b> (Hayward, Allison, Bruno, Abbot, Monti, Tomri)</li> <li>9. <b>Cherry</b> (Mishri, Double Cherry)</li> </ol> <p><b>In Vegetable crops</b></p> <ol style="list-style-type: none"> <li>1. <b>Chilli</b> (Agni, Shikha, Kashi Anmol, Pant C-1, Tajaswani, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3)</li> </ol>
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	<p>2. <b>Tomato</b> (VL Tamatar 4 upto 1800m amsl, Indeterminate hybrid, Avinash (A-2), Himsona, Manisha, Naveen 2000+, Badshah, Shensha (Private Sector Varieties) or any other high yielding resistant to bacterial wilt should be selected for cultivation in hills.</p> <p>3. <b>Potato</b> (Kufri Gurriraj, Kufri Chipsona 1, Kufri chipsona 3, K Girdhari, K Himalini, Kufri Jyoti)</p> <p>4. <b>Brinjal hybrid</b> (Chaya (L), PPL-74 (L), Pant Samrat (L), Pant Rituraj (R), Navkiran (R) and Rajni (R).</p> <p>5. <b>French bean</b> (VL Bean 2 upto 1800m amsl, Anupama)</p> <p>6. <b>Cucumber</b></p> <p>a. <b>For open field condition:</b> Pusa Udhay, Pusa Barkha, Shubhangi, Himangi, Punjab Naveen, Tasty, Ruchi, Mandakini, Kumud, Noori, Alamgir, Rani, Don.</p> <p>b. <b>For protected condition:</b> Pant Parthenocarpic Cucumber-2 &amp;3, Hilton, Kian, Isatis, Malini etc.</p> <p>7. <b>Onion</b> (VL Piaz 3 upto 2000m amsl, Agrifond Light Red).</p> <p>8. <b>Pea</b> (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown, Pusa Pragati, Pant Sabji Matar 3, Azad Pea 3, GS-10, RS-10 (Priya))</p> <p>9. <b>Cabbage hybrids</b> (Varuna, Hari rani gol, Pragati, Green star)</p> <p>10. <b>Cauliflower</b> Snowball-16 Pusa Shubra, Pusa Snowball-16, PSBK-25 (Late Season Var.)</p> <p>11. <b>Radish</b> Early Mino, Japanese white, Japanese White, Pusa Himani, Pusa Chetki, Pusa Reshmi, Arka Nishant, Punjab Pasand</p> <p>12. <b>Leafy Vegetable</b> (All green in Palak, Hathikaan in Rye, Great Lakes in Lettuce, Pant Haritma in Coriander)</p> <p>13. <b>Capsicum</b> (VL Shimla Mirch 3 upto 1800m amsl, California wonder, Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, Pusa Dipti) at <b>Soldungari</b>, Talwari state, Lolti in block Tharali. Lawani, Kheta, Mundoli and Vaan in block Dewal, Maath in Vill. Dasoli, Ramni in Vill. Ghat. Bhararisain region in Gairsain, Hapla region in block Pokhri, Sankot in block Narayan Bagar.</p> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Fodder Crops: Promotion of high yielding varieties</b> at Soldungari, Talwari state, Lolti in block Tharali. Lawani, Kheta, Mundoli and Vaan in block Dewal, Maath in Vill. Dasoli, Ramni in Vill. Ghat. Bhararisain region in Gairsain, Hapla region in block Pokhri, Sankot in block Narayan Bagar of</p> <p>1. <b>Shorgum</b> (SSG-988, PC-29, MP chari, PCH-106)</p> <p>2. <b>Lobia</b> (UPC-5286, UPC-4200, BL-1)</p> <p>3. <b>Fodder Maize</b> (Ganga-2, Ganga-5, QPM )</p> <p>4. <b>Jai -Oat</b> (JHO-851, UPO-94, OS-6)</p> <p>5. <b>Hybrid Napier</b> (IGFRI-3,6,10 NB-21)</p> <p><b>Medicinal Plants</b> (Wild / Local collection) at block Ghat, Karnprayag, Pokhri, Deval, Tharali and Dasoli</p> <p>1. <b>Kutki</b></p> <p>2. <b>Bach</b></p> <p>3. <b>Kunja</b></p> <p>4. <b>Van kakri</b></p> <p>5. <b>Vajardanti</b></p>
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	<p>6. <b>chiraita</b></p> <p>7. <b>Ashwagandha</b></p> <p><b>Floriculture crops</b> at block Ghat, Karnprayag, Pokhri, Deval, Tharali and Dasoli</p> <ol style="list-style-type: none"> <li>1. <b>Marigold</b> (African Genda, Pusa Narangi, Pusa Basanti Moonsoth, Merinar French Genda, Tina, Singhnet, Golden boy)</li> <li>2. <b>Rose</b> (For Gulabjal and oil- Noorjahan, Ranisahiba, For flowers- First red, Sonia, Noveleze)</li> <li>3. <b>Gladiolous</b> (American buty, Oscar friendship, Shobh Sapna Poonam)</li> <li>4. <b>Rajnigandha</b> (Hybrid varieties Subhashin, and Shringar)</li> <li>5. <b>Lilium</b> (oriental species of lillium)</li> </ol> <p><b>Live stock Animals and Birds</b> : Promotion of high milk, Meat, wool and egg &amp; meat breed of different cattles, Buffaloes, Sheep and Goat and poultry birds at block Ghat, Karnprayag, Pokhri, Deval, Tharali and Dasoli</p> <ol style="list-style-type: none"> <li>1. <b>Buffalo</b> (Murraha, Neeli-ravi)</li> <li>2. <b>Cattle</b> (Badri, Cross bred of Jursey, Red Sindhi HF, Sahiwal)</li> <li>3. <b>Goatary</b> (Barbari, Jamunapari, Gaddi, Chigu from H.P.)</li> <li>4. <b>Sheep</b> (Gaddi, Bhakarwal, Gurej, Kashmir, Merino)</li> <li>5. <b>Poultry</b> (Croiler, Kadaknath, Cob, Cari-davendra, cari-nirbheek)</li> <li>6. <b>Fishries</b> (Trout and Mahasheer)</li> </ol> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Construction of rain water harvesting structures (LDPE tank, Cemented tanks) in private as well as government buildings in all blocks.</li> <li>3. Construction of trenches for high percolation of water in most of the area of in all blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of old fruit belt of Tharali comprising of village Ratgaon, Doongri, Rainin in block Ghat, Vaan &amp; Mundoli in block Tharali belts by introduction of new cultivars of stone fruits.</li> <li>2. Promotion of Cardmom cultivation in Dasholi block.</li> <li>3. Promotion of off-season vegetable Pea in block Tharali (Gwaldam, Kasbinagar) and Joshimath(Mirag, Badagaon), Dewal (Vaan, Mundoli)</li> <li>4. Popularization and promotion of Zero energy cool chamber among farmer group at Nyay Panchayat level.</li> <li>5. Promotion of potato cultivation and seed production at Gwaldam, Sankot, Ratgaon, Soldungri, Kasvinagar in block Tharali</li> <li>6. Promotion of off season vegetables (tomato, capsicum, cole crops etc.) cultivation in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> <li>7. Promotion of off-season vegetable Pea at Soldungri, Gwaldam and Ratgaon cluster in block Tharali, Sankot in block Narayan Bagar, Raini in block Ghat.</li> </ol>
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	<p>8. Promotion of Razma in Tharali, Dewal, Gairsain, Dasoli, Pokhri, Narayan Bagar and Ghat blocks.</p> <p>9. Promotion of production of lentil in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</p> <p><b>Management of wild animal problem</b></p> <p>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</p> <p>2. Enacting legislative measures for protection of crop from wild animals.</p> <p>3. Cultivation of capsicum in as it is least affected by monkey.</p> <p>4. Promotion of pulses crops in crop rotation to improve soil fertility</p> <p>5. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</p> <p>6. Promotion of cultivation of Kafal, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</p> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <p>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</p> <p>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler and Vivek small tool kit for reduction in drudgery of hill farmers in all the blocks of the zone.</p> <p><b>Adoption of efficient irrigation techniques</b></p> <p>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</p> <p>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</p> <p>3. Green House Cultivation for Vegetables</p> <p><b>Management of soil health in low or valley areas</b></p> <p>1. Popularization of soil sampling and soil testing in intensive mode and distribution of soil health card to farmers for judicious use of Manure and fertilisers.</p> <p>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</p> <p>3. Organic cultivation of local grain and millets in different blocks.</p> <p><b>Others</b></p> <p>1. Cluster approach for holistic development.</p> <p>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</p> <p>3. Cultivation of fodder and forage crops &amp; medicinal plants.</p> <p>4. Adoption of only well decomposed FYM/ value added compost.</p> <p>5. Adoption of efficient and timely use of IPM and IDM practices.</p> <p>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</p> <p>7. Promotion of moisture conservation practices.</p> <p>8. Promotion to focus on timely weed management.</p>
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<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk yield breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Gaddi, Sirohi &amp; Jamunapari) in Sheep (Gaddi, Bhakarwal, Gurej, Sashmir Merino) in Dewal, Tharali, Narayan Bagar, Pokhri, Dasoli, Gairsain, Karnprayag and Ghat block.</li> <li>2. Establishment of Fodder Bank at each block /Nayay Panchayat level to meet fodder requirement of area</li> <li>3. Establishment of milk chilling plant at Simli and Nandprayag of Karnprayag block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross breed and Milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed: Promotion of different Integrated Farming System modules such as :</p> <ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>2. Fodder production+ Mini dairy+Composting+ Protected cultivation</li> <li>3. Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea)+ Planting material supply+Mushroom</li> </ol> <p><b>Cropping system</b> Summer Squash-Tomato/Capsicum/Cucumber-onion/Pea Maize- Wheat Horse gram/ Pigeon pea – Lentil Tomato/ Capsicum – Vegetable Pea Okra – Potato</p> <p><b>Horticulture</b></p> <ul style="list-style-type: none"> <li>• Citrus fruits (100 plants)</li> </ul> <p><b>Livestock</b></p> <ul style="list-style-type: none"> <li>• Cow (01)/ Buffalo(01) + Backyard Poultry (100)</li> </ul> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Vermi-composting (20m<sup>2</sup>)</li> <li>2. Fodder production in terrace risers and bunds.</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for Malta at Block – Tharali, Ghat, Gairsain.</li> <li>2. Establishment of mini fruit grading plant for Pear and stone fruits at Narayan Bagar, Simli and Nandprayag at Karnprayag blocks.</li> <li>3. Establishment of Food and Processing Units at each block level in Pokhri &amp; Gairsain for pickle making using Garlic&amp; wild Aonla.</li> <li>4. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>5. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in all the blocks.</li> <li>6. Establishment of Food and Processing Units at Bageshwar for pickle making using wild Aonla, &amp; hill lemon.</li> <li>7. Promotion of common resources on custom hire basis viz. Power tiller &amp; Mini thresher at Nayay Panchayat level of different block units.</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour bunding for arable purpose in waste land in all the blocks and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Gairsain, Deval, Tharali, and Narayan Bagar blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted in Tharali, Ghat and Karnprayag block</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Tharali, Karnprayag, Narayan Bagar and Ghat Blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Popularization of roof water harvesting system in different villages in all blocks.</li> <li>10. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of Zero tillage method of sowing in cereals.</li> <li>2. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>3. Promotion of line sowing and fertilizers application in crops.</li> <li>4. Promotion of recommended seed rate, spacing and depth.</li> <li>5. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>6. Promotion &amp; use of tricocard, light trap &amp; pheromones trap for control of insect-pest in different horticulture/cereal crops.</li> <li>7. Use of Bio mulch and black plastic mulch in horticulture &amp; vegetable crops.</li> <li>8. Promotion of hand tools in agricultural and horticultural operations.</li> <li>9. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers.</li> <li>10. Promotion of mulching (bio or degradable plastic) in vegetable fields to maintain moisture and reduce intercultural operation cost/labour cost /irrigation.</li> <li>11. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>12. Promotion of power tillers, power sprayer, mechanical fruit harvester, power weeder and power driven horticultural equipment and tools for reduction of drudgery.</li> </ol>

<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, fish farming and mushroom production.</li> <li>2. Promotion of apiculture for small and landless farmers.</li> <li>3. Promotion of cultivation and collection of medicinal plants in Block-Deval, Ghat, Narayan Bagar and Tharali.</li> <li>4. Promotion of skill development in women and youth</li> <li>5. Promotion of apiculture/ mushroom for small and landless farmers in all districts.</li> <li>6. Promotion of skill development for Nursery raising techniques in fruits and vegetables, Mushroom cultivation, apiculture, sericulture, commercial poultry raising, Handicraft, commercial dairy business, Orchard Management, Processing for women and youth in all the blocks.</li> <li>7. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Consolidation of land holding either forcefully implementation by govt or by mutual understanding in village.</li> <li>2. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>3. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables.</li> <li>4. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>5. Establishment of mother orchard to meet the present and future demand of germplasm in horticultural fruit crops.</li> <li>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material/seedlings in the state.</li> <li>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>8. Promote mechanization through small implement suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility and protected cultivation of vegetables.</li> <li>9. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad.</li> <li>10. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</li> <li>11. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad</li> <li>12. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</li> </ol>

	<p>13. Promotion and cultivation of Marigold for meeting the demand of religious places like Badrinath and other religious places in Karnprayag, Gairsain and Ghat blocks.</p> <p>14. Implementation of Soil Health Card Scheme at gram panchyat level.</p> <p>15. Implementation of policies for control of wild animal menace in agricultural areas.</p> <p>16. Implementation of Soil Health Card Scheme in each block.</p> <p>17. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</p> <p>18. Labelling of organic inputs and their certification mechanism for various crops in all the blocks headquarters.</p> <p>19. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</p> <p>20. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</p> <p>21. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</p>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<p>1. Establishment of cold storage in all the blocks.</p> <p>2. Creation of better transportation facilities with cold chain van at each Block level.</p> <p>3. Creation of direct linkages with food processing industries for better prices.</p> <p>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</p> <p>6. Installation of mini grading machines at village level.</p> <p>7. Establishment of mini mandies at Block level.</p> <p>8. Creation of direct linkages with food processing industries for better prices.</p> <p>9. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>10. Installation of mini grading machines at village level.</p> <p>11. Promotion of local Hatt at Tahsil level in all blocks.</p> <p>12. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</p>
<b>Strategy 10 : Online Management and Evaluation</b>	<p>1. Development of Mobile apps/ software for online management and evaluation at district level.</p> <p>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</p> <p>3. Organization of monthly review meeting at district to solve the problems related with farmers.</p> <p>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</p> <p>5. Weather forecasting and contingency plan.</p>

**District: Chamoli**  
**Zone: D (>2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p><b>Millets</b> promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. <b>Amranth</b> (PRA 1, PRA 2, PRA 3)</li> <li>2. <b>Buckwheat</b> (PRB 1, Himgiri, Himpriya)</li> </ol> <p><b>In Fruit crops</b> promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. <b>Apricot</b> CITH Apricot-1 and CITH Apricot-3</li> <li>2. <b>Apple</b> (Royal Delicious, Red Delicious, Red Chief, Walspur, Oregoen spur, Red spur, Golden Spur, bright and early, Early Red one, Red chief. Rymer, Sweet Banana, Kings Orange Pippins etc)</li> <li>3. <b>Walnut</b> CITH-1 and other CITH selections</li> </ol> <p><b>Under Vegetable crops</b> at different village clusters of Pandukeshwar, Mana, Mirg, Auli, Parsari, Tolma, phagati, Jhelam, Mallari, Kailashpur, Niti village cluster in block Joshimath</p> <ol style="list-style-type: none"> <li>1. <b>French bean</b> (VL Bean 2, Anupama)</li> <li>2. <b>Potato</b> : Kufri Jyoti, Kufari Himalini, Kufri Kiriraj</li> <li>3. <b>Pea</b> (Vivek Matar 11, Vivek Matar 10 &amp; VL Ageti Matar 7, Pusa Pragati, Pant Sabji Matar 3, Azad Pea 3, GS-10, RS-10 (Priya) in</li> <li>4. <b>cabbage</b> (T-621, Pragati, Indica, Varuna, Pusa Mukta, Sri Ganesh Gol, Green Star, Pride of India)</li> <li>5. <b>Cauliflower</b> Snowball-16 Pusa Shubra, Pusa Snowball-16, PSBK-25 (Late Season Var.)</li> </ol> <p><b>Medicinal Plants</b> (Wild / Local collection) at different village cluster of Pandukeshwar, Mana, Mirg, Auli, Parsari, Tolma, phagati, Jhelam, Mallari, Kailashpur, Niti village cluster in block Joshimath</p> <ol style="list-style-type: none"> <li>1. <b>Kutki</b></li> <li>2. <b>Bach</b></li> <li>3. <b>Kuth</b></li> <li>4. <b>Van kakri</b></li> <li>5. <b>Vajardanti</b></li> <li>6. <b>Chiraita</b></li> </ol> <p><b>Flower crops</b> at different village cluster of Pandukeshwar, Mana, Mirg, Auli, Parsari, Tolma, phagati, Jhelam, Mallari, Kailashpur, Niti village cluster in block Joshimath.</p> <ol style="list-style-type: none"> <li>1. <b>Gladiolous</b> (American buty, Oscar friendship, Shobh Sapna)</li> <li>2. <b>Lilium</b> : <b>Oriental species of lillium and other temperate bulbous flowers</b></li> <li>3. <b>Live stock Animals and Birds:</b> Promotion of high milk, Meat, wool and egg &amp; meat breed of different cattles, Buffaloes, Sheep and Goat and poultry birds.</li> <li>4. <b>Cattle</b> (Cross bred of Jursey, HF, Red Sindhi)</li> <li>5. <b>Goatary</b> (Barbari, Jamunapari, Gaddi, Chigu from H.P.)</li> <li>6. <b>Sheep</b> ( Gaddi, Bhakarwal, Gurej, Merino)</li> <li>7. <b>Poultry</b> (Croiler, Kadaknath, Cob, Cari-davendra, cari-nirbheek)</li> </ol> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> </ol>
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	<ol style="list-style-type: none"> <li>2. Construction of rain water harvesting structure in private as well as government buildings in all blocks.</li> <li>3. Construction of trenches for high percolation of water in valley area in Auli, Mirg, Tapovan Jhelam, Kelashpur, Mana block of Joshimath</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in apple orchards of Jhelam, Mirg, Parsari, Tapovan, Auli cluster villages in block Joshimath</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Need to introduce new walnut, apricot, apple varieties with appropriate pollinizer variety especially in Joshimath block.</li> <li>2. Promotion of production of vegetable pea, and French Bean in different cluster villages of Mirg, Parsari, Badgaon, Jhelam, Pandukeshwar, Mana &amp; Mallari of Joshimath block.</li> <li>3. Popularization and promotion of Zero energy cool chamber among farmer group at Nyay Panchayat level.</li> <li>4. Promotion of Seed production of local Razma, Cabbage &amp; Potato at Auli Jhelum, Pandukeshwar of Joshimath block.</li> <li>5. Promotion of bulbous flower like tuberose, liliun, gladiolus and other temperate bulbous flowering plants</li> <li>6. Promotion of Yak for eco-tourism</li> <li>7. Promotion of dual purpose sheep and goat for meat &amp; wool knitting purpose</li> <li>8. Skill Development for the promotion of Handicraft wool knitting from Goat &amp; Sheep.</li> <li>9. Promotion of zero energy cool chambers for keep the horticulture produce for longer duration.</li> <li>10. Promotion of trench cultivation of vegetable in higher temperate altitudes.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Enacting legislative measures for protection of crop from wild animals.</li> <li>2. Promotion of strong specially designed protected cultivation structures which can withstand heavy snow fall for the cultivation of vegetables (Capsicum, Cabbage, Cauliflower, leafy veg. like lettuce, Kale, Coriander) in all the blocks</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of Power Tiller/ potato ridger at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, improved horticulture tools, power sprayer for orchards at Nyaypanchayat level at block Joshimath.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> </ol>
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	<ol style="list-style-type: none"> <li>Promotion of vermi composting unit at village level</li> <li>Promotion of pulses crops in crop rotation to improve soil fertility</li> <li>Organic cultivation of Amranth, Razma &amp; Pea in different village cluster in Joshimath block.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>Cluster approach for holistic development.</li> <li>Promotion of high Value Crops like vegetable, fruits, spices (Jumbo) etc.</li> <li>Cultivation of fodder crops &amp; medicinal plants.</li> <li>Adoption of only well decomposed FYM/ value added compost.</li> <li>Promotion of efficient and timely use of IPM and IDM practices.</li> <li>Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>Adoption of moisture conservation practices.</li> <li>Promotion to focus on timely sowing and weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>Promotion of high milk yield breeds of cows Jersey, Red Sindhi and H.F, and goats (Gaddi, Chigu, Changthagi) and Sheep breed (Gaddi, Bhakarwal, Gurej, Kashmir Merino) in high altitue areas of Auli, Niti, Mana, Kailashpur and Mirg area of Joshimath Block.</li> <li>Establishment of Fodder Bank at each block /Nayay Panchayat level to meet fodder/feed block and mineral blocks requirement particularly during lean period.</li> <li>Establishment of milk processing plant at Joshimath block.</li> <li>Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>Strengthening of traditional water bodies/ rivulets with Mahaseer and trout at Joshimath block.</li> <li>Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <ol style="list-style-type: none"> <li>Protected cultivation+ Composting+Goatry/backyard poultry/Dairy</li> <li>Fodder production+ Mini dairy+Composting+ Protected cultivation</li> <li>Seed production (Potato, Radish, Cabbage, Pea and Rajma</li> </ol> <p><b>Cropping system</b> Rajma/Potato/Pea/Cabbage/Radish/Leafy vegetables</p> <p><b>Horticulture</b> Apple/Apricot/Walnut (100 plants)</p> <p><b>Livestock</b> Cow (01)/ sheep(50 )/Goat (50) + Backyard Poultry (100)</p> <p><b>Others</b> Vermi-composting (20m<sup>2</sup>)</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Establishment of mini fruit grading plant for Apple, Walnut and Apricot at Joshimath block</li> <li>Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Potato Ridger, power sprayer and other horticultural tools and other equipments at Nyay Panchayat level in Joshimath block</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour bunding for arable purpose in waste land in Joshimath block.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in high altitudes of Joshimath block</li> <li>3. Plantation of Sea buck thorn, at high altitudes of Joshimath block.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in all blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate Joshimath Blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Popularization of roof water harvesting system in different villages in all blocks.</li> <li>10. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of Zero tillage method of sowing in Amranth.</li> <li>2. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>3. Promotion of line sowing and fertilizers application in crops.</li> <li>4. Promotion of recommended seed rate, spacing and depth.</li> <li>5. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>6. Promotion &amp; use of tricocard, light trap &amp; pheromones trap for control of insect-pest in different horticulture/cereal crops.</li> <li>7. Use of Bio mulch and black plastic mulch in horticulture &amp; vegetable crops.</li> <li>8. Promotion of hand tools in agricultural and horticultural operations.</li> <li>9. Promotion of use of Power tillers, Power weeders, Power sprayer. Promotion of mulching (bio or degradable plastic) in vegetable fields to maintain moisture and reduce intercultural operation cost/labour cost /irrigation.</li> <li>10. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>11. Promotion of power tillers, power sprayer, mechanical fruit harvester, power weeder and power driven horticultural equipment and tools for reduction of drudgery.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, sheep-goat farming, fish farming and mushroom production.</li> <li>2. Promotion of apiculture for small and landless farmers.</li> <li>3. Promotion of cultivation and collection of medicinal plants in Joshimath block</li> <li>4. Promotion of skill development in women and youth in Handicraft Making from wool of sheep and goat.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Promotion of skill development for Nursery raising techniques in fruits and vegetables, Mushroom cultivation, apiculture, sericulture, commercial poultry raising, Handicraft, commercial dairy business, Orchard Management, Processing for women and youth in all the blocks.</li> <li>6. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance at Joshimath block.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Consolidation of land holding either forcefully implementation by govt or by mutual understanding in village.</li> <li>2. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>3. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables.</li> <li>4. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.</li> <li>5. Establishment of mother orchard to meet the present and future demand of germplasm in horticultural fruit crops.</li> <li>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material/seedlings in the state.</li> <li>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>8. Promote mechanization through small implement suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility and protected cultivation of vegetables.</li> <li>9. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad.</li> <li>10. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</li> <li>11. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad</li> <li>12. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Lilium, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in all the blocks.</li> <li>13. Promotion and cultivation of Marigold for meeting the demand of religious places like Badrinath and other religious places in Karnprayag, Gairsain and Ghat blocks.</li> <li>14. Implementation of Soil Health Card Scheme at gram panchyat level.</li> <li>15. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>16. Implementation of Soil Health Card Scheme in each block.</li> </ol>

	<p>17. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</p> <p>18. Labelling of organic inputs and their certification mechanism for various crops in all the blocks headquarters.</p> <p>19. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</p> <p>20. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</p> <p>21. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</p>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<p>1. Establishment of cold storage in all the blocks.</p> <p>2. Creation of better transportation facilities with cold chain van at each Block level.</p> <p>3. Creation of direct linkages with food processing industries for better prices.</p> <p>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</p> <p>6. Installation of mini grading machines at village level.</p> <p>7. Establishment of mini mandies at Block level.</p> <p>8. Creation of direct linkages with food processing industries for better prices.</p> <p>9. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</p> <p>10. Installation of mini grading machines at village level.</p> <p>11. Promotion of local Hatt at Tahsil level in all blocks.</p> <p>12. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</p>
<b>Strategy 10 : Online Management and Evaluation</b>	<p>1. Development of Mobile apps/ software for online management and evaluation at district level.</p> <p>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</p> <p>3. Organization of monthly review meeting at district to solve the problems related with farmers.</p> <p>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</p> <p>5. Weather forecasting and contingency plan</p>

## Technology Intervention Success Stories

### Example 1: Polyhouse Cultivation with Plastic Mulch Technology and Drip irrigation / Fertigation Technology in Vegetable Crops [Krishi Vigyan Kendra (Chamoli)]

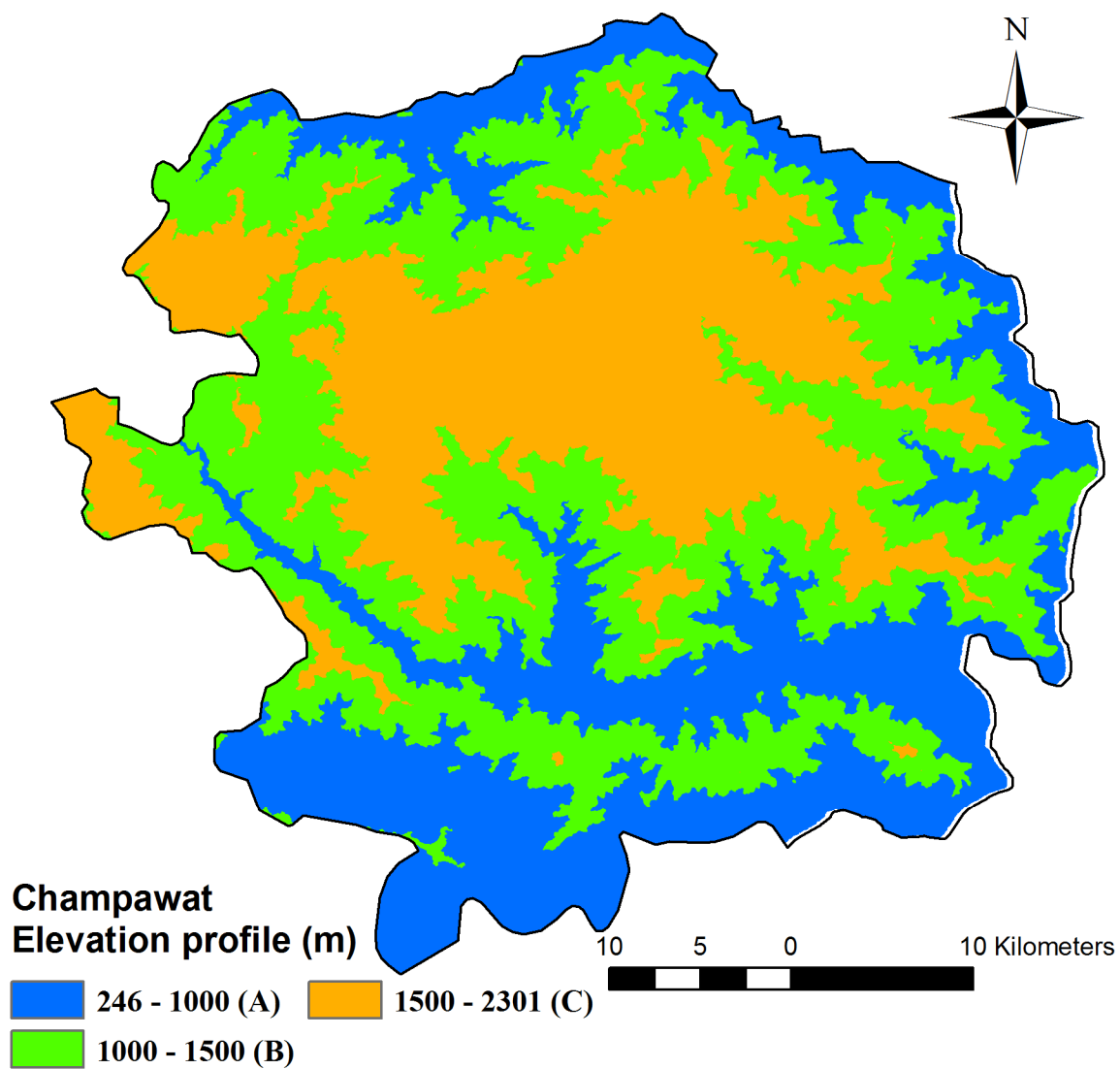
<b>Name of Farmer</b>	Sri Kalam Singh Rawat, Village-Malbajwar, Tehsil-Tharali, District-Chamoli (Uttarakhand) (Mobile No. 9997791795)	
<b>Details of the farm</b>	0.10 ha Land, Partially irrigated	
<b>Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details</b>	1. Polyhouse cultivation in Tomato, Capsicum, Cucumber. 2. Plastic mulch technology for the cultivation of Tomato, Summer squash, Cucumber, Capsicum, Brinjal, Chilli. etc under KVK Demonstrations. 3. Demonstration on application of Drip irrigation/ fertigation technology in vegetable crops.	
<b>Details of results obtained due to the adoption of technologies (Season-wise crops grown, techniques adopted, results achieved etc.)</b>	Improved/ present production technologies Latest high yielding hybrid seeds of vegetables, Use of Polyethylene mulch and Poly-tunnel & polyhouse for seedling production and off-season vegetable cultivation.	Traditional / past production practices Cultivation of traditional crops and use of tradition self produced seeds

Crop	Technology practice	Area (ha)	Production (q)	Economics (Rs.)			
				Cost of Production	Gross income	Net income	B:C ratio
Summer Squash	Under Polytunnel / Polyhouses with black plastic mulch & drip irrigation / fertigation	0.01	10	4000	20000	16000	5
Capsicum		0.01	4	6000	16000	10000	2.66
Tomato		0.01	16	8000	56000	48000	7
Cucumber		0.01	11	6000	27500	21500	4.58
Brinjal	Open field condition with black plastic mulch	0.02	0.8	4000	16000	12000	4
Vegetable Pea	Open field	0.04	3	2000	12000	10500	6
Total		0.1	44.8	30000	147500	118000	





**DISTRICT: CHAMPAWAT**



**Figure 10: District Champawat elevation profile**





**District: Champawat**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (PBW-550, DBW-17, UP-2628, UP2585, HD-2967, UP-2572, VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572), paddy (Pant Shankar dhan -1, Pant Basmati-1 &amp;2, Hybrid rice, PR-113, PR-114, NDR-359 VL Dhan 65, VL Dhan 85 and Vivek Dhan 154, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355, Pusa Basmati 1509 &amp; PRH 10,); Barley (VL Jau 118 and VLB 94); in Bastia, aam bag, chandani, phagpur, garikot, Chalthi, Belkhat areas of Champawat block.</li> <li>2. Promotion of high yielding varieties of finger millets (VL Mandua 324, VL Mandua 352, PRM1) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) in Champawat block .</li> <li>3. Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Bastia, aam bag, chandani, phagpur, garikot, Chalthi, Belkhet areas of Champawat block.</li> <li>4. Promotion of high yielding variety of lentil (Pant Lantil-4 &amp; 5, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram ( VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean ( VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65, PS-1092) and Pigeon pea (VL Arhar 1,) in Champawat block</li> <li>5. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10 and Vivek Matar 12), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (VL Tamatar 4), Onion (VL Piaz 3), VL Shimla Mirch 3 and garlic (VL Lehsun 1) hill areas of Champawat block.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Creation of additional water storage tank in Hill areas of Champawat block for lean season.</li> <li>2. Creation of trenches for high percolation of water in slope/terraces in all areas of this zone.</li> <li>3. Promotion of water conservation techniques like mulch, sprinkler and drip for juvenile plants in Hill areas of Champawat block blocks of this zone.</li> <li>4. Popularisation of roof water harvesting system in all zones.</li> <li>5. Rejuvenation and popularisation of traditional water harvesting systems (Naula) in this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of old fruit belt of Vanbasa and Tanakpur belts by introduction of new cultivars of mango, Litchi fruits</li> <li>2. Mass cultivation of Cinnamon plants at low hills in Lower hill areas as Sukhi Dhang, Jajal</li> <li>3. Promotion of Ginger/Turmeric cultivation in Lower hill areas as Sukhi Dhang &amp; Jajal areas under rainfed conditions of this block.</li> <li>4. Promotion of off season vegetable such as Tomato, potato, onion, garlic/protected cultivation in all blocks of this zone.</li> </ol>
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	<ol style="list-style-type: none"> <li>5. Fallow land development under agro-forestry in all blocks of zone.</li> <li>6. Promotion of hybrid/basmati rice particularly in irrigated areas of Tanakpur and Vanbasa and pulses, oilseeds in rainfed areas of all blocks.</li> <li>7. Promotion of irrigated areas of Tanakpur and Vanbasa for seed production of rice and wheat.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of lime/lemon in fruits, lady finger in vegetable, ginger or turmeric in spices, dual purpose varieties of barley, wheat and oats or Lemon grass at larger scale in cultivated field in all blocks to minimize the damage from wild pigs, monkeys and cows.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation in all blocks.</li> <li>4. Promotion of bio fencing on trench bunds.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers .</li> <li>2. Popularization of manually operated mini crop harvesters for millets.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available, etc.</li> <li>2. Drip Irrigation in integration with water harvesting structure where water for irrigation is limited</li> <li>3. Green House Cultivation for Vegetables with drip irrigation</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Organic cultivation of traditional crop viz., finger millet, barnyard millets, black soybean, horse gram, traditional rice in all blocks of this zone.</li> <li>2. Promotion of Bio-fertilizer/soluble fertilizer based farming, especially in rainfed areas of this zone.</li> <li>3. Adoption of pulse based crop rotation and maximum use of value added compost/FYM in all blocks of this zone.</li> <li>4. Making available the required recommended nutrients/ micro-nutrients at right time, place and quantity.</li> <li>5. Adoption of integrated nutrient management in irrigated areas of rice and wheat for Tanakpur, Vanbasa and irrigated area of Reetha.</li> <li>6. Popularization of soil and water conservation measures by pulse based intercropping, contour farming and shoulder bunds in particular rainfed areas.</li> </ol>
<b>Strategy 2 :</b> <b>Livestock:</b> <b>Goatry,</b> <b>Poultry,</b> <b>Fisheries</b>	<ol style="list-style-type: none"> <li>1. Selection of high milk breeds in buffaloes (Murrah) and cattle (Jersey, Red Sindhi and Shaiwal).</li> <li>2. Establishment of Fodder Bank in each block to meet fodder requirement of area.</li> <li>3. Establishment of milk chilling plant at Sult block of this zone.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>Introduction and promotion of cross Heifer for increasing income of marginal farmer in all blocks.</li> <li>Strengthening of traditional water bodies/rivulets with Mahaseer or carps at Vanbasa and tanakpur.</li> <li>Popularisation of green fodder crops ie sorghum, lobia, maize, oat, berseem in all blocks.</li> <li>Community pasture development at village level.</li> <li>Planning for establishment of Gaushala at block level to rear unproductive cattles to avoid the damage crops in cultivated areas.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p><b>Promotion of different Integrated Farming System modules for 20 nali's or 0.4 ha such as :</b></p> <p><b>Vegetable based – 18 nali protected cultivation + 2 nali composting and Goatry/ Poultry</b></p> <ol style="list-style-type: none"> <li>Protected cultivation (100sqm low cost polyhouse- Capsicum, cucumber, Tomato, nurse raising and cole crops)/ off season vegetable; 18 nali + Composting (50sqm) + Goatry (4F+1M) /backyard poultry (50birds)</li> </ol> <p><b>Live stock based- 10 nali green fodder + 5 nali Dairy, composting and Goatry/ Poultry+ 5 nali Protected cultivation</b></p> <ol style="list-style-type: none"> <li>Fodder production (10 nali; Sorghum, lobia-Oat in rainfed or berseem in irrigated) + Mini dairy (Crossbreed05) + Composting (50sqm) + Protected cultivation; 5 nali</li> </ol> <p><b>Crop based- 15 nali crop and vegetable+ 5 nali Dairy, composting and Goatry/ Poultry+ 2 nali Nursery raising Protected cultivation 5 nali</b></p> <ol style="list-style-type: none"> <li>Truthfull seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea); 15 nali + Planting material supply 2 nali + Mushroom + Composting</li> <li>Crop 14 nali (Gahat, madua, soyabean, lentil- 7 nali + vegetable- Cucurbits, French bean, veg pea, tomato, capsicum and leafy vegetables (7 nali)-dairy/backyard poultry; 5 nali +composting (50sqm).</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Establishment of mini fruit grading plant for mango &amp; Litchi stone at Tanakpur area of Champawat blocks.</li> <li>Establishment of Food Processing Units for mango &amp; Litchi, mango at Tanakpur area of Champawat blocks</li> <li>Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Tanakpur area of Champawat blocks.</li> <li>Establishment of Food and Processing Units at Tanakpur for pickle making using wild Aonla, mango &amp; Jack fruits.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Tractors and other bif agriculture equipments in Champawat &amp; Vanbasa areas.</li> </ol>

	<ol style="list-style-type: none"> <li>7. Creation of larger facilities of infrastructure for reducing post harvest losses in horticultural commodities viz. Long term storage, warehouses.</li> <li>8. Development of cottage industries at village level for unfinished products.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Champawat, Jajal, Bastia, and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Hill areas this block.</li> <li>3. Plantation of Morus plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Hill areas this block</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Hill areas this block.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zinc, Boron, Phosphorus, etc.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks.</li> <li>2. Promotion of cultivation and collection of medicinal plants in hills areas.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of skill development in women and youth in all three blocks.</li> <li>Creation of new SHGs in other villages of three blocks.</li> <li>Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Land consolidation in hill areas of Champawat district is essentially required.</li> <li>Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>Implementation of Soil Health Card Scheme in each block.</li> <li>Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>Labelling of organic inputs and certification mechanism for various crops in all four blocks.</li> <li>Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Establishment of mini mandies at Block level.</li> <li>Creation of better transportation facilities with cool chain van at Block level.</li> <li>Creation of direct linkages with food processing industries for better prices.</li> <li>Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>Installation of mini grading machines at village level.</li> <li>Promotion of local Hatt at Tahsil level in all blocks.</li> <li>Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Champawat**  
**Zone: B (1000-1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572), paddy (Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209, Jethi dhan – Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355, Pusa Basmati 1509 &amp; PRH 10, Irrigated VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85); Barley (VL Jau 118 and VLB 94); Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Lohaghat, Barakot, Pati &amp; Hill areas of Champawat blocks.</li> <li>2. Promotion of high yielding varieties of finger millets (VL Mandua 324, VL Mandua 352, PRM1) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1) in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (VL Tamatar 4), Onion (VL Piaz 3), VL Shimla Mirch 3 and garlic (VL Lehsun 1) in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above recommended crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of citrus fruit (lime/ lemon/ malta) plants at mid hills in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>2. Promotion of ginger cultivation in all blocks of the zone.</li> <li>3. Promotion of organic cultivation of turmeric in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>4. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> <li>5. Promotion of production of vegetable pea, okra in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</li> </ol>
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	<p>6. Promotion of production of pigeon pea in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</p> <p>7. Promotion of production of lentil</p> <p><b>Management of wild animal problem</b></p> <p>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</p> <p>2. Enacting legislative measures for protection of crop from wild animals.</p> <p>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Lohaghat, Barakot, Pati, Hill areas of Champawat blocks.</p> <p>4. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</p> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <p>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</p> <p>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</p> <p><b>Adoption of efficient irrigation techniques</b></p> <p>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</p> <p>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</p> <p>3. Green House Cultivation for Vegetables</p> <p><b>Management of soil health in low or valley areas</b></p> <p>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</p> <p>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</p> <p>3. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp in different blocks.</p> <p>4. Organic cultivation of local grain and millets in different blocks.</p> <p><b>Others</b></p> <p>1. Cluster approach for holistic development.</p> <p>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</p> <p>3. Cultivation of fodder crops &amp; medicinal plants.</p> <p>4. Adoption of only well decomposed FYM/ value added compost.</p> <p>5. Adoption of efficient and timely use of IPM and IDM practices.</p> <p>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</p> <p>7. Promotion of moisture conservation practices.</p> <p>8. Promotion to focus on timely weed management.</p>
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<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Barbari, Beetal, Sirohi &amp; Jamunapari) in Lohaghat, Barakot, Pati &amp; Champawat blocks.</li> <li>2. Establishment of Fodder Bank in Lohaghat, Barakot, Pati, Champawat block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of mini milk chilling plant at Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer at blocks level</li> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</li> <li>8. Replacement of Carp in fisheries and croilers dual purpose in mid and high hills etc.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  Rice - Wheat  Maize- Wheat  Horse gram/ Pigeon pea – Lentil  Tomato/ Capsicum – Vegetable Pea  Okra – Potato</p> <p><b>Horticulture</b>  Citrus fruits (100 plants)</p> <p><b>Livestock</b>  Cow (01)/ Buffalo(01) + Backyard Poultry (100)</p> <p><b>Others</b>  Vermi-composting (20m<sup>2</sup>)  Fodder production in terrace risers and bunds.</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for mango &amp; Litchi stone at Tanakpur area of Champawat blocks.</li> <li>2. Establishment of Food Processing Units for mango &amp; Litchi, mango at Tanakpur area of Champawat blocks</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>5. Establishment of Food and Processing Units at Tanakpur for pickle making using wild Aonla, mango &amp; Jack fruits.</li> <li>6. Promotion of common resources on custom hire basis viz. Power tiller, Tractors and other bif agriculture equipments in Champawat &amp; Vanbasa areas.</li> <li>7. Creation of larger facilities of infrastructure for reducing post harvest losses in horticultural commodities viz. Long term storage, warehouses.</li> <li>8. Development of cottage industries at village level for unfinished products.</li> </ol>



<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Champawat, Jajal, Bastia, and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak etc.) may be promoted in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.).</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks of Champawat district.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Lohaghat, Barakot, Pati, Champawat blocks.</li> <li>3. Promotion of skill development in women and youth in all four blocks.</li> <li>4. Creation of new SHGs in other villages of four blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all four blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Land consolidation in Champawat district is essentially required.</li> <li>2. Policies must be implemented for control of wild animal menace in agricultural areas.</li> <li>3. Implementation of Soil Health Card Scheme in each block.</li> <li>4. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in four blocks.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all four blocks.</li> <li>6. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>7. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>8. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies at Block level.</li> <li>2. Creation of better transportation facilities with cool chain van at Block level.</li> <li>3. Creation of direct linkages with food processing industries for better prices.</li> <li>4. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of cold room.</li> <li>8. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>9. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program</li> </ol>

**District: Champawat**  
**Zone: C (1500-2400 m))**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat {UP-2572, VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 (from 1700 to 2400m amsl)} in Pati blocks</li> <li>2. Promotion of high yielding varieties of finger millets ( VL Mandua 352 upto 2000m amsl and PRM1), Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207 upto 2000m amsl) and in Pati blocks.</li> <li>3. Promotion of high yielding variety of lentil (PL 4, PI 5) and soybean (PS 1092) in Pati blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown), French bean (VL Bean 2), tomato (VL Tamatar 4 upto 1800m amsl), Onion (VL Piaz 3 upto 2000m amsl), VL Shimla Mirch 3 upto 1800m amsl and garlic (VL Lahsun 2) in Pati blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Pati blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of citrus fruit (lime/ lemon/ malta) plants, Kiwi (Allison/ Haward/ Monty + Tomari) at mid &amp; high hills in Pati blocks.</li> <li>2. Promotion of ginger cultivation in all zone.</li> <li>3. Promotion of organic cultivation of turmeric in Pati block.</li> <li>4. Promotion of onion and garlic cultivation in Pati block.</li> <li>5. Promotion of off season vegetables (tomato, capsicum, cole crops etc.) cultivation in Pati block.</li> <li>6. Promotion of production of vegetable pea in Pati blocks.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in Pati block.</li> </ol>
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	<ol style="list-style-type: none"> <li>4. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> <li>5. Promotion of chestnut and stone fruits.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>3. Organic cultivation of local grain and millets in different blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices.</li> <li>8. Promotion to focus on timely weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion and up-gradation of local breeds with high milking breeds of cows (Jersey &amp; Holstein friesian), and goats (Sirohi) in Pati block,</li> <li>2. Establishment of Fodder Bank in Pati block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Devidhura block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>6. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</li> </ol>

<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  Soybean – Lentil  Cole Crops – Vegatable pea  Maize- Potato  Pea - Wheat</p> <p><b>Horticulture</b>  Kiwi &amp; Pear fruits (100 plants)</p> <p><b>Livestock</b>  Cow (01) + Sheep(10)</p> <p><b>Others</b>  Bee Keeping and poly tunnels for nursery raising  Vermi-composting (20m<sup>2</sup>)</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for Kiwi, pear and stone fruits at Pati block.</li> <li>2. Establishment of Food Processing Units for pear at Pati blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Pati block.</li> <li>5. Establishment of small processing units for tertiary and value addition of Kiwi, citrus fruits, pear in Pati block.</li> <li>6. Promotion of common resources on custom hire basis viz. Power tiller in Pati block,</li> <li>7. Mini wheat and Paddy thresher in Pati block.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Balik, Ramak, Mangal lakh, Garsh lakh, Dharonch and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Pati block.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Utees, Oak, Mulberry, etc.) may be promoted in Pati block.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all block.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Pati block.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate in Pati block.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zinc, Boron, Phosphorus, etc. may be provided.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, horticulture improved kits etc.)</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of well decomposed FYM, Vermicompost and Biofertilizers.</li> <li>Promotion of line sowing and balanced fertilizers application in crops.</li> <li>Promotion of recommended seed rate, spacing and depth.</li> <li>Promotion of need based application of pesticides and other agricultural inputs.</li> <li>Promotion of hand tools in agricultural and horticultural operations.</li> <li>Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>Promotion of apiculture/ sericulture/ mushroom for small and landless farmers in all blocks of Champawat district.</li> <li>Promotion of cultivation and collection of medicinal plants in Pati block.</li> <li>Promotion of skill development in women and youth in all three blocks.</li> <li>Creation of new SHGs in villages.</li> <li>Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all block.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Land consolidation in Champawat district is essentially required.</li> <li>Implementation of Policies for control of wild animal menace in agricultural areas.</li> <li>Implementation of Soil Health Card Scheme.</li> <li>Increasing institutional support by providing subsidises and incentives to small and marginal farmers in Pati blocks.</li> <li>Labelling of organic inputs and certification mechanism for various crops in Pati block.</li> <li>Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Installation of mini mandies at Block level.</li> <li>Creation of better transportation facilities with cool chain van at Block level.</li> <li>Creation of direct linkages with food processing industries for better prices.</li> <li>Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>Installation of mini grading machines at village level.</li> </ol>

	<ul style="list-style-type: none"> <li>7. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>8. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> <li>9. Development of policies to ensure the purchasing of farm produce/ products at farmers field site to encourage the farmers</li> </ul>
<b>Strategy 10 : Online Management and Evaluation</b>	<ul style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ul>

## Technology Intervention Success Stories

### Example 1: Polymulch Technology for High Remuneration in Rainfed Hills [Krishi Vigyan Kendra (Champawat)]

<b>Advantages</b>	:	<ol style="list-style-type: none"><li>1. High productivity &amp; early crop</li><li>2. Moisture conservation</li><li>3. Effective weed control</li><li>4. Reduce nutrient loss</li><li>5. Reduce soil compaction</li><li>6. Quality &amp; early crop produce</li></ol>
<b>Polymulch sheet</b>	:	40-50 micron / 70-90 GSM
<b>Expenditure</b>	:	Rs 2000-3000 / 200 m <sup>2</sup>
<b>Net income</b>	:	3000-3500 / 200m <sup>2</sup>
<b>Impact</b>	:	More than 500 farmers have adopted polymulch technology and are harvesting 30%-40% higher production as compared to traditional method
<b>Suitable crops</b>	:	Tomato, capsicum, brinjal, chillies, marrow, cauliflower, cabbage





## Example 2: Fish-Poultry-Vegetable Integrated Technology for Hills [Krishi Vigyan Kendra (Champawat)]

**Benefits:** Production of diversified food (fish, poultry, vegetables) at cheaper cost

**Technical details:** Pond size: 100 m<sup>2</sup> area, Number of chicks: 120-140, Crop area: 1000 m<sup>2</sup>

**Fish species:** Silver carp, Grass carp, Common carp

**Fish Stocking:** 250-300 No. (2-4-inch size) in 30:40:30 ratio during February-March

**Poultry birds:** rearing 120-140 chicks of croiler variety in two crops in a year

**Vegetable Production:** cabbage, cauliflower, capsicum, tomato, brinjal, onion, vegetables pea in polyhouse and open fields in 1000 m<sup>2</sup> area

**Production:** 60-80 kg fish, 200-250 kg poultry meat, 2500-3000kg vegetables

**Expenditure:** Rs 20,000-25,000/- **Gross income:** Rs 75,000-80,000/-

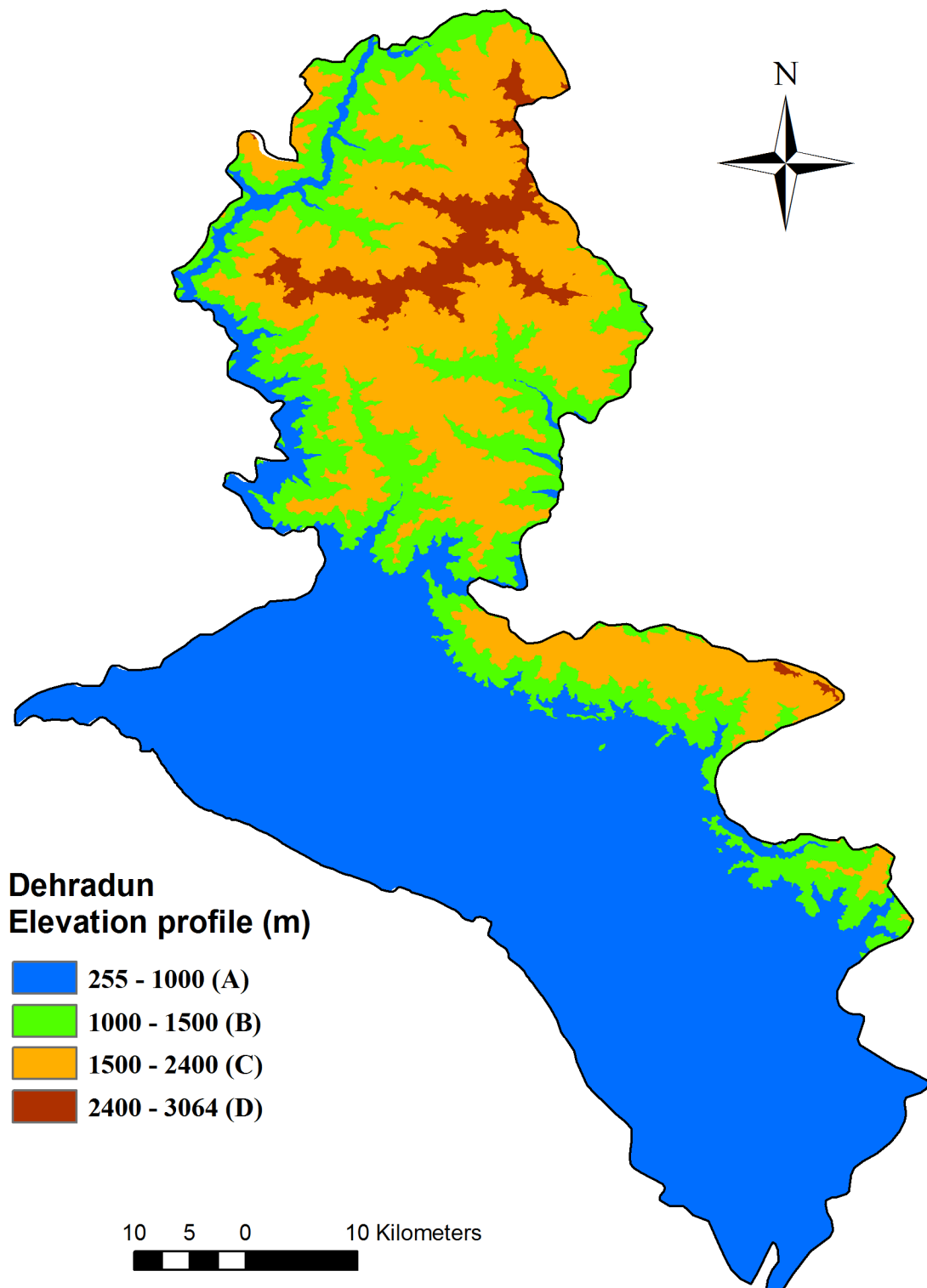
**Net income:** Rs 50,000-60,000/-

**Adoption:** 35 fish Farmers have adopted fish -poultry-vegetable farming so far





**DISTRICT: DEHRADUN**



**Figure 11: District Dehradun elevation profile**



**District: Dehradun**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p>Promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li><b>Wheat</b> (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 349, HS-490, HS-507, UP-2572, VL-907, VL-892, HD-2967, PBW-550, PBW-502, DPW-621-50, HD-3086 suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Paddy</b> (Hybrid rice: Arize-6444, NDR-359, Pant Basmati-1, Pant Basmati-2, Pusa-44, Pant Dhan-18, HKR-47, PR-113, Pusa Basmati-1509, Pusa Basmati-1121, Arize-6129, Pant Dhan 24, 26, Pant Sankar Dhan 3) suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Maize</b> (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Maize hybrid-3396, Maize hybrid-3401, Maize hybrid-9144, Maize hybrid-9164 , Kanchan, Navin, Shweta) suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Sugarcane</b> (Early Varieties : Co Pant 84211, Co Pant 94211, Co Pant 03220, CoS 8436, CoS 88230, CoJ 85, CoS 96268, Co 238) and Mid-late varieties : Co Pant 84212, Co Pant 90223, Co Pant 96219, Co Pant 97222, Co Pant 99214, Co Pant 05224) suitable for Vikasnagar, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Tomato</b> (Ayushman, Shaksham, Dipanker, Abhinav, Avtar, Aviral, Arka Rakshak, Himshikhar, Sampoorana, NS 504, Abhilash, 4223, 3428, 914, 3201, 999, 2853, 1458, Kashi amaan, Kashi abhimaan, Kashi vishesh, Naveen 2000, Himsona, Pusa Sheetal, Pusa Gaurave, Pant T-3 suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Chilli</b> (DG-1701, Anokhi, Sagarika, Sakata-651, Tarika-2161, 078, 4884, VNR 305, Kalyani, Kranti, Kashi surkh, KA2, Kashi early, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3, Laher, soldier, Pant Chilli-1, Pusa Jwala, Pusa Sadabahar, Arka Lohit, Divya Jyoti, Gopika, Kalyani) suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Vegetable pea</b> (Vivek Matar 10, and Vivek Matar 12, VL Ageti Matar 7, Sweet Pearl, PSM-3, GS-10, Azad Matar-3, VRP-5, VRP-6, VRP-7, Arkle, GS 10, Arkle, Azad Matar-2, Arka Ajit and Kashi Udai suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>Rajma</b> (VL Rajma 63, VL Rajma 125, PDR-14 (Udai), Chakrata local suitable for Vikasnagar, Kalsi, Sahaspur and Raipur blocks of district Dehradun</li> </ol>
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	<p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <ol style="list-style-type: none"> <li><b>1. Mango</b> (Dushari, Langra, Chausa, Amrapali, Mallika, Bombay green, Pusa surya, Pusa Arunima, Arunika, Pusa shreshta, Pusa Lalima ) suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> <li><b>2. Litchi</b> (Rose scented, calcuttia, gandaki Sampada, Gandaki lalima, Gandaki yogita (suitable for high density plantation) suitable for Vikasnagar, Kalsi, Sahaspur, Raipur and Doiwala blocks of district Dehradun</li> </ol> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds in Vikasnagar, Sahaspur, Raipur and Doiwala blocks of district Dehradun and Naula and Check dam in Chakrata and Kalsi blocks.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone so as to create awareness among the villagers.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Chakrata, Kalsi and Raipur blocks.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip irrigation.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of mango and litchi in Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks.</li> <li>2. Promotion of ginger cultivation in Vikasnagar, Sahaspur, Raipur, and Kalsi blocks of the zone.</li> <li>3. Promotion of onion and garlic cultivation in Kalsi, Vikasnagar and Sahaspur block of Dehradun.</li> <li>4. Promotion of off season vegetables (tomato, vegetable pea, chilli, capsicum, cole crops etc.,) cultivation in Kalsi and Chakrata blocks.</li> <li>5. Promotion of production of tomato cultivation in Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks with the use of proper crop rotation.</li> <li>6. Promotion of production of vegetable pea, okra in Vikasnagar, Sahaspur, Raipur and Kalsi blocks.</li> <li>7. Promotion and production of basmati rice in Vikasnagar, Sahaspur, Kalsi and Doiwala blocks.</li> </ol> <p><b>8. Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Wild animals especially elephants are a big problem in Doiwala and Raipur block. In Kalsi and Vikasnagar blocks there is a problem of wild boars. Electric fencing is required in these places. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of cultivation of fruit crops in the forest areas so that wild animals do not come in the cultivated areas in Doiwala and Raipur Kalsi and Vikasnagar block. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol>
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	<p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>2. Farm mechanization will help in the timely sowing of crops. Mini harvesters should be developed so as to harvest on time.</li> <li>3. Use of mechanized weeder in crops like sugarcane and maize will immensely help the farmers to do weeding on time and thus reduce drudgery of female farmers.</li> <li>4. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in plain areas</b></p> <p>Without improvement in soil health, crop productivity enhancement under the rain fed farming system in the District Dehradun plains and hilly zone is a difficult task. Soil and water conservation together should be considered a major thrust area for management of soil health. In a watershed approach, various soil and water conservation measures including construction of water harvesting structures, activities for prevention of soil erosion, forestation, terracing and land development should be taken up in the District Dehradun.</p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Popularization of biofertilizers like Rhizobium, Azotobacter, Azospirillum, PSB, PSM, K solubilising micro-organism and use of these biofertilizers with FYM at the time of sowing.</li> <li>3. Fortification of FYM with pseudomonas and trichoderma</li> <li>4. Promotion of vermi composting unit and green manuring in all the villages of this zone.</li> <li>5. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp in different blocks.</li> <li>6. Promotion of green manuring in Vikasnagar, Sahaspur, Doiwala blocks of all the villages of this zone.</li> <li>7. Introduction of one leguminous crop in a yearly crop rotation. Vegetable pea is a very popular crop in all the blocks of district Dehradun and this crop can be successfully included in the crop rotation.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> </ol>
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	6. Compulsion of seed treatment through bio agent/ chemical in the cluster. 7. Adoption of moisture conservation practices. 8. Promotion to focus on timely weed management.
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	1. Promotion of high milk breeds of cows (Sahiwal, Red Sindhi & Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi & Jamunapari) in Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala block, while promotion of wool yielding breeds of sheep in Chakrata block. 2. Establishment of feed and fodder Bank in Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala block to meet fodder requirement of area particularly during lean period. 3. Establishment of milk chilling plant at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala block. 4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level at all the blocks of Dehradun. 5. Introduction of poultry breeds like CARI Devendra and CARI Nirbheek as back yard poultry breeds. These breeds are suitable for egg and meat purposes. 6. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers. 7. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Kalsi block. The river Yamuna and Tonas can be used for fish farming. 8. Availability of feed material with low prices & Timely health check-ups of animals. 9. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.
<b>Strategy 3 : Integrated Farming system</b>	<p>In District Dehradun the variations in altitude and climate offer natural advantage for crop diversification. As such, alternative strategies for agriculture related enterprises viz., horticulture, forestry, floriculture, medicinal plants needs to be strengthened. Besides, less remunerative crops can be replaced with more profitable crops on a rotational basis. Utilization of fallow lands may also provide additional gains. The traditional and scientific resources/know-how should be blended and disseminated to improve the agricultural economy of hills. It is essential to integrate the available natural resource, tap the untapped potential of crops/varieties and technical know-how in an eco-friendly manner to enhance agricultural productivity for food and nutritional security as well. Introduction of vegetable crops in the crop sequence is capable of enhancing profitability by 2-3 times.</p> <p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b></p> <p>rice-wheat-moong  maize-wheat-moog  rice-wheat-moong  rice-vegetable pea-moong  maize-wheat-moong</p>



	maize-rajma-moong maize-vegetable pea-moong sugarcane + rajma-cauliflower sugarcane + urd-coriander tomato-maize-vegetable pea <b>Horticulture</b> Mango/Litchi/Guava/ Lemon (100 plants) <b>Livestock</b> Cow (01)/ Buffalo(01) + Backyard Poultry (100) <b>Others</b> 1. Vermi-composting (20m <sup>2</sup> ) 2. Fodder production in terrace risers and bunds. 3. Mushroom production 4. Bee keeping
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	1. In district Dehradun there should be plan to establish agro-processing facilities close to the points of production in rural areas, which will promote off-farm employment. 2. Agricultural Cooperatives and Gram Panchayats can play a leading role in this effort. As a part of post harvest management strategy, additional logistic infrastructure will also be required to be created. 3. District Dehradun produces large varieties of cereals, fruits, vegetables and spices. A sizable quantity of this produce is wasted because of lack of storage, processing and packaging facilities. In order to develop and strengthen this sector, backward and forward linkages can be established by involving private sector and coordination with all concerned departments and agencies of the State and Central Government. 4. Establishment of Small & Medium Size Agro Parks, which provide common infrastructure facilities for storage, processing and marketing of surplus fruits and vegetables. 5. Establishment of fruit & vegetable based wineries. 6. Establishment of mini fruit grading plant for mango, litchi and stone fruits at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks . 7. Establishment of Food Processing Units for mango at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks. 8. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks. 9. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks. 10. Tertiary and value addition of mango, citrus fruits, in at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks by establishment of small processing units. 11. Establishment of Food and Processing Units at at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks for pickle making using mango & lemon.

	<p>12. Promotion of common resources on custom hire basis viz. Power tiller, Mini wheat and Paddy thresher in at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks.</p> <p>13. Gravity ropeways to be constructed in Kalsi block to provide road head access to the farm produce need to be taken to be taken at a larger scale.</p> <p>14. Private investment must also be encouraged in post harvest technology and infrastructure to bridge the gap in agricultural marketing.</p>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<p>As such there is no problem of wasteland and waste water in District Dehradun. But where the slope is very steep, there is some problem of soil erosion. In the hills of Kalsi and Raipur blocks Contour making for arable purpose in waste land in Kalsi block and other hill areas.</p> <ol style="list-style-type: none"> <li>1. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Raipur and Kalsi blocks.</li> <li>2. Plantation of Mulberry (Morus) plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus, etc.) may be promoted in at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks.</li> <li>3. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>4. Construction of tank for storage of water for lean season in all blocks.</li> <li>5. Establishment of storage system for rain water in monsoon season.</li> <li>6. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of specific fertilizers and micronutrients like Zinc, Boron, Phosphorus, potassium etc.</li> <li>2. Use of fortified FYM, vermicompost along with biofertilizers will increase the macro nutrient availability and thus will decrease the use of fertilizers. The soil organic matter content will increase and soil fertility will increase.</li> <li>3. Foliar application of nutrients will also reduce the cultivation cost.</li> <li>4. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.)</li> <li>5. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in at Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks.</li> <li>6. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>7. Promotion of recommended seed rate, spacing and depth.</li> <li>8. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>9. Promotion of hand tools in agricultural and horticultural operations.</li> <li>10. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>11. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>

<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture in Vikasnagar, Sahaspur, and Doiwala blocks / sericulture in Vikasnagar, Sahaspur, and Doiwala blocks, / mushroom for small and landless farmers in all blocks of Dehradun district.</li> <li>2. Promotion of skill development in women and youth in all Vikasnagar, Sahaspur, Raipur, Kalsi and Doiwala blocks.</li> <li>3. Creation of new SHGs in all villages of all blocks and linking them with NABARD or lead banks of that areas.</li> <li>4. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all six blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<p>Adequate and timely availability of inputs is essential for agricultural growth. A dynamic and growing, agricultural sector requires seed, fertilizer, plant protection chemicals, bio pesticides, agricultural machinery and credit at reasonable rates to the farmers.</p> <ol style="list-style-type: none"> <li>1. Land consolidation (Chakbandi) in Dehradun district is essentially required. This will help in proper planning and execution of farming practices.</li> <li>2. Buy back mechanism of the government should be strengthened and all produce of the farmer should be bought by the government.</li> <li>3. Implementation of policies for control of wild animal menace in agricultural areas (by sterilization/castration/killing).</li> <li>4. Implementation of Soil Health Card Scheme in each nyay panchayat of all blocks.</li> <li>5. Providing quality inputs at right time to the farmers</li> <li>6. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> <li>7. Popularization of Udyan cards and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>8. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>9. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<p>Action points that need to be considered for closing in on the present marketing gaps are:-</p> <ol style="list-style-type: none"> <li>1. Transportation is the major problem in hill regions. So, either procurement centre may be established in the area or some transportation subsidy may be introduced for improving profitability of the farmers.</li> <li>2. The awareness among farmers about other post harvest management aspects such as grading, processing etc. needs to be created by the concern departments.</li> <li>3. For planning of marketing strategies, a data base on consumer behavior market competitiveness, strategies of potential rivals in export market, income and price response needs to be developed in the State.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Organization commodity specific growers' associations at village, market (AMC) and state level and integrating their functions in relation to market centric activity.</li> <li>5. Govt. of Uttarakhand may tap Rural Infrastructure Development Fund from NABARD for all the AMCs projects on a comprehensive basis (new as well as modernization).</li> <li>6. Involving Gram Panchayats to organize and manage markets at local level by undertaking remunerative schemes and improving their revenues.</li> <li>7. Village level processing should be encouraged by providing appropriate technology and by organizing the marketing of such processed products.</li> <li>8. Establishment of mini mandies at Block level.</li> <li>9. For highly perishable vegetable and fruit crops like mango, litchi, tomato, capsicum etc creation of better transportation facilities with cool chain van at Block level.</li> <li>10. Creation of direct linkages with food processing industries for better prices.</li> <li>11. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>12. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>13. Installation of mini grading machines at village level.</li> <li>14. Establishment of cold storage facilities in Kalsi and Vikasnagar blocks.</li> <li>15. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>16. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Linking up villages to local market; local market to regional/ state markets and state markets to national and international markets duly network them online (e-marketing).</li> <li>3. Use of internet to increase knowledge and explore marketing possibilities</li> <li>4. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>5. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>6. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Dehradun**  
**Zone: B (1000 to 1500 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>Promotion of high yielding varieties of the following crops in two blocks only namely Chakrata &amp; Kalsi <ul style="list-style-type: none"> <li><b>Wheat</b> (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572, UP 2628, UP 2554),</li> <li><b>Paddy</b> (Spring rice - VL Dhan 208 and VL Dhan 209; Jethi rice - Vivek Dhan 154 and VL Dhan 157; Irrigated Rice - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85), Pant Dhan-19, HKR-127 &amp; PRH 10, Pant Dhan 4, PD 11);</li> </ul> </li> <li>Promotion of HYV of <b>Maize</b> (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Maize hybrid-3396, Maize hybrid-3401, Maize hybrid-9144, Maize hybrid-9164 , Kanchan, Navin, Shweta) suitable for Chakrata &amp; Kalsi blocks of district Dehradun</li> <li>Promotion of high yielding varieties of <b>finger millets</b> (VL Mandua 324, and VL Mandua 352, PRM1) and <b>Barnyard millet</b> (PRJ-1, VL Madira 172 and VL Madira 207) in Chakrata &amp; Kalsi blocks</li> <li><b>Amaranthus</b> (VL Chua 44); <b>Buckwheat</b> (VL Ugal 7)</li> <li>Promotion of high yielding variety of <b>lentil</b> (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514 and <b>Pigeon pea</b> (VL Arhar 1) in Chakrata &amp; Kalsi blocks of district Dehradun.</li> <li><b>Rajma</b> (VL Rajma-63, VL Rajma 125, PDR-14 (Udai), Chakrata local suitable for Chakrata &amp; Kalsi blocks</li> <li><b>Tomato</b> (VL Tamatar 4, Ayushman, Shaksham, Dipanker, Abhinav, Avtar, Aviral, Arka Rakshak, Himshikhar, Sampoorana, NS 504, Abhilash, 4223, 3428, 914, 3201, 999, 2853, 1458, Kashi amaan, Kashi abhimaan, Kashi vishesh, Naveen 2000, Himsona, Pusa Sheetal, Pusa Gaurave, Pant T-3 suitable for in Chakrata &amp; Kalsi blocks</li> <li><b>Chilli</b> (DG-1701, Anokhi, Sagarika, Sakata-651, Tarika-2161, 078, 4884, VNR 305, Kalyani, Kranti, Kashi surkh, KA2, Kashi early, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3, Laher, soldier, Pant Chilli-1, Pusa Jwala, Pusa Sadabahar, Arka Lohit, Divya Jyoti, Gopika, Kalyani, VL Shimla Mirch 3) suitable for Chakrata &amp; Kalsi blocks.</li> <li><b>Vegetable pea</b> (Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12, Sweet Pearl, PSM-3, GS-10, Azad Matar-3, VRP-5, VRP-6, VRP-7, Arkle, GS 10, Arkle, Azad Matar-2, Arka Ajit, Kashi Udai suitable for in Chakrata &amp; Kalsi blocks</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>Various system of water harvesting depending upon the source of water supply may be implemented like (a) in-situ rain water harvesting can be done through bunding and terracing, contour farming, mulching etc. (b) rain water / direct surface run off</li> </ol>
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	<p>harvesting through roof top collection, dug out ponds, storage tank, diversion bunds /channel etc. (c) Stream flow or run off harvesting through nala bunding, waterharvesting dam, percolation tank/ ponds, (d) Sub surface flow harvesting in Chakrata &amp; Kalsi blocks.</p> <ol style="list-style-type: none"> <li>2. Conserve soil and water through in-situ moisture conservation, water harvesting and land management practices in Chakrata &amp; Kalsi blocks</li> <li>3. Regenerating natural resources base: conservation practices like plot border planting with terrace repair on-arable land and contour trenching on non-arable land for in-situ moisture conservation in Chakrata &amp; Kalsi blocks</li> <li>4. Strengthening of existing water storage structures like ponds in Chakrata &amp; Kalsi blocks of district Dehradun and Naula and Check dam in Chakrata and Kalsi blocks.</li> <li>5. Each and every field should be thought of as a recharge unit and it can be achieved by levelling of land and increase in bund height. This will help in water recharge and will stop overflow of water</li> <li>6. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone so as to create awareness among the villagers.</li> <li>7. Creation of trenches for high percolation of water in most of the area of Chakrata and Kalsi blocks.</li> <li>8. Promotion of water conservation techniques like mulch, sprinkler and drip irrigation.</li> <li>9. More crop per drop of water.</li> <li>10. Roof Water Harvesting</li> <li>11. There is an urgent need to generate alternate sources of irrigation to increase the net irrigated area, which in turn shall also increase the cropping intensity. These alternative sources can be rainwater harvesting, check dams, hydram for lift irrigation etc.</li> <li>12. Technologies like drip irrigation, sprinklers etc. can also be used for better water management in Chakrata &amp; Kalsi blocks.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Promotion of ginger cultivation in Chakrata and Kalsi blocks of the zone.</li> <li>2. Promotion of onion and garlic cultivation Chakrata and Kalsi blocks of Dehradun.</li> <li>3. Promotion of off season vegetables (tomato, vegetable pea, chilli, capsicum, cole crops etc.,) cultivation in Kalsi and Chakrata blocks.</li> <li>4. Promotion of production of tomato cultivation in Kalsi and Chakrata blocks with the use of proper crop rotation.</li> <li>5. Promotion of production of vegetable pea, okra in Chakrata and Kalsi blocks.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. In Kalsi and Chakrata blocks there is a problem of wild boars. Electric fencing/normal fencing is required in these places. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> </ol>
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	<ol style="list-style-type: none"> <li>Enacting legislative measures for protection of crop from wild animals.</li> <li>Promotion of cultivation of fruit crops in the forest areas so that wild animals do not come in the cultivated areas in Kalsi and Chakrarta block. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> <li>Farm mechanization will help in the timely sowing of crops. Mini harvesters should be developed so as to harvest on time.</li> <li>Use of mechanized weeder in crops like maize will immensely help the farmers to do weeding on time and thus reduce drudgery of female farmers.</li> <li>Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in hilly areas</b></p> <ol style="list-style-type: none"> <li>Integrated Plant Nutrient Management (IPNM)- IPNM can be practiced by sensitizing area groups, creating awareness to farmers through publicity propaganda, organizing communities and training's. Demonstrations can be conducted on the lines of Farmers Field School (FFS).</li> <li>Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>Reclamation of acidic soil by liming should be done in Chakrarta &amp; Kalsi blocks on a war footing</li> <li>Popularization of biofertilizers like Rhizobium, Azotobacter, azospirillum, PSB, PSM, K solubilising micro-organism and use of these biofertilizers with FYM at the time of sowing.</li> <li>Fortification of FYM with pseudomonas and trichoderma</li> <li>Promotion of vermi composting unit</li> <li>Introduction of one leguminous crop in a yearly crop rotation. Vegetable pea is a very popular crop in all the blocks of district Dehradun and this crop can be successfully included in the crop rotation.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>Cluster approach for holistic development.</li> <li>Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>Cultivation of fodder crops &amp; medicinal plants.</li> <li>Adoption of only well decomposed FYM/ value added compost.</li> <li>Promotion of efficient and timely use of IPM and IDM practices.</li> </ol>
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	6. Compulsion of seed treatment through bio agent/ chemical in the cluster. 7. Adoption of moisture conservation practices. 8. Promotion to focus on timely weed management.
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	1. The animals such as cow and buffalo in the hill region of district Dehradun and especially in Chakrata & Kalsi blocks belong to the nondescript breed and are very small in size as compared to the cattle in plains. Productivity of these animals in mountain areas is low as compared to the productivity of these animals in the plain areas of the district. Keeping in view these constraints, formulation and implementation of pragmatic policy to realize the potential of livestock population is an urgent need. 2. Promotion of high milk breeds of cows (Sahiwal, Red Sindhi & Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi & Jamunapari) in Kalsi and Chakrata block, while promotion of wool yielding breeds of sheep in Chakrata block. 3. Establishment of feed Bank in Kalsi and Chakrata block to meet fodder requirement of area particularly during lean period. Establishment of fodder bank and ready -to- eat type of concept. 4. Establishment of milk chilling plant at Kalsi block. 5. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level at all the blocks of Dehradun. 6. Introduction of poultry breeds like CARI Devendra and CARI Nirbheek as back yard poultry breeds. These breeds are suitable for egg and meat purposes. 7. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers. 8. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Kalsi block. The river Yamuna and Tonas can be used for fish farming. 9. Availability of feed material with low prices & Timely health check-ups of animals. 10. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer. 11. Promote dairy by expanding milk processing capacity, expansion of intensive mini dairy and strengthening of distribution structure. 12. Plantation of feedstock trees like shatoot, Bhimal, chamlai and grasses like clover, talfatue. Mixed cropping will be emphasized in the villages. 13. Availability of Credit and/or financial assistance for allied activities such as animal husbandry, medicinal & aromatic plants, sericulture etc.
<b>Strategy 3 : Integrated Farming system</b>	Following Integrated farming system model may be developed: <b>Cropping system (Area 4000m<sup>2</sup>)</b> rice-wheat-moong maize-wheat-moog rice-vegetable pea/ cauliflower/ cabbage vegetable pea-wheat-maize vegetable pea-ginger



	vegetable pea-cauliflower-maize rajma-vegetable pea rajma-lentil rajma-onion/garlic tomato-maize-vegetable pea tomato-chilli tomato-cabbage tomato-cauliflower <b>Horticulture</b> Apple /Peach/ Pear/ Lemon (100 plants) <b>Livestock</b> Cow (01)/ Buffalo(01)/goat (10) + Backyard Poultry (100) <b>Others</b> 1. Vermi-composting (20m <sup>2</sup> ) 2. Fodder production in terrace risers and bunds. 3. Mushroom production 4. Bee keeping
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	1. Chakrata and Kalsi blocks produce large varieties of cereals, fruits, vegetables and spices. A sizable quantity of this produce is wasted because of lack of storage, processing and packaging facilities. In order to develop and strengthen this sector, backward and forward linkages can be established by involving private sector and coordination with all concerned departments and agencies of the State and Central Government. 2. Establishment of Small & Medium Size Agro Parks, which provide common infrastructure facilities for storage, processing and marketing of surplus fruits and vegetables. 3. Establishment of fruit & vegetable based wineries. 4. Gravity ropeways to be constructed in Kalsi and Chakrata block to provide road head access to the farm produce need to be taken to be taken at a larger scale. 5. Private investment must also be encouraged in post harvest technology and infrastructure to bridge the gap in agricultural marketing. 6. Establishment of mini fruit grading plant for stone fruits at Kalsi block. 7. Establishment of Food Processing Units for tomato, ginger, turmeric, vegetable pea in Kalsi and Chakrata blocks. 8. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks. 9. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in in Kalsi and Chakrata blocks 10. Tertiary and value addition of citrus fruits, in in Kalsi and Chakrata blocks by establishment of small processing units. 11. Establishment of Food and Processing Units in Kalsi and Chakrata blocks for pickle making using hill lemon. 12. Promotion of common resources on custom hire basis viz. Power tiller, Mini wheat and Paddy thresher in in Kalsi and Chakrata blocks

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. As such there is no problem of wasteland and waste water in Kalsi and Chakrata blocks of District Dehradun. But where the slope is very steep, there is some problem of soil erosion. In the hills of Kalsi and Chakrata blocks Contour making for arable purpose in waste land in Kalsi block and other hill areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Chakrata and Kalsi blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus, etc.) may be promoted in Kalsi and Chakrata blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Construction of tank for storage of water for lean season in all blocks.</li> <li>6. Establishment of storage system for rain water in monsoon season.</li> <li>7. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Use of fortified FYM, vermicompost along with biofertilizers will increase the macro nutrient availability and thus will decrease the use of fertilizers. The soil organic matter content will increase and soil fertility will increase.</li> <li>2. Foliar application of nutrients will also reduce the cultivation cost.</li> <li>3. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/ Paddy reapers etc.)</li> <li>4. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Kalsi and Chakrata blocks.</li> <li>5. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>6. Promotion of recommended seed rate, spacing and depth.</li> <li>7. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>8. Promotion of hand tools in agricultural and horticultural operations.</li> <li>9. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>10. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
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<b>Strategy 8 : Enabling Policies</b>	<p>Adequate and timely availability of inputs is essential for agricultural growth. A dynamic and growing, agricultural sector requires seed, fertilizer, plant protection chemicals, bio pesticides, agricultural machinery and credit at reasonable rates to the farmers.</p> <ol style="list-style-type: none"> <li>1. Land consolidation (Chakbandi) is essentially required in Chakrata and Kalsi blocks. This will help in proper planning and execution of farming practices.</li> <li>2. Buy back mechanism of the government should be strengthened and all produce of the farmer should be bought by the government.</li> <li>3. Implementation of policies for control of wild animal menace in agricultural areas (by sterilization/castration/killing).</li> <li>4. Implementation of Soil Health Card Scheme in each nyay panchayat of all blocks.</li> <li>5. Providing quality inputs at right time to the farmers</li> <li>6. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> <li>7. Popularization of Udyan cards and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>8. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>9. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<p>Action points that need to be considered for closing in on the present marketing gaps are:-</p> <ol style="list-style-type: none"> <li>1. Transportation is the major problem in hill regions and especially in Chakrata and Kalsi blocks. During rainy season the roads get blocked and perishable fruits and vegetables can not be transported to the markets. So, either procurement centre may be established in the area or some transportation subsidy may be introduced for improving profitability of the farmers.</li> <li>2. The awareness among farmers about other post harvest management aspects such as grading, processing etc. needs to be created by the concern departments in Chakrata and Kalsi blocks.</li> <li>3. For planning of marketing strategies, a data base on consumer behavior market competitiveness, strategies of potential rivals in export market, income and price response needs to be developed in the State.</li> <li>4. Organization commodity specific growers' associations at village, market (AMC) and state level and integrating their functions in relation to market centric activity.</li> <li>5. Govt. of Uttarakhand may tap Rural Infrastructure Development Fund from NABARD for all the AMCs projects on a comprehensive basis (new as well as modernization).</li> <li>6. Involving Gram Panchayats to organize and manage markets at local level by undertaking remunerative schemes and improving their revenues.</li> <li>7. Village level processing should be encouraged by providing appropriate technology and by organizing the marketing of such processed products.</li> </ol>

	<ol style="list-style-type: none"> <li>8. Establishment of mini mandies at Block level.</li> <li>9. For highly perishable vegetable and fruit crops like mango, litchi, tomato, capsicum etc creation of better transportation facilities with cool chain van at Block level.</li> <li>10. Creation of direct linkages with food processing industries for better prices.</li> <li>11. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>12. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>13. Installation of mini grading machines at village level.</li> <li>14. Establishment of cold storage facilities in Chakrata and Kalsi blocks. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>15. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Linking up villages to local market; local market to regional/ state markets and state markets to national and international markets duly network them online (e. marketing).</li> <li>3. Use of internet to increase knowledge and explore marketing possibilities</li> <li>4. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>5. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>6. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Dehradun**  
**Zone: C (1500 to 2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p><b>In this zone only two blocks Chakrata and Kalsi are located :</b></p> <p>Promotion of high yielding varieties of the following crops in two blocks only, namely Chakrata &amp; Kalsi</p> <ol style="list-style-type: none"> <li><b>1. Wheat</b> (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 (from 1700 to 2400m amsl), and UP 2572, UP 2628, UP 2554).</li> <li><b>2. Paddy</b> (VL Dhan 86, Pant Dhan-19, HKR-127 &amp; PRH 10, Pant Dhan 4, PD 11);</li> <li><b>3. Promotion of HYV of Maize</b> (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2 (upto 2000m amsl), Maize hybrid-3396, Maize hybrid-3401, Maize hybrid-9144, Maize hybrid-9164 , Kanchan, Navin, Shweta) suitable for Chakrata &amp; Kalsi blocks of district Dehradun</li> <li><b>4. Promotion of high yielding varieties of finger millets</b> (VL Mandua 352 upto 2000m amsl) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207 upto 1800m amsl) in Chakrata &amp; Kalsi blocks.</li> <li><b>5. Rajma</b> (VL Rajma-63, VL Rajma 125, PDR-14 (Udai), Chakrata local suitable for Chakrata &amp; Kalsi blocks</li> <li><b>6. Tomato</b> (VL Tamatar 4 upto 1800m amsl , Ayushman, Shaksham, Dipanker, Abhinav, Avtar, Aviral, Arka Rakshak, Himshikhar, Sampoorana, NS 504, Abhilash, 4223, 3428, 914, 3201, 999, 2853, 1458, Kashi amaan, Kashi abhimaan, Kashi vishesh, Naveen2000, Himsona, Pusa Sheetal, Pusa Gaurave, Pant T-3 suitable for Chakrata &amp; Kalsi blocks.</li> <li><b>7. Chilli</b> (DG-1701, Anokhi, Sagarika, Sakata-651, Tarika-2161, 078, 4884, VNR 305, Kalyani, Kranti, Kashi surkh, KA2, Kashi early, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3, Laher, soldier, Pant Chilli-1, Pusa Jwala, Pusa Sadabahar, Arka Lohit, Divya Jyoti, Gopika, Kalyani, VL Shimla Mirch 3 upto 1800m amsl) suitable for Chakrata &amp; Kalsi blocks.</li> <li><b>8. Vegetable pea</b> (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown , Sweet Pearl, PSM-3, GS-10, Azad Matar-3, VRP-5, VRP-6, VRP-7, Arkle, GS 10, and Arkle, Azad Matar-2, Arka Ajit, Kashi Udai suitable for in Chakrata &amp; Kalsi blocks</li> <li><b>9. Onion</b> (VL Piaz 3 upto 2000m amsl); <b>Garlic</b> (VL Lahsun 2) suitable for in Chakrata &amp; Kalsi blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li><b>1. In the Chakrata &amp; Kalsi blocks various system of water harvesting</b> depending upon the source of water supply may be implemented like (a) in-situ rain water harvesting can be done through bunding and terracing, contour farming, mulching etc. (b) rain water /</li> </ol>
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	<p>direct surface run off harvesting through roof top collection, dug out ponds, storage tank, diversion bunds /channel etc. (c) Stream flow or run off harvesting through nala bunding, waterharvesting dam, percolation tank/ ponds, (d) Sub surface flow harvesting in Chakrata &amp; Kalsi blocks.</p> <ol style="list-style-type: none"> <li>2. Conserve soil and water through in-situ moisture conservation, water harvesting and land management practices in Chakrata &amp; Kalsi blocks.</li> <li>3. Regenerating natural resources base: conservation practices like plot border planting with terrace repair on-arable land and contour trenching on non-arable land for in-situ moisture conservation in Chakrata &amp; Kalsi blocks.</li> <li>4. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone so as to create awareness among the villagers.</li> <li>5. Creation of trenches for high percolation of water in most of the area of Chakrata and Kalsi blocks.</li> <li>6. Promotion of water conservation techniques like mulch, sprinkler and drip irrigation.</li> <li>7. Roof Water Harvesting.</li> <li>8. There is an urgent need to generate alternate sources of irrigation to increase the net irrigated area, which in turn shall also increase the cropping intensity. These alternative sources can be rainwater harvesting, check dams, hydram for lift irrigation etc.</li> <li>9. Technologies like drip irrigation, sprinklers etc. can also be used for better water management in Chakrata &amp; Kalsi blocks.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Promotion of <b>ginger and turmeric</b> cultivation in Chakrata and Kalsi blocks of the zone.</li> <li>2. Promotion of <b>onion and garlic</b> cultivation Chakrata and Kalsi blocks of Dehradun.</li> <li>3. Promotion of off season vegetables (tomato, vegetable pea, chilli, capsicum, cole crops, etc.) cultivation in Kalsi and Chakrata blocks.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. In Kalsi and Chakrata blocks there is a problem of wild boars. Electric fencing/normal fencing is required in these places. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field. Relocation of wild animals. Replanattion of forests with fruit trees etc.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Farm mechanization will help in the timely sowing of crops. Mini harvesters should be developed so as to harvest on time.</li> <li>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in Chakrata &amp; Kalsi blocks.</li> <li>3. Use of mechanized weeder in crops like maize</li> <li>4. Promotion of improved sickle, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol>
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	<p><b>Management of soil health in hilly areas</b></p> <ol style="list-style-type: none"> <li>1. Integrated Plant Nutrient Management (IPNM)- IPNM should be practiced by sensitizing area groups, creating awareness to farmers through publicity propaganda, organizing communities and training's.</li> <li>2. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>3. Reclamation of acidic soil by liming should be done in Chakrata &amp; Kalsi blocks on a war footing</li> <li>4. Popularization of biofertilizers like Rhizobium, Azotobacter, azospirillum, PSB, PSM, K solubilising micro-organism and use of these biofertilizers with FYM at the time of sowing.</li> <li>5. Fortification of FYM with pseudomonas and trichoderma</li> <li>6. Promotion of vermi composting unit</li> <li>7. Introduction of one leguminous crop in a yearly crop rotation.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops &amp; medicinal plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices.</li> <li>8. Promotion to focus on timely weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. The animals such as cow and buffalo in the hill zone of district Dehradun and especially in Chakrata &amp; Kalsi blocks belong to the nondescript breed and are very small in size and low in productivity as compared to the cattle in plains.</li> <li>2. Promotion of high milk breeds of cows (Sahiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Kalsi and Chakrata block, while promotion of wool yielding breeds of sheep in Chakrata block.</li> <li>3. Establishment of fodder bank and ready -to- eat type of concept in Chakrata &amp; Kalsi blocks.</li> <li>4. Establishment of milk chilling plant in Chakrata &amp; Kalsi blocks.</li> <li>5. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>6. Introduction of poultry breeds like CARI Devendra and CARI Nirbheek as back yard poultry breeds. These breeds are suitable for egg and meat purposes.</li> <li>7. Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>8. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.</li> <li>9. Promote dairy by expanding milk processing capacity, expansion of intensive mini dairy and strengthening of distribution structure.</li> </ol>

	<p>10. Plantation of feedstock trees like shatoot, Bhimal, chamlai and grasses like clover, talfatue. Mixed cropping will be emphasized in the villages.</p> <p>11. Availability of Credit and/or financial assistance for allied activities such as animal husbandry, medicinal &amp; aromatic plants, sericulture etc.</p>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed:</p> <p><b>Cropping system (Area 4000m<sup>2</sup>)</b>  maize-wheat  rice-vegetable pea/ cauliflower/ cabbage  vegetable pea-ginger  vegetable pea-cauliflower-maize  rajma-vegetable pea  rajma-lentil  rajma-onion/garlic  tomato-maize-vegetable pea  tomato-chilli  tomato-cabbage  tomato-cauliflower  ginger-pulses</p> <p><b>Horticulture</b>  Apple /Peach/ Pear/ Lemon (100 plants)</p> <p><b>Livestock</b>  Cow (01)/ Buffalo(01)/goat (10) + Backyard Poultry (100)</p> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Vermi-composting (20m<sup>2</sup>)</li> <li>2. Fodder production in terrace risers and bunds.</li> <li>3. Mushroom production</li> <li>4. Bee keeping</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Chakrata and Kalsi blocks produce large varieties of cereals, fruits, vegetables and spices. A sizable quantity of this produce is wasted because of lack of transportation, storage, processing and packaging facilities.</li> <li>2. Establishment of Small &amp; Medium Size Agro Parks, which provide common infrastructure facilities for storage, processing and marketing of surplus fruits and vegetables.</li> <li>3. Establishment of fruit &amp; vegetable based wineries.</li> <li>4. Gravity ropeways to be constructed in Kalsi and Chakrata block to provide road head access to the farm produce need to be taken to be taken at a larger scale.</li> <li>5. Establishment of mini fruit grading plant for stone fruits in Chakrata &amp; Kalsi blocks.</li> <li>6. Establishment of Food Processing Units for tomato, ginger, turmeric, vegetable pea in Kalsi and Chakrata blocks.</li> <li>7. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>8. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in in Kalsi and Chakrata blocks</li> </ol>



	<p>9. Tertiary and value addition of citrus fruits, in in Kalsi and Chakrata blocks by establishment of small processing units.</p> <p>10. Establishment of Food and Processing Units in Kalsi and Chakrata blocks for pickle making using hill lemon.</p>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<p>1. As such there is no problem of wasteland and waste water in Kalsi and Chakrata blocks of District Dehradun. But where the slope is very steep, there is some problem of soil erosion. In the hills of Kalsi and Chakrata blocks Contour making for arable purpose in waste land in Kalsi block and other hill areas.</p> <p>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Chakrata and Kalsi blocks.</p> <p>3. Plantation of Mulberry (Morus) plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercus etc.) may be promoted in Kalsi and Chakrata blocks.</p> <p>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</p> <p>5. Construction of tank for storage of water for lean season in all blocks.</p> <p>6. Establishment of storage system for rain water in monsoon season.</p> <p>7. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</p>
<b>Strategy 6 : Reduced cultivation cost</b>	<p>1. Use of fortified FYM, vermicompost along with biofertilizers will increase the macro nutrient availability and thus will decrease the use of fertilizers. The soil organic matter content will increase and soil fertility will increase.</p> <p>2. Foliar application of nutrients will also reduce the cultivation cost.</p> <p>3. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.).</p> <p>4. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Kalsi and Chakrata blocks.</p> <p>5. Promotion of line sowing and balanced fertilizers application in crops.</p> <p>6. Promotion of recommended seed rate, spacing and depth.</p> <p>7. Promotion of need based application of pesticides and other agricultural inputs.</p> <p>8. Promotion of hand tools in agricultural and horticultural operations.</p> <p>9. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</p> <p>10. Promotion of pressurized irrigation techniques in horticultural crops.</p>
<b>Strategy 7 : Off-farm income</b>	<p>1. Promotion of apiculture in Chakrata and Kalsi blocks, mushroom for small and landless farmers in Chakrata and Kalsi blocks.</p> <p>2. Promotion of skill development like stitching, pickle , papad, candle, bag making in women and youth in Chakrata and Kalsi blocks</p>

	<ol style="list-style-type: none"> <li>3. Creation of new SHGs in all villages of all blocks and linking them with NABARD or lead banks of that areas.</li> <li>4. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in Chakrata and Kalsi blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Adequate and timely availability of inputs is essential for agricultural growth. A dynamic and growing, agricultural sector requires seed, fertilizer, plant protection chemicals, bio pesticides, agricultural machinery and credit at reasonable rates to the farmers.</li> <li>2. Land consolidation (Chakbandi) is essentially required in Chakrata and Kalsi blocks. This will help in proper planning and execution of farming practices.</li> <li>3. Buy back mechanism of the government should be strengthened and all produce of the farmer should be bought by the government.</li> <li>4. Implementation of policies for control of wild animal menace in agricultural areas (by sterilization/castration/killing).</li> <li>5. Implementation of Soil Health Card Scheme in each nyay panchayat of all blocks.</li> <li>6. Providing quality inputs at right time to the farmers.</li> <li>7. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> <li>8. Popularization of Udyan cards and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>9. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>10. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<p>Action points that need to be considered for closing in on the present marketing gaps are:-</p> <ol style="list-style-type: none"> <li>1. Transportation is the major problem in hill regions and especially in Chakrata and Kalsi blocks. During rainy season the roads get blocked and perishable fruits and vegetables can not be transported to the markets. So, either procurement centre may be established in the area or some transportation subsidy may be introduced for improving profitability of the farmers.</li> <li>2. The awareness among farmers about other post harvest management aspects such as grading, processing etc. needs to be created by the concern departments in Chakrata and Kalsi blocks.</li> <li>3. For planning of marketing strategies, a data base on consumer behavior market competitiveness, strategies of potential rivals in export market, income and price response needs to be developed in the State.</li> <li>4. Organization commodity specific growers' associations at village, market (AMC) and state level and integrating their functions in relation to market centric activity.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Govt. of Uttarakhand may tap Rural Infrastructure Development Fund from NABARD for all the AMCs projects on a comprehensive basis (new as well as modernization).</li> <li>6. Involving Gram Panchayats to organize and manage markets at local level by undertaking remunerative schemes and improving their revenues.</li> <li>7. Village level processing should be encouraged by providing appropriate technology and by organizing the marketing of such processed products.</li> <li>8. Establishment of mini mandies at Block level.</li> <li>9. For highly perishable vegetable and fruit crops like mango, litchi, tomato, capsicum etc creation of better transportation facilities with cool chain van at Block level.</li> <li>10. Creation of direct linkages with food processing industries for better prices.</li> <li>11. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>12. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>13. Installation of mini grading machines at village level.</li> <li>14. Establishment of cold storage facilities in Chakrata and Kalsi blocks. Promotion of local Hatt at Tahsil level in all blocks.</li> <li>15. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Linking up villages to local market; local market to regional/ state markets and state markets to national and international markets duly network them online (e. marketing).</li> <li>3. Use of internet to increase knowledge and explore marketing possibilities</li> <li>4. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>5. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>6. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

## Technology Intervention Success Stories

### Example 1: Technological Intervention through Knowledge Sharing in Fruit Crop Management of Shoot Gall Psylla Doubled the Income of Mango Farmers in Dehradun [Krishi Vigyan Kendra (Dehradun)]

Brief about the study area and major technological interventions	
Insecticides introduced for the first time in management of shoot gall psylla in mango among the farmers (thiamethoxam 0.75 g/lit + profenophos 2 ml/lit)	
No. of Villages (Dehradun district, Uttarakhand, Shivalik Hills)	42
No. of farm families targeted (beneficiaries)	430
Net cultivated area of targeted families (ha)	2000
Incidence of shoot gall psylla recorded before intervention in 2013	62 %
Yield of mango recorded per tree before intervention during 2013	22-48 kg
Drying of branches due to shoot gall psylla before intervention	24-52 %
No. of awareness programme organized (Survey, campaign, training)	118
No. of literature published and distributed to the farmers	2000
No. of news published in the leading newspapers of hindi	36
No. of news broadcasted through electronic media	14

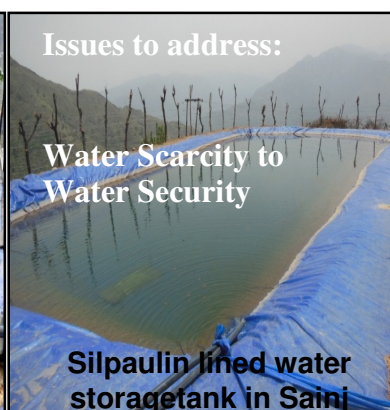
Overall impact after four years (2014, 2015, 2016 and 2017)			
Parameter	Pre-intervention (2013)	Post-intervention (2017)	Improvement (times)
Incidence of shoot gall psylla	2200	2000	90.90%
Gross income earned by the farmers due to management of shoot gall psylla in 4 years	8.80 crores	18.28 crores	2.07
No. of farmers benefited due to management of shoot gall psylla	-	620	620
Impact of technology in the neighbour district	-	Haridwar, Udham Singh Nagar, Nanital in Uttarakhand and Saharanpur in U.P.	4 districts and 2 states



**Example 2: Tapping Surplus Spring Water Resources in Hilly Areas - An Effective and Sustainable Venture for Doubling Farmers' Income [ICAR-IISWC (Dehradun)]**

<b>Brief about the study area and major technological interventions</b>		
<b>Villages (Dehradun district, Uttarakhand, N-W Himalayas)</b>	<b>Hattal</b>	<b>Sainj</b>
<b>No. of farm families targeted (beneficiaries)</b>	<b>130</b>	<b>35</b>
<b>Net cultivated area of targeted families (ha)</b>	<b>55</b>	<b>15</b>
<b>No. of small ponds (each 10 -20 cum) lined with silpaulin</b>	<b>32</b>	<b>27</b>
<b>Total length of HDPE pipe line (km)</b>	<b>8</b>	<b>5.6</b>
<b>Storage capacities of major tanks (cum)</b>	<b>480</b>	<b>200</b>
<b>Cost of interventions-pipe lines and WHS (Rs' lakhs)</b>	<b>12.44</b>	<b>8.66</b>
<b>Farmers' contribution</b>	<b>21 %</b>	<b>25 %</b>

<b>Overall impact after three years</b>			
<b>Parameter</b>	<b>Pre-project (2013)</b>	<b>During 2016</b>	<b>Improvement (times)</b>
<b>Net irrigated area (ha)</b>	<b>10.5</b>	<b>30</b>	<b>2.86</b>
<b>No. of families practicing only agriculture</b>	<b>34</b>	<b>99</b>	<b>2.91</b>
<b>No. of families returned to Sainj village</b>	<b>-</b>	<b>8</b>	<b>Migration Reversed</b>
<b>Gross area under vegetables -tomato, cauliflower, peas, capsicum, cabbage, carrot, beans etc. (ha)</b>	<b>21</b>	<b>60</b>	<b>2.86</b>
<b>Total monetary output from vegetable cultivation in irrigated area (Rs' lakhs)</b>	<b>42.49</b>	<b>146.68</b>	<b>3.45</b>
<b>Av. annual family income from agriculture (Rs)</b>	<b>28020</b>	<b>82950</b>	<b>2.96</b>





### Example 3: Participatory Gravity-flow Water Conveyance System for Irrigation in Hill Agriculture [ICAR-IISWC (Dehradun)]

Brief information	
<b>Location/cluster</b>	N-W Himalayan foothills; Dehradun, Uttarkhand Village cluster – Pasauli, Devthala, Dungakhet, Gadoria
<b>Population</b>	Socially backward: 82%; Economically poor: 80%; Total population: 1997
<b>Technological intervention</b>	Water conveyance system, soil and crop varietal improvement and diversification
<b>Gravity Flow Conveyance System</b>	<ul style="list-style-type: none"> <li>➤ GI Pipeline from source to command head (4" dia): 2 km long</li> <li>➤ Intake structure at source and Distribution Tank (50,000 litres)</li> <li>➤ Underground PVC pipeline (4" dia) in command area: 1.8 km long</li> <li>➤ Outlets (risers) in command area: one at each 1.5 ha (total 19#)</li> <li>➤ Created command area: 26 ha</li> </ul>
Inclusive impact	
<b>Irrigated area (ha)</b>	Overall increased by 173.5%; maximum in Pasauli village (391%)
<b>Crop production</b>	597.4 tonne to 1741.13 tonne (increased by 191.5%)
<b>Family income</b>	Overall increased by 194% after end of the project
<b>Fodder production</b>	Deficient to surplus (708 tonne)
<b>B:C ratio of the project</b>	2.78



#### Example 4: Participatory Sub-surface Water Harvesting System in Foot Hill Areas of Himalayas in Uttarakhand [ICAR-IISWC (Dehradun)]

##### Brief about the study area and major technological interventions

Villages	Kalimati	Bhopalpani
No. of farm families targeted	72	125
Net cultivated area of targeted families (ha)	16	25.6
No. of sub surface water harvesting ponds	01	01
Storage capacity of major tanks (cum)	260	420
Length of PVC pipe line (110 mm dia)	-	1764 m
Cost of interventions (Rs lakh)	1.97	2.81
Farmers' contribution	34.72%	27.51%

##### Overall impact after the project

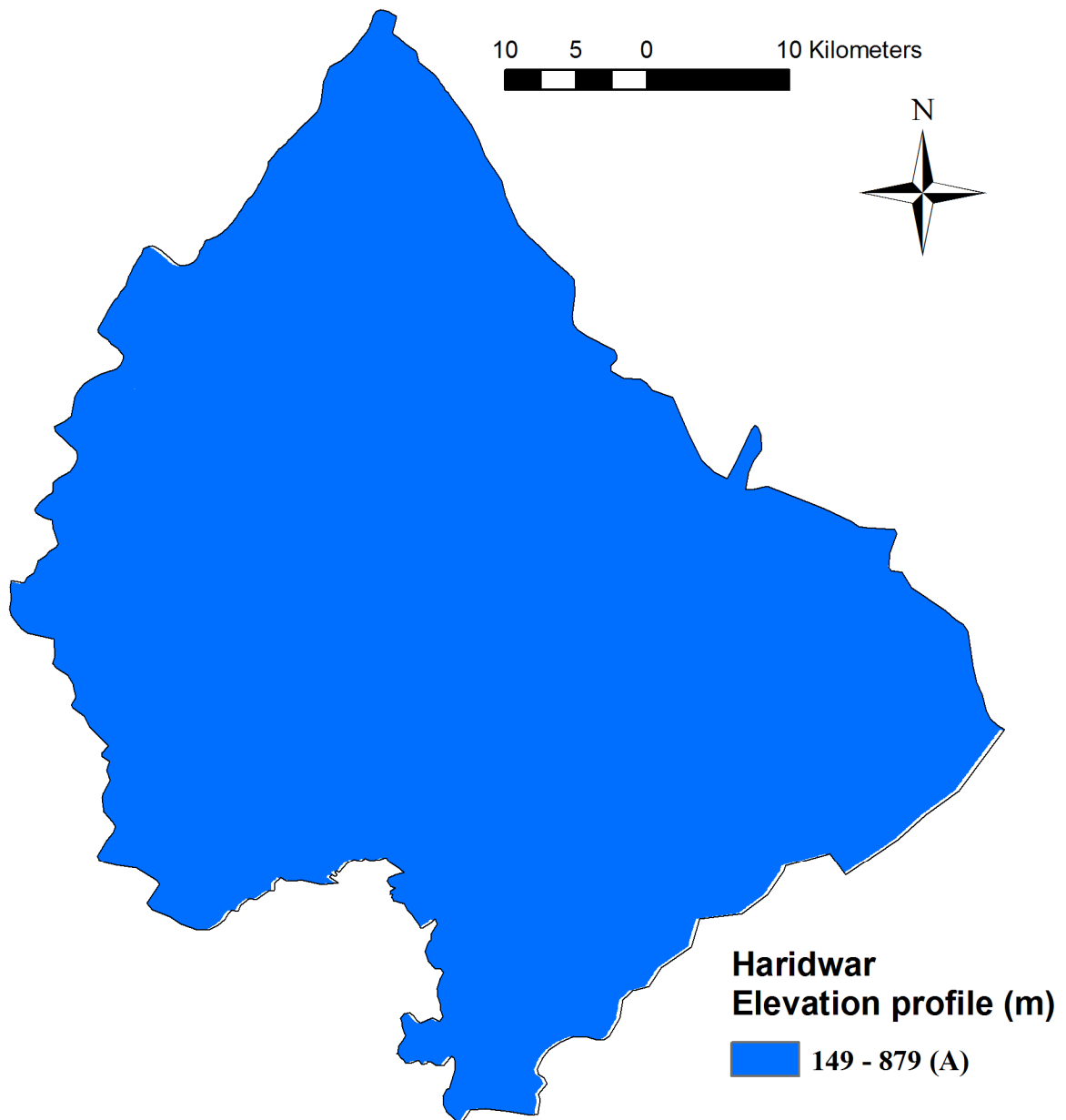
Parameter	Pre-project (1998-2000)	Post-project (2016)	Improve-ment (times)
Net irrigated area (ha)	-	41.6	100
Number of families practicing only agriculture	82	197	2.40
Number of families returned back to Kalimati and Bhopalpani villages for agriculture	-	115	Migration Reversed
Gross area under double cropping (paddy-wheat) (ha)	12	41.6	3.46
Total monetary output through assured irrigation in <i>rabi</i> season wheat (lakh)	3.60	24.96	6.93
Av. annual family income from agriculture (Rs)	24720	77425	3.13







**DISTRICT: HARIDWAR**



**Figure 12: District Haridwar elevation profile**



**District: Haridwar**  
**Zone: A (up to 1000m)**

<b>Strategy 1 : Productivity Enhancement</b>	<ol style="list-style-type: none"> <li>1. Enhancement of productivity of sugarcane in Narson, Bahadarabad, Roorkee and Bhagwanpur block.</li> <li>2. Promotion of Sugarcane: Sowing at recommend spacing, at right time, discouragement of summer sowing, promotion of inter cropping, management of white grub and top borer through recommended pesticides.</li> <li>3. Promotion of improved varieties wheat (VL Gehun 953, HD 2967, UP 2382, UP 2425, WR 544, HD3086, UP 2628 UP 2554, UP 2526, UP 2565), Rice (PB 1509, PB-1, Pant Basmati 1, Pant Sankar Dhan-3, Pant Dhan-19, HKR-127) and sugarcane (Co Pant 99214, CO 0238, CoP 5224, CoP 3220) for the zone.</li> <li>4. Promotion of improved varieties of speciality corn (CMVL Sweet Corn 1 and CMVL Baby Corn 2).</li> <li>5. Vegetable pea (VL Ageti Matar 7 and VL Matar 10)</li> <li>6. Garlic (VL Lehsun 1).</li> <li>7. Recommended package and practices will be followed for the above said crop varieties</li> <li>8. Promotion of seed treatment.</li> <li>9. Promotion of appropriate and timely irrigation.</li> <li>10. Promotion of balanced use of fertilizer (inclusion of potash and micronutrients.)</li> <li>11. Promotion of weed Management.</li> <li>12. Rejuvenation of old Mango orchards in Bhagwanpur..</li> <li>13. Production of high quality seedlings through tissue culture for Mango orchards.</li> <li>14. Encouragement of proper pesticide application technology.</li> <li>15. Promotion of use of stickers with pesticides spray</li> <li>16. Promotion of sowing by trench method.</li> <li>17. Promotion of onion/pulses (Marigold in spring and veg pea)/gram/Lentil.</li> <li>18. Promotion of green manuring, bio-fertilizers and bio-pesticides in Roorkee and Bhagwanpur Block.</li> <li>19. Increasing crop intensity, cultivation of catch crops viz. short duration moong/maize after harvesting of wheat and before sowing of paddy crops.</li> <li>20. Promotion of high value vegetables and medicinal plants Roorkee Block.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Surface irrigation in laser levelled land</li> <li>2. Micro- irrigation system in Sugarcane, Mango, Litchi, Guava and in Vegetables</li> <li>3. Drip Irrigation in Green House Cultivation for Cut Flowers and Vegetables</li> </ol>
<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Domestication of high yielding breed such as Sahiwal, Tharparker (Cow), Murrah, Neeli, Bhadawari (Buffaloes), Jamuna Pari (Goat) in Narson, Bhagwanpur and Bahadarabad Block of the district.</li> <li>2. Promotion of proper nutritional management of livestock-use of area specific mineral mixture, Urea, Molases, Mineral Block.</li> </ol>

	<ol style="list-style-type: none"> <li>3. Development of grass land in different villages of all blocks.</li> <li>4. Ensuring availability of good Veterinary surgeon at block level.</li> <li>5. Training of dairy, poultry and fish farmers.</li> <li>6. Rejuvenation of abandon pond for fisheries in all blocks.</li> <li>7. Development of good nursery of fishes and availability of good species of fingerlings is required; fisheries should be promoted through favourable policies.</li> </ol>																								
<b>Strategy 3 : Integrating Farming system</b>	<ol style="list-style-type: none"> <li>1. Development of separate models for small and big land holdings.</li> <li>2. Development of area specific and farmer specific model of IFS such as Crop + Dairy for big land holdings, Vegetable crop +Mushroom for small farmers of Bahadarabad Block;</li> <li>3. Crop + Horticulture + Dairy + Mushroom + Bee Keeping</li> </ol> <p><b>Cropping System</b></p> <table border="1"> <thead> <tr> <th>Crop</th><th>Area (sq.m)</th></tr> </thead> <tbody> <tr> <td>Sugarcane (spring)+ Onion-Ratoon</td><td>2000</td></tr> <tr> <td>Basmati Rice (PB 1509)-Mustard/Wheat</td><td>1500</td></tr> <tr> <td>Basmati Rice (PB 1509)-Potato-Urdbean</td><td>1500</td></tr> <tr> <td>Maize (cobs)-Arhar-Wheat</td><td>1100</td></tr> <tr> <td>Sorghum-Oat+Barseem+Mustard-Maize (fodder)</td><td>900</td></tr> </tbody> </table> <p><b>b. Horticulture/Agroforestry/Apiculture</b></p> <table border="1"> <tbody> <tr> <td>High density Guava+Papaya+Napier/Karonda at boundaries</td><td>2000</td></tr> <tr> <td>Dairy 2 cows</td><td>600</td></tr> <tr> <td>Vermicompost</td><td>150</td></tr> <tr> <td>Apiculture (5 boxes)</td><td>-</td></tr> <tr> <td>Backyard poultry (20No)</td><td>100</td></tr> <tr> <td>Mushroom cultivation</td><td>150</td></tr> </tbody> </table>	Crop	Area (sq.m)	Sugarcane (spring)+ Onion-Ratoon	2000	Basmati Rice (PB 1509)-Mustard/Wheat	1500	Basmati Rice (PB 1509)-Potato-Urdbean	1500	Maize (cobs)-Arhar-Wheat	1100	Sorghum-Oat+Barseem+Mustard-Maize (fodder)	900	High density Guava+Papaya+Napier/Karonda at boundaries	2000	Dairy 2 cows	600	Vermicompost	150	Apiculture (5 boxes)	-	Backyard poultry (20No)	100	Mushroom cultivation	150
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<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<p><b>A. For Khanpur, Laksar and Bhagwanpur Block</b></p> <ol style="list-style-type: none"> <li>1. Mechanization of harvesting of wheat and paddy.</li> <li>2. Development of good network between farmers and mandi/buyers.</li> <li>3. Establishment of Government Procurement Centres at maximum places for facilitating the farmers and preventing losses at the farmers place</li> <li>4. Development of cold storage and processing facility for vegetable and fruits.</li> </ol> <p><b>B. For Laksar and Bahadarabad Blocks</b></p> <ol style="list-style-type: none"> <li>1. Development of modern sheller facilities for advanced or new varieties of aromatic rice.</li> <li>2. Establishment of flour mills at local level.</li> </ol> <p><b>C. For Bhagwanpur and Bahadarabad Industrial Units</b></p> <ol style="list-style-type: none"> <li>1. Establishment of processing plant for the purchase and processing of local fruit, vegetable and other agricultural produce.</li> </ol>																								
<b>Strategy 5 : Waste land development and waste water treatment</b>	<p><b>For Bahadarabad (low water table) &amp; Khanpur (Water logged) Blocks</b></p> <ol style="list-style-type: none"> <li>1. Reclamation of waste land.</li> <li>2. Promotion of agro forestry plantation in wasteland for improvement of organic carbon.</li> <li>3. Facilitation of seed suitable for wasteland to the farmers.</li> <li>4. Establishments of treatment plants for waste water and polluted water and promotion of treated water for irrigation.</li> </ol>																								

	<ol style="list-style-type: none"> <li>5. Channelization of river.</li> <li>6. Construction of ponds for fish cultivation in the area with high water table and water logged area.</li> <li>7. Establishment of waste water treatment plants based on phytoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of timely sowing, irrigation, mechanization of farm activities, and balanced use of fertilization based on soil testing.</li> <li>2. Promotion of use of recommended seed rate, weed management with latest weedicides, adoption of IPM and IDM.</li> <li>3. Promotion of seed treatment, line sowing and mechanization in all the crops.</li> <li>4. Facilitation of farmers with weather updates.</li> <li>5. Implemented Chakbandi in district.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Establishment of custom hiring centre for farm implements.</li> <li>2. Promotion of sericulture in Roorkee and Bhagwanpur Block</li> <li>3. Establishment of small scale processing units (for flour mill/oil expellers) by youth.</li> <li>4. Development of online advisory centres by trained youths.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<p><b>Narson and Roorkee Block</b></p> <ol style="list-style-type: none"> <li>1. Khandsari industry should be revived.</li> <li>2. Mandatory grassland for all villages.</li> <li>3. Mandatory same year payment of sugarcane by the sugar mills.</li> </ol> <p><b>For All Blocks of the district</b></p> <ol style="list-style-type: none"> <li>1. MSP for all crops should be enhanced.</li> <li>2. Purchase of local agricultural produce should be made mandatory for the processing industry of the district.</li> <li>3. Only wasteland should be used for establishment of industry and productive land should not be used.</li> <li>4. Link MANREGA with Agriculture production system Promotion of FPO through policies support.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Promotion of FPO through policies support Organic Jaggery and Jaggery powder, Turmeric powder, Aromatic Rice. Organic Jaggery and Jaggery powder</li> <li>2. Encouragement of Cooperative Societies as a tool of marketing channels.</li> <li>3. Establishment of direct linkages with food processing industries may be established for better prices</li> <li>4. Creation of improved transport facility from village to mandi.</li> <li>5. Improvement of roads in the interior parts of the Laksar and Khanpur Block.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Creation of independent effective and competent agencies for online management evaluation.</li> <li>2. Development of Mobile apps/ software for online management and evaluation.</li> </ol>

## Technology Intervention Success Stories

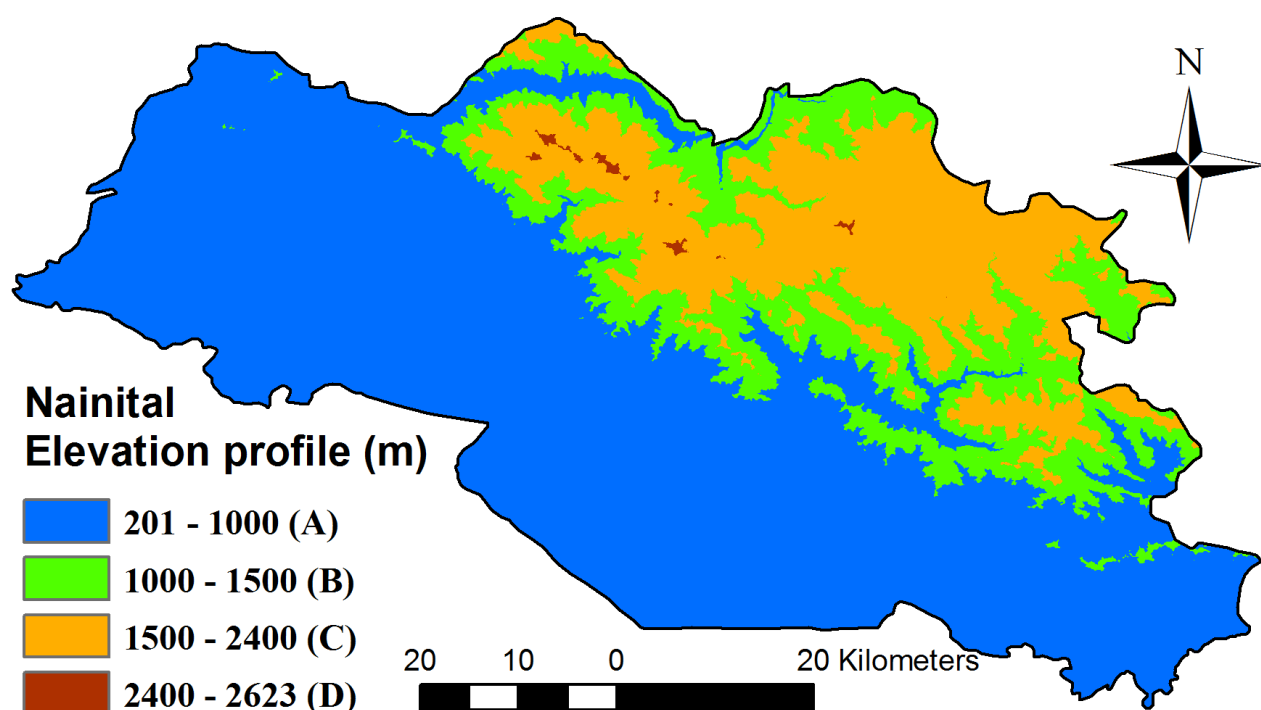
### Example 1: Livelihood Uplifments through Organic Farming - Sh. Vijay Pal Singh, V & P-Sherpur Khelmau [Krishi Vigyan Kendra (Haridwar)]

- Adoption of autumn planting sugarcane method: Following autumn planted Sugarcane with potato and mustard, urd, maize, cucumber in spring. Green onion is also taken up in autumn sugarcane.
- Using Jiva amrit (composition for 0.4 ha is - 10 kg cow dung+10 kg cow urine+2 kg Jaggery+2 kg gram Flour+1/2 kg bund soil+100 litre water) in place of chemical fertilizer
- Sowing of cane sets using trench opener: Trench opener is used for sugarcane sowing. Cane sets were sown parallel to the trenches, which results in better plant growth and yield increase.
- Use of Bio fertilizer and pesticides: Trichoderma, Beauveria bassiana, Pseudomonas
- Conduction of Animal Health Camps with help of Line Departments for infertility management of livestock which results in higher production of milk.
- Introduction of New HYV of field crops and their fertilizer/pest management.
- Crop diversification through Banana as pure crop.
- Beekeeping is practiced for additional income

### Overall Impact after five years

Parameter	Area (ha)	Economics during 2012-13			Impact after five years (2016-17)		
		Cost of Cultivation (Rs.)	Net Income (Rs.)	BCR	Cost of Cultivation (Rs.)	Net Income (Rs.)	BCR
Field Crops	1.52	188775	199005	1.68	281481	489926	2.45
Horticulture Crops	0.40	140043	110982	1.37	159633	157367	1.60
Livestock	0.05	135596	164177	1.86	238241	410197	2.43
Agroforestry	0.08	17711	20204	1.78	32446	39015	1.85
Beekeeping	50 box	144350	72350	1.50	728600	1278150	2.75

## DISTRICT: NAINITAL



**Figure 13: District Nainital elevation profile**





**District: Nainital**

**Zone: A (up to 1000 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, DBW-16, DBW-17, PBW-343, PBW-373, PBW-502, PBW-527, PBW-550, HD-2687, HD-2967, UP-2526, UP-2554, UP-2565, UP-2572, UP-2784, UP-2785, WH-542, UP-2684, UP 2628, UP 2748, HS-490, HS-507, HPW-349, UP 2584, RAJ-3765, RAJ-3077)</li> <li>2. Promotion of high yielding varieties of Paddy Irrigated (Pant Sankar Dhan-3, Pant Dhan-12, Pant Dhan-23, Pant Dhan-26, Narendra Sankar Dhan -2, Pusa Sankar Dhan -10, Pant Sugandh Dhan-25, Pant Sugandh Dhan-26, Pant Sugandh Dhan-27, Pusa Sugandh -5, VL Dhan – 85, VL Dhan-65, PR-113, Pant Basmati-1, Pant Basmati-2, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355 plus) Rainfed- Chaitki Dhan-VL Dhan 208 and VL Dhan 209, Jethi dhan –Vivek Dhan 154, VL Dhan 156, VL Dhan 157 and VL Dhan 158</li> <li>3. Promotion of high yielding varieties of Soybean (PS-1042, PS-1092, PS-1241, PRS-1, PS-1347, PS-1225, PS-19, PS-21, PS-22, PS-23, PS 1347, VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65 and PS-19)</li> <li>4. Promotion of high yielding varieties of Maize (Surya, Kanchan, Naveen, DH 296, PEEHM-1 to 5, Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Mize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2, Vivek Sankul Makka 31 Gaurav, Pant Sankar Makka-1, Kiran, Navjot, HM-4, HM-10, Prabhat, Kisan, HM-11, Buland, P-3522)</li> <li>5. Promotion of high yielding varieties of Barley (PRB-502, UPB-1008, VL Jau 118 and VLB 94)</li> <li>6. Promotion of high yielding varieties of <b>Finger millet (Ragi/mandua)</b> (VL Mandua 324, and VL Mandua 352, PRM-1, PRM-2, PES-110, PES-176, Pant Mandua-3)</li> <li>7. Promotion of high yielding varieties of Urd (PU-6, PU-31, PU-35, PU-40, Shekhar-2)</li> <li>8. Promotion of high yielding varieties of Moong (Pant Moong-4, Pant Moong-5, Pant Moong-7, Pant Moong-8, PDM-11, Samrat, Narendra Moong-1)</li> <li>9. Promotion of high yielding varieties of Arhar (Pant Arhar-3, Pant Arhar-291, UPAS-120, Pusa-992, VL Arhar 1, Bahar, Amar, Narendra Arhar-1)</li> <li>10. Promotion of high yielding varieties of Chickpea (Pant Kabuli Chana-1, GNG-1969, Aman, GNG-1958, Aadhar, Pusa-547, Pusa-256, Pusa-1053, JGK-1)</li> <li>11. Promotion of high yielding varieties of Lentil (PL-4, PL-7, PL-8, DPL-15, DPL-62, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514)</li> <li>12. Promotion of high yielding varieties french bean (VL Bauni Bean 1 and VL Bean 2), Vegetable pea (Vivek Matar 10, and Vivek Matar 12)</li> </ol>
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	<p>13. Promotion of high yielding varieties of Toria/Sarson (PT-30, PT-303, 507, Uttara, PPS-1, Pant Sweta, Type-9, Bhawani, VL Toria-3, Urvashi, Rohini, Vardan, Vasanti, PR-20)</p> <p>14. Promotion of high yielding varieties of Litchi (Rose scented, calcuttia, gandaki Sampada, Gandaki lalima, Gandaki yogita (suitable for high density plantation)</p> <p>15. Promotion of high yielding varieties of Mango (Dushari, Langra, Chausa, Amrapali, Mallika, Bombay green, Pusa surya, Pusa Arunima, Arunika, Pusa shreshta, Pusa Lalima)</p> <p>16. Promotion of high yielding varieties of Tomato (Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852)</p> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Bhimtal, Haldwani and Ramnagar block.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of mango and litchi in Ramnagar, Haldwani and Kotabagh blocks.</li> <li>2. Rejuvenation of senile orchards of Gola pear with improved varieties like Wartlet, Max Wartlet etc. in the zone of Bhimtal block</li> <li>3. Establishment of high density orchards of mango, guava, litchi, banana, aonla and jackfruit in Ramnagar, Haldwani and Kotabagh blocks.</li> <li>4. Cultivation of Cinnemon (Tejpatta) plants at low hills in Bhimtal block, particularly Dogda, Jeolikote, Aampadao, Aamiyagaon clusters.</li> <li>5. Promotion of ginger cultivation in all blocks of the zone.</li> <li>6. Promotion of organic cultivation of turmeric in Haldwani and Bhimtal blocks.</li> <li>7. Promotion of onion and garlic cultivation in Bhimtal belt.</li> <li>8. Promotion of off season vegetables cultivation in Bhimtal block.</li> <li>9. Promotion of production of tomato cultivation in Golapar cluster of Haldwani block and Gintigaon, Siyat and Ranikota cluster in Kotabagh with the use of proper crop rotation.</li> <li>10. Promotion of production of vegetable pea, okra in Kotabagh and Haldwani block.</li> <li>11. Promotion of production of black gram and pigeonpea in, Haldwani block.</li> <li>12. Promotion of production of lentil and blackgram in Thari, Rajpur, Kandla, Beria, Veerpur Tara and Veerpur Lakshi, Chhoi, Chilkiya, Jogipura, Sawalde clusters of Ramnagar block.</li> </ol>
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	<p>13. Promotion of organic production of basmati rice in Thari, Rajpur, Kandla, Beria, Veerpur Tara and Veerpur Lakshi, Chhoi, Chilkiya, Jogipura, Sawalde clusters of Ramnagar block.</p> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of Karonda surrounding the field in Ramnagar, Haldwani and Kotabagh block.</li> <li>2. Promotion of protected cultivation of flowers in Ramnagar, block.</li> <li>3. Promotion of protected cultivation of vegetables in Bhimtal block.</li> <li>4. Promotion of cultivation of lime/lemon at larger scale in Ramnagar, Haldwani and Kotabagh block.</li> <li>5. Promotion of cultivation of garlic, ginger and turmeric in Ramnagar, and Kotabagh block.</li> <li>6. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals</li> <li>7. Enacting legislative measures for protection of crop from wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, maize sheller for drudgery reduction of farm women in all the blocks of the zone.</li> <li>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>2. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available, etc.</li> <li>3. Drip Irrigation in integration with water harvesting structure where water for irrigation is limited</li> <li>4. Green House Cultivation for Vegetables with drip irrigation</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Promotion of vermi compost unit and green manuring in all the villages of this zone.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in different blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Adoption of Soil health improvement practices.</li> <li>3. Selection of right crop &amp; variety.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Seed treatment through bio agent/ chemical means strictly in the cluster.</li> <li>6. Judicious use of fertiliser.</li> <li>7. Improvemnt of Moisture conservation practices.</li> <li>8. Promotion to focus on timely weed management</li> <li>9. Promotion and Adoption of IPM techniques</li> <li>10. Adoption of Farm mechanization (Power tiller, thresher etc.)</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows, buffaloes and goats in all the blocks.</li> <li>2. Establishment of Fodder Bank in Bhimtal to meet fodder requirement of area.</li> <li>3. Establishment of milk chilling plant at Haldwani, Kotabagh and Ramnagar blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>Establishment of hatcheries for need of broiler or croiler at block level at Bhimtal, Haldwani and Ramnagar</li> <li>Introduction and promotion of cross Heiffer for increasing income of marginal farmer.</li> <li>Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Bhimtal.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Promotion of different Integrated Farming System modules such as :</p> <ol style="list-style-type: none"> <li>Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>Fodder production+ Mini dairy + Composting + Protected cultivation</li> <li>Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea) + Planting material supply + Mushroom</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Establishment of mini fruit grading plant for malta and pear at Jeolikote, Bhawali and Aampadao, Naukuchiyatal, Chafi and nearby area of Bhimtal.</li> <li>Establishment of Food Processing Units for Litchi at Ramnagar, Aonla at Kotabagh and Mango at Haldwani block and Citrus fruits, pear at Bhimtal.</li> <li>Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Haldwani, Kotabagh, Bhimtal, Ramnagar blocks.</li> <li>Establishment of small processing units for tertiary and value addition of mango, citrus fruits, pear in Haldwani, Ramnagar and Bhimtal blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Contour making for arable purpose in waste land in Bhimtal.</li> <li>Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Bhimtal block.</li> <li>Promotion of plantation of mulberry (<i>Morus</i>), wild fruit plants in Ramnagar block, wild fruit plants and fodder trees (<i>Grewia</i>, <i>Alnus</i>, <i>Celtis</i>, <i>Quercus</i>) in Bhimtal block.</li> <li>Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>Popularization of trenches for percolation of water to avoid surface run off in Bhimtal block.</li> <li>Construction of check dam and artificial structure to maximize water percolation rate in Bhimtal and ponds in Haldwani, Kotabagh and Ramnagar block.</li> <li>Construction of tank for storage of water for lean season in all blocks.</li> <li>Establishment of storage system for rain water in monsoon season.</li> <li>Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>

<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in Haldwani, Ramnagar and Kotabagh block.</li> <li>2. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Promotion of hand tools in agricultural and horticultural operations.</li> <li>6. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>7. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>8. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, goatry, fish farming and mushroom production in Bhimtal and poultry, fish farming in Haldwani and Kotabagh.</li> <li>2. Promotion of apiculture for small and landless farmers in Bhimtal.</li> <li>3. Promotion of sericulture in Ramnagar.</li> <li>4. Promotion of cultivation and collection of medicinal plants in Bhimtal.</li> <li>5. Promotion of skill development in women and youth in all three blocks</li> <li>6. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance in all three blocks.</li> <li>7. Creation of New SHGs in other villages of three blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in three blocks.</li> <li>2. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>3. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>4. Establishment of wood bank at Jeolikote and Bhawali to meet the present and future demand of germplasm in horticultural crops.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Implementation of Soil Health Card Scheme in each block.</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Creation of better transportation facilities with cool chain van at Block level.</li> <li>2. Creation of direct linkages with food processing industries for better prices.</li> <li>3. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>4. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>5. Installation of mini grading machines at village level.</li> <li>6. Establishment of cold room in Haldwani, Kotabagh and Ramnagar.</li> <li>7. Promotion of local Hatt at Jeolikote, Ranibagh, Okhaldunga in Bhimtal block, and Devalchaur, Golapar, Haripur Bachhi, Babori in Haldwani block and Kaladungi, Gintigaon, Bailbadao, Dola, Aamgadi in Kotabagh and Chilkiya, Jogipur, Sawaldae, Chhoi, Thari in Ramnagar block.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Nainital**  
**Zone: B (1000 to 1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (UP 2526, UP 2554, UP-2572, UP 2628, VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349, HS-277, HS-295, HS-420)</li> <li>2. Promotion of high yielding varieties of Paddy (Pant Sankar Dhan-3, Pant Dhan-12, Pant Dhan-23, Pant Dhan-26, PR-113, Pant Basmati-1, Pant Basmati-2, Pant Sugandh Dhan-26, Pant Sugandh Dhan-27, Irrigated VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85; Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209; Jethi dhan -Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158), Pant Dhan-11, PB-1509)</li> <li>3. Promotion of high yielding varieties of Barley (VL Jau 118 and VLB 94, PRB-502, UPB-1008)</li> <li>4. Promotion of high yielding varieties of <b>Finger millet (Ragi/mandua)</b> (VL Mandua 324, and VL Mandua 352, PRM-1, PRM-2, PES-110, PES-176, Pant Mandua-3)</li> <li>5. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2)Promotion of high yielding varieties of Barnyard Millet (PRJ-1, VL Madira 172 and VL Madira 207)</li> <li>6. Promotion of high yielding varieties of Horsegram (VL Gahat 10, VL Gahat 15 and VL Gahat 19)</li> <li>7. Promotion of high yielding varieties of Lentil (PL-4, PL-5, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514)</li> <li>8. Promotion of high yielding varieties of Toria/Sarson (PT-303, Bhawani, VL Toria-3, PT-507, Uttara)</li> <li>9. Promotion of high yielding varieties of Urd (U-31, PU-35, PU-40)</li> <li>10.Promotion of high yielding varieties of Moong (Pant Moong-5,Shweta)</li> <li>11.Promotion of high yielding varieties of Arhar (Pant Arhar-3, Pant Arhar-291, VL Arhar 1, UPAS-120, Pusa-992)</li> <li>12.Promotion of high yielding varieties of Chickpea (Pant Kabli Chana-1, Aman, GNG-1958, GNG-1969, Pant G-186, Pusa-256)</li> <li>13.Promotion of high yielding varieties of Tomato (VL Tamatar 4, Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852)</li> <li>14.Promotion of high yielding varieties of Potato (Kufri Gurriraj, Kufri Chipsona 1, Kufri chipsona 3, Kufri Jyoti, Kufri Chandramukhi)</li> <li>15.Promotion of high yielding varieties of Pea (PSM-3, PSM-5, Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12, Pusa Pragati)</li> <li>16.Promotion of high yielding varieties of French bean (VL Bauni Bean 1 and VL Bean 2, Pant Anupama, Pusha, Himlata, Swarna Lata, Laxmi, Pusha Parvati, Pant bean-2, Arka Anoop, Arka Bold)</li> <li>17.Promotion of high yielding varieties of Capsicum (VL Shimla Mirch 3, Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna)</li> <li>18.Promotion of high yielding varieties of Garlic (VL Garlic 1 and VL Lahsun 2); Onion (VL Piaz 3)</li> </ol>
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	<p>19. Promotion of high yielding varieties of Coriander (Pant Haritima, Hisar Sugandh, Hisar Aanand, CS-287, Rajendra Sonia)</p> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in Betalghat, Dhari and Okhalkanda block of this zone.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of peach, plum in Bhimtal, Betalghat and Okhalkanda blocks of this zone.</li> <li>2. Rejuvenation of senile orchards of Gola pear with improved varieties like Wartlet, Max Wartlet etc. in the zone of Bhimtal, Ramgarh, Okhalkanda and Dhari block of this zone.</li> <li>3. Establishment of high density orchards of mango, guava, litchi, aonla and jackfruit in valley area of Bhimtal, Betalghat, Dhari and Okhalkanda blocks of this zone.</li> <li>4. Cultivation of Cinnemon (Tejpatta) plants at low hills in Bhimtal block.</li> <li>5. Promotion of ginger cultivation in all blocks of the zone.</li> <li>6. Promotion of organic cultivation of turmeric in Bhimtal block.</li> <li>7. Promotion of onion and garlic cultivation in Bhimtal belt.</li> <li>8. Promotion of cultivation of kiwi in all blocks of this zone.</li> <li>9. Promotion of off season vegetables cultivation in Bhimtal, Ramgarh, Dhari, Betalghat and Okhalkanda block of this zone.</li> <li>10. Promotion of off season vegetables cultivation in Bhimtal, Dhari, Betalghat and Ramgarh block.</li> <li>11. Promotion of protected cultivation at Nyay Panchayat level of Bhimtal, Dhari, Betalghat and Ramgarh block of this zone.</li> <li>12. Encouragement of plantation of forest plants like Bhimal, Khadik, Mulberry, Kachnar at the ridges of field for fodder purpose in Betalghat, Dhari and Ramgarh block of this zone.</li> <li>13. Organic cultivation of chilli and ginger in Bhimtal and Betalghat block of this zone</li> <li>14. Promotion of production of vegetable pea in rainfed area of Ramgarh and Dhari block of this zone.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of Karonda surrounding the field in all blocks of this zone.</li> <li>2. Promotion of protected cultivation of flowers in Bhimtal block.</li> <li>3. Promotion of protected cultivation of vegetables in Bhimtal, Dhari, Betalghat and Ramgarh blocks of this zone.</li> <li>4. Promotion of cultivation of lime/lemon at larger scale in Bhimtal, Dhari, Betalghat and Ramgarh block of this zone.</li> </ol>
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	<ol style="list-style-type: none"> <li>Promotion of cultivation of garlic, ginger and turmeric in Bhimtal, Dhari, Betalghat and Ramgarh blocks of this zone.</li> <li>Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals</li> <li>Enacting legislative measures for protection of crop from wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>Promotion of serrated sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>Micro Irrigation (Drip and Sprinkler Irrigation) where water is available, etc.</li> <li>Drip Irrigation in integration with water harvesting structure where water for irrigation is limited</li> <li>Green House Cultivation for Vegetables with drip irrigation</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>Promotion of vermi compost unit and green manuring in all the villages</li> <li>Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in different blocks.</li> <li>Organic cultivation of local grain and millets in all the blocks of this zone.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>Cluster approach for holistic development.</li> <li>Adoption of Soil health improvement practices.</li> <li>Selection of right crop &amp; variety.</li> <li>Adoption of only well decomposed FYM/ value added compost.</li> <li>Promotion on seed treatment through bio agent/ chemical means strictly in the cluster.</li> <li>Judicious use of fertiliser.</li> <li>Improvement in moisture conservation practices.</li> <li>Promotion to focus on timely weed management</li> <li>Promotion and Adoption of IPM techniques</li> <li>Adoption of Farm mechanisation(Power tiller, thresher etc.)</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>Promotion of high milk breeds of cows, buffaloes and goats in all the blocks.</li> <li>Establishment of Fodder Bank in Bhimtal, Dhari, Betalghat and Okhalkanda to meet fodder requirement of area.</li> <li>Establishment of milk chilling plant at Chafi in Bhimtal block</li> <li>Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>Establishment of hatcheries for need of broiler or croiler at block level at Bhimtal, Ramgarh, Dhari and Betalghat, Okhalkanda.</li> <li>Introduction and promotion of cross Heiffer for increasing income of marginal farmer in Ramgarh, Dhari, Betalghat, Okhalkanda block of this zone.</li> <li>Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Bhimtal.</li> </ol>

<b>Strategy 3 : Integrated Farming system</b>	<ol style="list-style-type: none"> <li>1. Promotion of different Integrated Farming System modules such as :</li> <li>2. Protected cultivation + Composting + Goatry/ backyard poultry</li> <li>3. Fodder production + Mini dairy + Composting+ Protected cultivation</li> <li>4. Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea)+ Planting material supply + Mushroom</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for malta and pear at Bhimtal, Ramgarh, Dhari and Betalghat area.</li> <li>2. Establishment of Food Processing Units at Bhimtal, Betalghat, Ramgarh and Dhari</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in areas.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level of blocks of Ramgarh, Dhari, Betalghat, Okhalkanda of this zone.</li> <li>5. Establishment of small processing units for tertiary and value addition of mango, malta, citrus, pear in Ramgarh, Dhari, Betalghat, Okhalkanda blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Bhimtal, Betalghat, Dhari and Okhalkanda.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in Ramgarh, Dhari, Betalghat, Okhalkanda block of this zone.</li> <li>3. Promotion of plantation of mulberry (<i>Morus</i>), wild fruit plants and fodder trees (<i>Grewia</i>, <i>Alnus</i>, <i>Celtis</i>, <i>Quercus</i>) in Ramgarh, Dhari, Betalghat, Okhalkanda block of this zone.</li> <li>4. Plantation of perennial grasses like Bromus, fasku, chari (Sorghum), guinni, gunara, para, rahad, Balauk and siteriya in area of Betalghat, Dhari and Okhalkanda block.</li> <li>5. Popularization of soil bunds to save excessive loss of nutrients in wasteland in area of Betalghat, Dhari and Okhalkanda block..</li> <li>6. Popularization of trenches for percolation of water to avoid surface run off in all the blocks of this zone.</li> <li>7. Construction of check dam and artificial structure in all the blocks of this zone to maximize water percolation rate.</li> <li>8. Construction of tank for storage of water for lean season at Nyay Panchayat area of all the blocks of this zone.</li> <li>9. Creation of rain water harvesting structure in all the blocks of this zone.</li> <li>10. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in all the blocks of this zone.</li> <li>2. Promotion of line sowing and fertilizers application in crops of Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Promotion of need based application of pesticides and other agricultural inputs in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>5. Promotion of hand tools in agricultural and horticultural operations in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>6. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>7. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost in different blocks of this zone.</li> <li>8. Promotion of pressurized irrigation techniques in horticultural crops in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>9. Promotion of tillers and other garden tools for reduction of drudgery in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like goatry, poultry, fish farming and mushroom production in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>2. Promotion of apiculture for small and landless farmers in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>3. Promotion of sericulture in low hills or valley areas in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>4. Promotion of cultivation and collection of medicinal plants in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>5. Promotion of skill development in women and youth in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>6. Strengthening of existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance in Ramgarh, Dhari, Betalghat, Okhalkanda blocks of this zone.</li> <li>7. Creation of new SHGs in other villages in the blocks of Ramgarh, Dhari, Betalghat, Okhalkanda of this zone.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>2. Labelling of organic inputs and certification mechanism for various crops.</li> <li>3. Popularization of Udhyam and KCC for widespread use of government incentives/subsidies to farmers.</li> <li>4. Establishment of wood bank at Bhimtal, Ramgarh to meet the present and future demand of germplasm in horticultural crops.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Implementation of Soil Health Card Scheme in each block.</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Creation of better transportation facilities with Refrigerated Van at Block level.</li> <li>2. Creation of direct linkages with food processing industries for better prices.</li> <li>3. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>4. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>5. Installation of mini grading machines at village level.</li> <li>6. Establishment of cold room in different clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Nainital**  
**Zone: C (1500 to 2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (UP 2554, UP-2572, UP 2628, VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 and UP 2572(from 1700 to 2400m amsl), HS-277, HS-295, HS-420)</li> <li>2. Promotion of high yielding varieties of Paddy (Pant Sankar Dhan-3, Pant Dhan-12, Pant Dhan-23, Pant Dhan-26, PR-113, VL Dhan-86, Pant Dhan-11, Pant Dhan-11, PB-1509)</li> <li>3. Promotion of high yielding varieties of Finger millet (Ragi/mandua) ( and VL Mandua 352 upto 2000m amsl, PRM-1, PRM-2, PES-110, PES-176, Pant Mandua-3)</li> <li>4. Promotion of high yielding varieties of Barnyard Millet (PRJ-1, VL Madira 172 and VL Madira 207 upto 2000m amsl)</li> <li>5. Promotion of high yielding varieties of Rajmash (VL Rajma 63, VL Rajma 125)</li> <li>6. Promotion of high yielding varieties of Lentil (PL-4, PL-5, PL-7, PL-8)</li> <li>7. Promotion of high yielding varieties of Urd (U-31, PU-35, PU-40)</li> <li>8. Promotion of high yielding varieties of Moong (Pant Moong-5, Shweta)</li> <li>9. Promotion of high yielding varieties of Arhar (Pant Arhar-3, Pant Arhar-291, UPAS-120, Pusa-992)</li> <li>10. Promotion of high yielding varieties of Chickpea (Pant Kabli Chana-1, Aman, GNG-1958, GNG-1969, Pant G-186, Pusa-256)</li> <li>11. Promotion of high yielding varieties of Toria/Sarson (PT-303, Bhawani, PT-507, Uttara)</li> <li>12. Promotion of high yielding varieties of Apple (Need to introduce low chill or colour mutants and spur varieties suitable for different agroecological situations viz. Early Red one, Washington spur Pink Lady, Oregeon spur, Super chief and other new stains.)</li> <li>13. Promotion of high yielding varieties of Tomato (VL Tamatar 4 upto 1800m amsl, Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852)</li> <li>14. Promotion of high yielding varieties of Potato (Kufri Girriraj, Kufri Chipsona 1, Kufri chipsona 3, Kufri Jyoti, Kufri Chandramukhi)</li> <li>15. Promotion of high yielding varieties of Pea (PSM-3, PSM-5, Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown , Pusa Pragati)</li> <li>16. Promotion of high yielding varieties of French bean (VL Bean 2, Pant Anupama, Pusha, Himlata, Swarna Lata, Laxmi, Pusha Parvati, Pant bean-2, Arka Anoop, Arka Bold)</li> <li>17. Promotion of high yielding varieties of Capsicum (VL Shimla Mirch 3 (upto 1800m amsl), Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna)</li> <li>18. Promotion of high yielding varieties of Coriander (Pant Haritima, Hisar Sugandh, Hisar Aanand, CS-287, Rajendra Sonia)</li> <li>19. Promotion of high yielding varieties Onion (VL Piaz 3 upto 2000m amsl); Garlic (VL Lahsun 2)</li> </ol>
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	<p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>3. Creation of trenches for high percolation of water in most of the area of Ramgarh, Okhalkanda and Dhari block.</li> <li>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of peach, plum, pear, apricot and apple in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>2. Establishment of high density orchards of peach, nectrin, plum, pear, apricot and apple in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>3. Promotion of organic ginger cultivation in all blocks of the zone.</li> <li>4. Promotion of onion and garlic cultivation in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>5. Promotion of cultivation of kiwi in all blocks of this zone.</li> <li>6. Promotion of off season vegetables cultivation in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>7. Promotion of protected cultivation at Nyay Panchayat level of Ramgarh, Dhari and Mukteshwar blocks of this zone.</li> <li>8. Encouragement of plantation of forest plants like Bhimal, Khadik, Mulberry, Kachnar at the ridges of field for fodder purpose in Betalghat, Dhari and Ramgarh block of this zone.</li> <li>9. Promotion of production of vegetable pea in rainfed area of Ramgarh, Mukteshwar and Dhari block of this zone.</li> <li>10. Promotion of Ginger, turmeric and garlic cultivation in Okhalkanda, Dhari and Ramgarh belt.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of Karonda surrounding the field in all blocks of this zone.</li> <li>2. Promotion of protected cultivation of flowers in Bhimtal, Ramgarh and Mukteshwar block.</li> <li>3. Promotion of protected cultivation of vegetables in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>4. Promotion of cultivation of lime/lemon at larger scale in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>5. Promotion of cultivation of garlic, ginger and turmeric in Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>6. Promotion of cultivation of Kafal, Mango, Hishalu and other wild fruits in different pockets in forest areas for wild animals</li> <li>7. Enacting legislative measures for protection of crop from wild animals.</li> <li>8. Promotion of live fencing of Karonda surrounding the field.</li> </ol>
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	<p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available, etc.</li> <li>2. Drip Irrigation in integration with water harvesting structure where water for irrigation is limited</li> <li>4. Green House Cultivation for Vegetables with drip irrigation</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Promotion of vermi compost unit and green manuring in all the villages of Ramgarh, Okhalkanda, Dhari and Mukteshwar blocks of this zone.</li> <li>2. Organic cultivation of local grain and millets in different blocks of this zone.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Adoption of soil health improvement practices.</li> <li>3. Selection of right crop &amp; variety.</li> <li>4. Adopt of only well decomposed FYM/ value added compost.</li> <li>5. Promotion on seed treatment through bio agent/ chemical means strictly in the cluster.</li> <li>6. Judicious use of fertiliser.</li> <li>7. Improvement of moisture conservation practices.</li> <li>8. Promotion of focus on timely weed management.</li> <li>9. Promotion and Adoption of IPM techniques.</li> <li>10. Adoption of Farm mechanisation (Power tiller, thresher etc.).</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows, buffaloes and goats in all the blocks.</li> <li>2. Establishment of Fodder Bank in Ramgarh, Okhalkanda, Dhari and Mukteshwar block of this area to meet fodder requirement.</li> <li>3. Establishment of milk chilling plant at Ramgarh and Okhalkanda block of this zone.</li> <li>4. Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>5. Establishment of hatcheries for need of broiler or croiler at block level at Bhimtal, Dhari, Betalghat, Okhalkanda</li> <li>6. Introduction and promotion of cross Heiffer for increasing income of marginal farmer in Ramgarh, Dhari, Betalghat, Okhalkanda block of this zone.</li> <li>7. Strengthening of traditional water bodies/rivulets with Mahaseer or carps at Ramgarh and Mukteshwar.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Promotion of different Integrated Farming System modules such as :</p> <ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>2. Fodder production+ Mini dairy+Composting+ Protected cultivation</li> <li>3. Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea)+ Planting material supply+Mushroom</li> </ol>

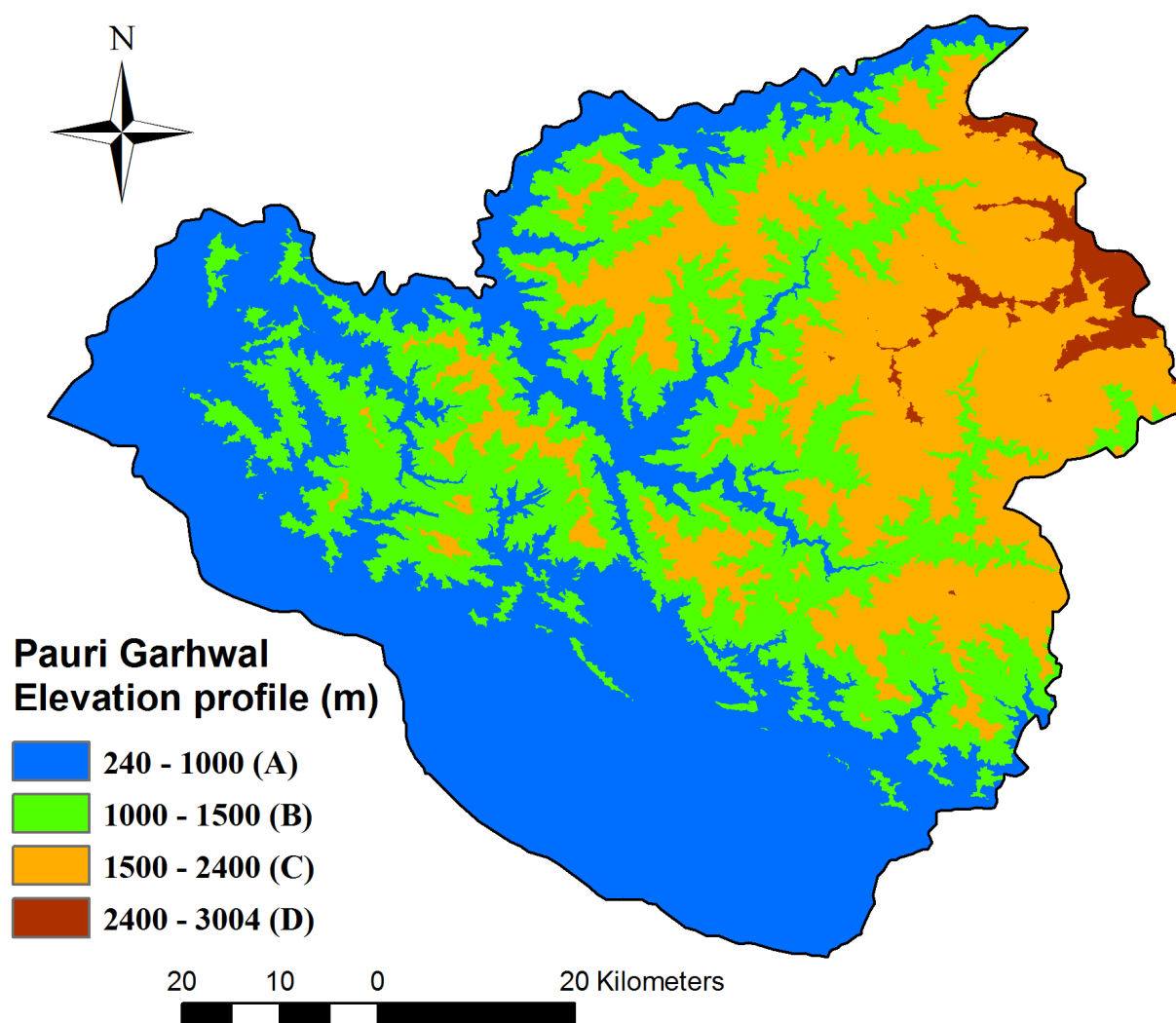
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for peach, plum, pear and apple at Ramgarh and Mukteshwar block of this zone.</li> <li>2. Establishment of Food Processing Units at Ramgarh, Dhari, Mukteshwar and Okhalkanda.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in this zone.</li> <li>4. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level.</li> <li>5. Establishment of small processing units for tertiary and value addition of citrus fruits, apricot, plum, kiwi and Rhododendron in Ramgarh, Mukteshwar, Okhalkanda and Dhari blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Ramgarh, Mukteshwar, Okhalkanda and Dhari blocks and other area.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope.</li> <li>3. Promotion of plantation of mulberry, wild fruit plants and fodder trees (Bheemal, Alnus, Celtis, Oak).</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off.</li> <li>6. Construction of check dam and artificial structure in all the blocks of this zone to maximize water percolation rate.</li> <li>7. Construction of tank for storage of water for lean season at Nyay Panchayat area of all the blocks of this zone.</li> <li>8. Creation of rain water harvesting structure in all the blocks of this zone.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>2. Promotion of line sowing and fertilizers application in crops.</li> <li>3. Promotion of recommended seed rate, spacing and depth.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Promotion of hand tools in agricultural and horticultural operations.</li> <li>6. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>7. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>8. Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>9. Promotion of tillers and other garden tools for reduction of drudgery.</li> </ol>



<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, goatry, fish farming and mushroom production in blocks Ramgarh, Mukteshwar, Okhalkanda and Dhari of this zone.</li> <li>2. Promotion of apiculture for small and landless farmers in blocks Ramgarh, Mukteshwar, Okhalkanda and Dhari of this zone.</li> <li>3. Promotion of sericulture in low hills or valley areas in blocks Ramgarh, Mukteshwar, Okhalkanda and Dhari of this zone.</li> <li>4. Promotion of cultivation and collection of medicinal plants in blocks Ramgarh, Mukteshwar, Okhalkanda and Dhari of this zone.</li> <li>5. Promotion of skill development in women and youth in all blocks of this zone.</li> <li>6. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. for better performance.</li> <li>7. Creation of new SHGs other villages of the district.</li> <li>8. Creation of new SHGs may in other villages of Ramgarh, Mukteshwar, Okhalkanda and Dhari blocks of this zone.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Increasing institutional support by providing subsidises and incentives to small and marginal farmers.</li> <li>2. Labelling of organic inputs and certification mechanism for various crops.</li> <li>3. Popularization of Udhyan and KCC for widespread use of government incentives/subsidies to farmers.</li> <li>4. Establishment of wood bank at Ramgarh and Mukteshwar to meet the present and future demand of germplasm in horticultural crops.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Implementation of Soil Health Card Scheme in each block.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Creation of better transportation facilities with Refrigerated Van at Block level.</li> <li>2. Installation of mini grading machines at village level.</li> <li>3. Establishment of cold room in different clusters.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>6. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>7. Installation of mini grading machines at village level.</li> <li>8. Establishment of cold room in different clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>



## DISTRICT: PAURI GARHWAL



**Figure 14: District Pauri Garhwal elevation profile**



**District: Pauri Garhwal**  
**Zone: A (up to 1000 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572), paddy (VL Dhan 65, Vivek Dhan 85 and Vivek Dhan154, Pant Dhan-19, Pusa Basmati 1509, Pant Sankar Dhan-3, Pant Sugandh Dhan-25, Pant Sugandh Dhan-26; finger millets (VL Mandua 324, PRM 1, VL Mandua 352, ) and Barley (PRB-502, UPB-1008, VLB-94) in Dugadda, Yamkeshwar and Bhavar regions of Jaiharikhal and Rikhnikhal blocks.</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2)</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 126, Pant Lentil 8, VL Masoor 507, VL Masoor 129), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), Urd (PU-6, PU-31, PU-35, PU-40), soybean (PS-1042, PS-1092, PS-1241, PRS-1, VLS 47, VL Soya 63 and VL Soya 65), Toria (PT-303), Pigeon pea (VL Arhar 1, Pant Arhar-3, Pant Arhar-291) and Mango (Dashehari, Amrapali, Langra, Chausa) in Dugadda, Yamkeshwar and Bhavar regions of Jaiharikhal and Rikhnikhal blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, and Vivek Matar 12, PSM-3), French bean (VL Bauni Bean 1 and VL Bean 2, Falguni, Contender), tomato (VL Tamatar 4, Heemsona, Naveen 2000+, Onion (VL Piaz 3, Agrifound Light Red, NHRDF Red) and garlic (VL Garlic 1) in Dugadda, Yamkeshwar and Bhavar regions of Jaiharikhal and Rikhnikhal blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of water harvesting and management</b></p> <ol style="list-style-type: none"> <li>1. Strengthening and promotion of water storage structures like water harvesting tanks/ ponds and check dams in bhabar regions of Dugadda, Yamkeshwar, Jaiharikhal and Rikhnikhal blocks.</li> <li>2. Promotion of water conservation techniques like mulching, drip and sprinkler irrigation in low areas of the Dugadda, Yamkeshwar, Jaiharikhal and Rikhnikhal blocks.</li> <li>3. Popularization of low cost lining material to check seepage in the zone.</li> <li>4. Creation of trenches for high percolation of water in most of the area of the zone.</li> <li>5. Establishment of roof top water harvesting structures in all households of the blocks in the zone.</li> </ol> <p><b>Interventions recommended to improve soil health</b></p> <ol style="list-style-type: none"> <li>1. Promotion of the use of bio- fertilizers and recommended doses of FYM, soil amendments and vermi-compost to improve soil health in the zone especially in organic belts of Jaiharikhal block.</li> <li>2. Distribution of soil health cards to each and every farmer of the zone along with nutrient recommendation for different crops.</li> </ol>
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	<ol style="list-style-type: none"> <li>3. Establishing soil testing labs for major and micro plant nutrients at Block level in each block.</li> <li>4. Spreading awareness about scientific use of organic manures, INM, use of biofertilizers, different soil amendments, vermi-composting etc.</li> <li>5. Assurance of availability of inputs viz., fertilizers, micronutrient, bio-fertilizers etc. at Nyay Panchayat Level in each block of the zone</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, small reaper, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of manually operated mini crop harvesters for rice, wheat and millets</li> </ol> <p><b>Other strategies to be adopted for doubling productivity</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, vegetable, fruits, spices, etc. at Nyay Panchayat Level in each block of the zone</li> <li>3. Promotion on judicious use of pesticides in IPM and IDM practices to reduce cost of cultivation and its hazardous effects in Dugadda, Yamkeshwar and Rikhnikhil blocks.</li> <li>4. Adoption of seed treatment through bio agent/ chemical means before sowing by each and every farmer of the zone</li> <li>5. Encouragement of soil and water conservation techniques like terrace farming, bunding etc to reduce soil erosion in these blocks of the zone</li> <li>6. Promotion of soil nutrient and irrigation based full package of practices for cultivation of crop varieties in each block.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of pure genetic breeds of cow (Jersey, Sindhi and Sahiwal) and buffalo (Murrah) in Dugadda and Yamkeshwar blocks.</li> <li>2. Organisation of timely de-worming, de-horning and vaccination programme of livestock at each block.</li> <li>3. Promotion of availability of Urea, Molasses, and Mineral mixer blocks at Nyay panchayat level.</li> <li>4. Promotion of availability of feed material with low prices at cluster level in each block.</li> <li>5. Selection of more numbers of veterinary experts at Nyay panchayat level</li> <li>6. Promotion on proper use of suitable mineral mixture, green fodder in all cluster.</li> <li>7. Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> </ol>

<b>Strategy 3 : Integrated Farming system</b>	<p>Development of following IFS model in the zone for 1000m<sup>2</sup> (0.1ha)</p> <p><b>Cropping system (Area 1000 m<sup>2</sup>)</b>  Rice-wheat  Horsegram/Pigeon pea-Lentil  Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b>  Mango/Guava/Citrus (80 plants)</p> <p><b>Livestock</b>  Cow (1)/ Buffalo (1) +Backyard poultry (100)</p> <p><b>Others</b>  One Polytunnel of 10 m<sup>2</sup> for nursery raising  One vermicompost unit of 20 m<sup>2</sup>  Fodder production (hybrid napier) in bunds.</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Development of Dehusker, Pearler, grader, miller and packaging unit for coarse millets at Nyay Panchayat level in Rikhnikhhal, Jaiharikhhal, Dugadda and Yamkeshwar blocks.</li> <li>2. Establishment of grading, processing, packaging units of mango and citrus at block level in the zone.</li> <li>3. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in Rikhnikhhal, Jaiharikhhal, Dugadda and Yamkeshwar blocks</li> <li>4. Establishment of storage facilities like warehouses, cold storage and cool chamber vehicles at Kotdwara in Dugadda block and Bidoli in Yamkeshwar block.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Plantation of Mulberry plants, wild fruit plants, Fodder trees (Grewia, Alnus) may be promoted in Rikhnikhhal, Jaiharikhhal, Dugadda and Yamkeshwar blocks.</li> <li>2. Contour making for arable purpose in waste land of the blocks.</li> <li>3. Preparation of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>4. Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone.</li> <li>5. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in the zone.</li> <li>2. Fertilizer application on soil test value at right time, right place with right method by each farmer of the zone.</li> <li>3. Implementation of recommended seed rate, spacing and depth by each farmer.</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Adoption of Power tillers, power weeders, Paddy threshers, Wheat threshers, millet threshers required for reducing cost of cultivation at cluster or nyay panchayat level.</li> </ol>

	<ol style="list-style-type: none"> <li>6. Increase in number of sales and community centres for easy and timely availability of seeds, seedlings, fertilizers and required information in each block.</li> <li>7. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost in citrus and vegetables in Rikhnikhil, Jaiharikhil, Dugadda and Yamkeshwar blocks.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Creation of SHGS and encouragement of micro-entrepreneurship and collective farming in all four blocks.</li> <li>2. Promotion of Value added product making in all blocks of the zone.</li> <li>3. Promotion of Mushroom production, Honey Bee production, poultry, fishery, Processing of fruits and vegetables, Sericulture, Vermi-composting units, Woollen knitting &amp; Handicraft, Candle making at cluster level in the blocks of zone</li> <li>4. Promotion of skill development in women and youth</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Enhancement in subsidy for polyhouse, fish tank, poultry etc. in whole district.</li> <li>2. Land consolidation in the district is required.</li> <li>3. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>4. Establishment of mandies and hatts at block level for quick and easy selling of the farm produce.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of mango, guava and citrus in the zone.</li> <li>6. Implementation of Soil Health Card Scheme in each block.</li> <li>7. Labelling of organic inputs and certification mechanism for coarse millets at district or block level.</li> <li>8. Addition of more crops in the PMFBY scheme.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Strengthening of transportation with cold chain vehicle facilities</li> <li>2. Awareness spreading about e-NAM in the zone.</li> <li>3. Establishment of local or block level mandies and hatts for quick and easy selling of the farm produce.</li> <li>4. Installation of grading, processing and packaging facilities of mango, citrus, vegetables at block/village level.</li> <li>5. Creation of direct linkages with food processing industries for better prices.</li> <li>6. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Facilitation with easily operative mobile app and software for online management, evaluation, monitoring, feedback and reading by farmers, state agriculture department and KVKs.</li> <li>2. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> </ol>



	<ol style="list-style-type: none"> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> <li>5. Organization of monthly review meeting at district to solve the problems related with farmers.</li> </ol>
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**District: Pauri Garhwal**  
**Zone: B (1000-1500 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349, HS-277, HS-295, HS-420 and UP 2572), paddy (Spring rice - VL Dhan 208 and VL Dhan 209; Jethi rice - Vivek Dhan 154 and VL Dhan 157; Irrigated Rice - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85), Pant Dhan-19, Pusa Basmati 1509); finger millets (VL Mandua 324, PRM1, VL Mandua 352, 7); Barnyard Millet (PRJ-1, VL Madira -172, VL Madira-207), Amaranth (VL Chua 44) in Kaljikkhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikkhal blocks.</li> <li>2. Promotion of high yielding variety of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2).</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), Urd (U-31, PU-35, PU-40), soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65), Toria (PT-303), Pigeon pea (VL Arhar 1, Pant Arhar-3, Pant Arhar-291) and in Kaljikkhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikkhal blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12, PSM-3), French bean (Falguni, Contender, Pant Anupama, VL Bauni Bean 1 and VL Bean 2), tomato (VL Tamatar 4, Heemsona, Naveen 2000+, Onion (VL Piaz 3, Agrifound Light Red, NHRDF Red) and garlic (VL Garlic), Potato (Kufri Giriraj, Kufri Jyoti, Kufri Chandramukhi), Capsicum (VL Shimla Mirch 3, Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna, Bomby) in Kaljikkhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikkhal blocks.</li> <li>5. Promotion of high yielding varieties of Peach (July Elberta, Nectarines), Plum (Santarosa, Mariposa), Pear (Max Red Bartlet), Kiwi (Allison, Monty, Bruno, Haward)</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of water harvesting and management</b></p> <ol style="list-style-type: none"> <li>1. Strengthening and promotion of water storage structures like water harvesting tanks/ ponds and check dams in Kaljikkhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikkhal blocks.</li> <li>2. Promotion of water conservation techniques like mulching, drip and sprinkler irrigation in low hills of Kaljikkhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikkhal blocks.</li> <li>3. Popularization of low cost lining material to check seepage in the zone.</li> <li>4. Construction of trenches for high percolation of water in most of the area of the zone.</li> <li>5. Establishment of roof top water harvesting structures in all households of the blocks in the zone.</li> </ol>
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	<p><b>Interventions recommended to improve soil health</b></p> <ol style="list-style-type: none"> <li>1. Promotion on use of bio- fertilizers and recommended doses of FYM, soil amendments and vermi-compost to improve soil health in Kaljikhhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhhal blocks.</li> <li>2. Implementation of soil health cards to each and every farmer of the zone along with nutrient recommendation for different crops.</li> <li>3. Establishment of soil testing labs for major and micro plant nutrients at Block level in each block.</li> <li>4. Spreading awareness about scientific use of organic manures, INM, use of biofertilizers, different soil amendments, vermi-composting etc.</li> <li>5. Assurance of availability of inputs viz., fertilizers, micronutrient, bio-fertilizers etc. at Nyay Panchayat Level in each block of the zone</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, small reaper, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of manually operated mini crop harvesters for rice,wheat and millets</li> </ol> <p><b>Other strategies to be adopted for doubling productivity</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development</li> <li>2. Promotion on timely and local availability of high yielding varieties of all the cereal, pulse, vegetable, fruits, spices, etc. at Nyay Panchayat Level in each block of the zone.</li> <li>3. Cultivation of spice crops like ginger and turmeric to ward off the losses caused by wild animals.</li> <li>4. Judicious use of pesticides in IPM and IDM practices to reduce cost of cultivation and its hazardeous effects in Kaljikhhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhhal blocks.</li> <li>5. Promotion on seed treatment through bio agent/ chemical means before sowing by each and every farmer of the zone.</li> <li>6. Encouragement of soil and water conservation techniques like terrace farming, bunding etc to reduce soil erosion in these blocks of the zone.</li> <li>7. Promotion of soil nutrient and irrigation based full package of practices for cultivation of crop varieties in each block.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of pure genetic breeds of cow (Jersy, Sindhi and Sahiwal) and buffalo (Murrah) in Kaljikhhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhhal blocks.</li> <li>2. Organisation of timely de-worming, de-horning and vaccination of livestock at each block.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of availability of Urea, Molasses, and Mineral mixer blocks at Nyay panchayat level.</li> <li>Promotion of availability of feed material with low prices at cluster level in each block.</li> <li>Selection of more numbers of veterinary experts at Nyay panchayat level.</li> <li>Promotion on proper use of suitable mineral mixture, green fodder in all clusters.</li> <li>Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>Strengthening of water bodies/ rivulets and Nayar river with Mahaseer or carps at Satpuli belt.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Development of following IFS model in the zone for 1000m<sup>2</sup> (0.1ha)</p> <p><b>Cropping system (Area 1000 m<sup>2</sup>)</b>  Rice-wheat  Horsegram/Pigeon pea-Lentil  Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b>  Citrus/Stone fruits (80 plants)</p> <p><b>Livestock</b>  Cow (1)/ Buffalo (1) +Backyard poultry (100)</p> <p><b>Others</b>  One Polytunnel of 10 m<sup>2</sup> for nursery raising  One vermicompost unit of 20 m<sup>2</sup>  Fodder production (hybrid napier) in bunds.</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Development of Dehusker, Pearler, grader, miller and packaging unit for coarse millets at Nyay Panchayat level in Kaljikhhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhhal blocks.</li> <li>Establishment of grading, processing, packaging units of stone fruits and citrus at block level in the zone.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in the zone</li> <li>Establishment of storage facilities like warehouses, cold storage and cool chamber vehicles at block level.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Plantation of Mulberry plants, wild fruit plants, Fodder trees (Bheemal, Utees and oak) may be promoted in Kaljikhhal, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhhal blocks.</li> <li>Contour making for arable purpose in waste land of the blocks.</li> <li>Preparation of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone.</li> <li>Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>

<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in the zone.</li> <li>2. Fertilizer application on soil test value at right time, right place with right method by each farmer of the zone</li> <li>3. Implementation of recommended seed rate, spacing and depth by each farmer</li> <li>4. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>5. Adoption of Power tillers, power weeders, Paddy threshers, Wheat threshers, millet threshers required for reducing cost of cultivation at cluster or nyay panchayat level.</li> <li>6. Increase in number of sales and community centres for easy and timely availability of seeds, seedlings, fertilizers and required information in each block.</li> <li>7. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost in citrus and vegetables in Kaljikhil, Kot, Ekeshwar, Nainidanda, Pokhra, Dwarikhil blocks.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Creation of SHGS and encouragement of micro-entrepreneurship and collective farming in all four blocks.</li> <li>2. Promotion of Value added product making in all blocks of the zone.</li> <li>3. Promotion of Mushroom production, Honey Bee production, poultry, fishery, Processing of fruits and vegetables, Sericulture, Vermi-composting units, Woollen knitting &amp; Handicraft, Candle making at cluster level in the blocks of zone</li> <li>4. Promotion of skill development in women and youth</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Enhancement in subsidy for polyhouse, fish tank, poultry etc. in whole district.</li> <li>2. Land consolidation in the district is required.</li> <li>3. Implementation of Policies for control of wild animal menace in agricultural areas.</li> <li>4. Establishment of mandies and hatts at block level for quick and easy selling of the farm produce.</li> <li>5. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of mango, guava and citrus in the zone.</li> <li>6. Implementation of Soil Health Card Scheme in each block.</li> <li>7. Labelling of organic inputs and certification mechanism for coarse millets at district or block level.</li> <li>8. Addition of more crops in the PMFBY scheme.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Strengthening transportation with cold chain vehicle facilities</li> <li>2. Awareness spreading about e-NAM in the zone.</li> <li>3. Establishment of local or block level mandies and hatts for quick and easy selling of the farm produce.</li> <li>4. Installation of grading, processing and packaging facilities of mango, citrus, vegetables at block/village level.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Creation of direct linkages with food processing industries for better prices.</li> <li>6. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Facilitation with easily operative mobile app and software for online management, evaluation, monitoring, feedback and reading by farmers, state agriculture department and KVKs.</li> <li>2. Formation of District level committees of State line departments with KVK experts may be formed for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of programme. Organization of monthly review meeting at district to solve the problems related with farmers.</li> </ol>

**District: Pauri Garhwal**  
**Zone: C (up to 1500-2400 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832, HPW 155, HS 365 (from 1700 to 2400m amsl), HS-277, HS-295, HS-420 and UP 2572), paddy (Pant Dhan-19, Pusa Basmati 1509); finger millets ( and VL Mandua 352 upto 2000m amsl, PRM1); Barnyard millet (VL Madira 172 and VL Madira 207 upto 2000m amsl) Amaranth (VL Chua 44) in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>2. Promotion of HYV of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2(upto 2000m amsl)</li> <li>3. Promotion of high yielding variety of Toria (PT-303), Pigeon pea (Pant Arhar-3, Pant Arhar-291,) in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>4. Promotion of high yielding varieties of vegetable viz., Vegetable pea (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown), French bean (Falguni, Contender, VL Bean 2), tomato (VL Tamatar 4 upto 1800m amsl, Heemsona, Naveen 2000+, Onion (VL Piaz 3 upto 2000m amsl, Agrifound Light Red), Garlic (VL Lahsun 2) Pea (PSM-3, PSM-5) and in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>5. Promotion of high yielding varieties of Apple (Super Chief, Jeromine, Red Chief, Scarlet Spur, Oregon Spur), Pear (Max red Bartlett), Walnut (Govind, CITH 1,2,3), Peach (Judy Elberta, Nectarines), Plum (Santarosa, Mariposa), Pear (Max Red Bartlett), Apricot (New Castle, Shakarpara), Kiwi (Allison, Monty, Bruno, Haward) in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of water harvesting and management</b></p> <ol style="list-style-type: none"> <li>1. Strengthening and promotion of water storage structures like water harvesting tanks/ ponds and check dams in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>2. Promotion of water conservation techniques like mulching, drip and sprinkler irrigation in Mid hills of Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>3. Popularization of low cost lining material to check seepage in the zone.</li> <li>4. Construction of trenches for high percolation of water in most of the area of the zone.</li> <li>5. Establishment of roof top water harvesting structures in all households of the blocks in the zone.</li> </ol> <p><b>Interventions recommended to improve soil health</b></p> <ol style="list-style-type: none"> <li>1. Promotion of the use of bio- fertilizers and recommended doses of FYM, soil amendments and vermi-compost to improve soil health in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> </ol>
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	<ol style="list-style-type: none"> <li>2. Implementation of soil health cards to each and every farmer of the zone along with nutrient recommendation for different crops.</li> <li>3. Establishment soil testing labs for major and micro plant nutrients at Block level in each block.</li> <li>4. Spreading awareness about scientific use of organic manures, INM, use of biofertilizers, different soil amendments, vermi-composting etc.</li> <li>5. Assurance of availability of inputs viz., fertilizers, micronutrient, bio-fertilizers etc. at Nyay Panchayat Level in each block of the zone.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available,</li> <li>3. Green House Cultivation for Vegetables.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, small reaper, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of manually operated mini crop harvesters for rice,wheat and millets</li> </ol> <p><b>Other strategies to be adopted for doubling productivity</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, vegetable, fruits, spices, etc. at Nyay Panchayat Level in each block of the zone.</li> <li>3. Cultivation of spice crops like ginger and turmeric to ward off the losses caused by wild animals in all blocks.</li> <li>4. Judicious use of pesticides in IPM and IDM practices to reduce cost of cultivation and its hazardeous effects in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>5. Promotion on Seed treatment through bio agent/ chemical means before sowing by each and every farmer of the zone.</li> <li>6. Encouragement of soil and water conservation techniques like terrace farming, bunding etc should be encouraged to reduce soil erosion in these blocks of the zone.</li> <li>7. Promotion of soil nutrient and irrigation based full package of practices for cultivation of crop varieties in each block.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of pure genetic breeds of cow (Jersy, Sindhi and Sahiwal) in Pauri, Pabou, Khirsu, Thalissain, Beeronkhal blocks.</li> <li>2. Organisation of timely de-worming, de-horning and vaccination of livestock at each block.</li> <li>3. Promotion on availability of Urea, Molasses, and Mineral mixer blocks at Nyay panchayat level.</li> <li>4. Promotion on availability of feed material with low prices at cluster level in each block.</li> <li>5. Selection of more numbers of veterinary experts at Nyay panchayat level</li> </ol>



	<ol style="list-style-type: none"> <li>Promotion on proper use of suitable mineral mixture, green fodder in all clusters.</li> <li>Establishment of hatcheries for need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.</li> <li>Strengthening of water bodies/ rivulets and Nayar river with Mahaseer or carps at Pabou, Paithani belt.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Development of following IFS model in the zone for 1000m<sup>2</sup> (0.1ha)</p> <p><b>Cropping system (Area 1000 m<sup>2</sup>)</b>  Rice-wheat  Horsegram/Pigeon pea-Lentil  Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b>  Stone fruits/pear/apple (80 plants)</p> <p><b>Livestock</b>  Cow (1)/Sheep(10)/Goat(10)+Backyard poultry (100)</p> <p><b>Others</b>  One Polytunnel of 10 m<sup>2</sup> for nursery raising  One vermicompost unit of 20 m<sup>2</sup>  Fodder production (hybrid napier) in bunds.</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Development of Dehusker, Pearler, grader, miller and packaging unit for coarse millets at Nyay Panchayat level in Pauri, Pabou, Khirsu, Thalisan, Beeronkhal blocks.</li> <li>Establishment of grading, processing, packaging units of stone fruits and citrus at block level in the zone.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at Nyay Panchayat level in the zone</li> <li>Establishment of storage facilities like warehouses, cold storage and cool chamber vehicles at block level.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Plantation of Mulberry plants, wild fruit plants, Fodder trees (Alnus and Quercus) may be promoted in Pauri, Pabou, Khirsu, Thalisan, Beeronkhal blocks.</li> <li>Contour making for arable purpose in waste land of the blocks.</li> <li>Preparation of soil bunds preparation to save excessive loss of nutrients in wasteland of all blocks.</li> <li>Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone.</li> <li>Establishment of waste water treatment plants based on phytoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in the zone.</li> <li>Fertilizer application on soil test value at right time, right place with right method by each farmer of the zone</li> <li>Implementation of recommended seed rate, spacing and depth by each farmer</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of need based application of pesticides and other agricultural inputs.</li> <li>Promotion of Power tillers, power weeders, Paddy threshers, Wheat threshers, millet threshers required for reducing cost of cultivation at cluster or nyay panchayat level.</li> <li>Increase in number of sales and community centres for easy and timely availability of seeds, seedlings, fertilizers and required information in each block.</li> <li>Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost in citrus and vegetables in Pauri, Pabou, Khirsu, Thalısain, Beeronkhal blocks.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>Creation of SHGS and encouragement of micro-entrepreneurship and collective farming in all four blocks.</li> <li>Promotion of Value added product making in all blocks of the zone.</li> <li>Promotion of Mushroom production, Honey Bee production, poultry, fishery, Processing of fruits and vegetables, Sericulture, Vermi-composting units, Woollen knitting &amp; Handicraft, Candle making at cluster level in the blocks of zone</li> <li>Promotion of skill development in women and youth.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Enhancement in subsidy for polyhouse, fish tank, poultry etc. in whole district.</li> <li>Land consolidation in the district is required.</li> <li>Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>Establishment of mandies and hatts at block level for quick and easy selling of the farm produce.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of mango, guava and citrus in the zone.</li> <li>Implementation of Soil Health Card Scheme in each block.</li> <li>Labelling of organic inputs and certification mechanism for coarse millets at district or block level.</li> <li>Addition of more crops in the PMFBY scheme.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Strengthening of transportation with cold chain vehicle facilities</li> <li>Awareness spreading about e-NAM in the zone.</li> <li>Establishment of local or block level mandies and hatts for quick and easy selling of the farm produce.</li> <li>Installation of grading, processing and packaging facilities of mango, citrus, vegetables at block/village level.</li> <li>Creation of direct linkages with food processing industries for better prices.</li> <li>Establishment of procurement and collection centre at Nyaypanchyat level for agricultural surplus with proper labelling.</li> </ol>

<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Facilitation with easily operative mobile app and software for online management, evaluation, monitoring, feedback and reading by farmers, state agriculture department and KVKs.</li> <li>2. Formation of District level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedbacks.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of programme. Organization of monthly review meeting at district to solve the problems related with farmers.</li> </ol>
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## Technology Intervention Success Stories

### Example 1: Off Season and Protected Vegetable Cultivation in District Pauri Garhwal [Krishi Vigyan Kendra (Pauri Garhwal)]

1.	Technology Demonstrated	Off season and protected vegetable cultivation
2.	No. of farm families targeted (2012-13 to 2016-17)	582
3.	Area of technology demonstrated during last five years (ha)	15.1

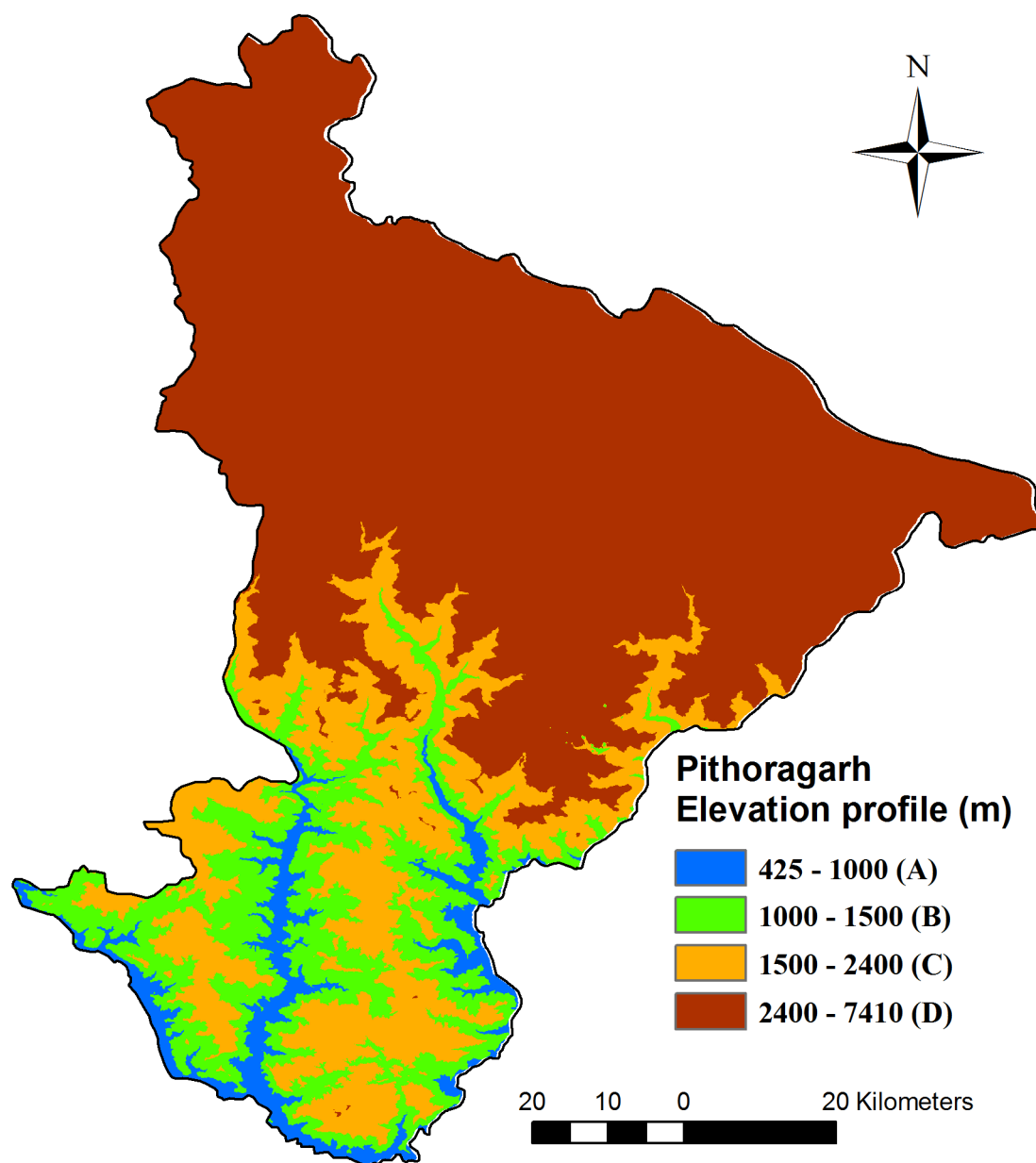
### Impact of the Technology

Crops	No. of Demonstrations (2012-13 to 2016-17)	Cultivable Area under Crop (ha)		Productivity of the Crop (q/ha)	
		Before Dissemination of technology	After Dissemination of technology	Before Adoption of technology	After Adoption of technology
Capsicum	158	4.5	25.50	30.00	66.69
Tomato	165	34	60.17	155.88	137.27
Onion	178	35	188.12	105.71	159.56
Pea	184	17	114.06	6.17	54.33

Crop	Economics (Rs/ha)			
	Gross cost	Gross income	Net income	B:C ratio
Capsicum	54675	176400	159625	2.92
Tomato	62934	376818	344684	5.48
Onion	92437	244500	300937	3.25
Pea	28390	1540000	121610	4.25



**DISTRICT: PITHORAGARH**



**Figure 15: District Pithoragarh elevation profile**



**District: Pithoragarh**  
**Zone: A (up to 1000 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <p>Promotion of high yielding varieties of</p> <ol style="list-style-type: none"> <li>1. Wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS-490, HS-507, HPW-349, UP 2572),</li> <li>2. Paddy             <ol style="list-style-type: none"> <li>a. Irrigated Rice (VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85)</li> <li>b. Rainfed- Chatki Dhan-VL Dhan 206, 207,208</li> <li>c. Jethi dhan – Vivek Dhan 154, VL Dhan 157, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355 plus,); in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> </ol> </li> <li>3. Promotion of high yielding varieties of corn (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53,CMVL Sweet Corn 1, CMVL Baby Corn 2)</li> <li>4. Promotion of high yielding varieties of finger millets (VL Mandua 324, and VL Mandua 352) and Barnyard millet (PRJ-1,VL Madira 172 and VL Madira 207) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>5. Promotion of high yielding variety of lentil (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65, PS-1092 , PS 1042, PS 1092) and Pigeon pea (Pant Arhar-291, VL Arhar 1, Pant Arhar-3) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>6. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, and Vivek Matar 12, Pusa Pragati, Round seeded varieties, Pant Sabji Matar 3, Azad Pea 3, Pea 89), Capsicum (VL Shimla Mirch 3, California wonder, Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, Pusa Dipti), Cabbage (T-621, Pragati, Indica,Varun, Pusa Mukta , Sri Ganesh Gole Green star, Pride of India), tomato (Himsona, Naveen 2000, Avinash 2, NP 7730, VL Tamatar 4), Onion (Agri found light red, Agri found dark red, Pusa red, Pusa ratnar, VL Piaz 3) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>7. Promotion of high yielding varieties of Citrus (Malta : Blood red, Valencia; Kinnow; Lemon &amp; lime: Pant lemon 1, Kagzi lime, Orange), Peach (Alxander, Red Globe, Crest heaven, Glo Heaven etc Nectarine- Snow Queen), Pear (Max Bartlette, Red Bartlette, Willium, Starkrimson, Hokoi, Sukoi (Low Hills),Plum (Italian plum, Prunes viz Frontier), Mango (Dashahari, Langra, Bombay, Amrapali), Litchi (Rose scented, calcuttia, Early bedana, muzzafarpur shahi, swarnaroopa, dehra rose) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Barinag and Gangolihaat blocks.</li> </ol>
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	<p>8. Promotion of high yielding variety of fodder crop berseem (BL-10, UPB-10), Oat (JHO-851, UPO-94, OS-6), Fodder maize (Ganga-2, Ganga-5, QPM) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Barinag and Gangolihaat blocks.</p> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing Hydram system of irrigation in Kanalicthinna, Bin, Dharchula and Munakot.</li> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all blocks.</li> <li>4. Creation of trenches for high percolation of water in most of the area of Kanalicthinna, Didihat, Munakot and Dharchula blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing orchards of Litchi, Mango, Pear, Peach and Plum in Munsyari, Didihat, Kanalicthinna, Bin, Munakot and Dharchula.</li> <li>2. Promotion of onion, potato and garlic cultivation in all blocks of the zone.</li> <li>3. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in all blocks.</li> <li>4. Promotion of production of vegetable pea, in Bin, Munakot and Kanalicthinna block.</li> <li>5. Promotion of production of pigeon pea and hybrid rice in Kanalicthinna, Dharchula, Bin and Munakot block.</li> <li>6. Promotion of production of Urd, Mung and lentil in Kanalicthinna, Dharchula, Bin and Munakot block.</li> <li>7. Promotion of organic production of basmati rice in Munakot, Bin and Kanalicthinna.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of Jatropha, Cheura, lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in all blocks.</li> <li>4. Promotion of cultivation of Kilmaru, Ber, wild Aonla, Kafal, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved Naveen sickle, Dung collector, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol>
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	<p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of Fortification of composting unit, adoption of legume based cropping system and green manuring techniques in concern areas of all blocks.</li> <li>3. Organic cultivation of rice, millets, spices and local grains in all blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder crops (oats, fodder maize, berseem) &amp; medicinal (Aloe vera and Brahmi) plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of INM, IPM and IDM modules.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices like mulching with local straw or black mulch in all blocks.</li> <li>8. Promotion to focus on integrated weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Jursey, HF, Sahiwal), buffaloes (Murrah, Neeli-ravi) and goats (Barbari, Jamunapari) in Bin, Munakot, Kannalichhinna, Didihat, Dharchula, Berinag and Gangolihat block</li> <li>2. Establishment of Fodder Bank in Bin, Dharchula, Munsyari, gangolihat and Berinag particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Munakot, kannalichinna and Bin block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at all blocks.</li> <li>5. Establishment of hatcheries for need of broilior or croilior in Didihat, Dharchula and Munsyari blocks.</li> <li>6. Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross breed milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed in all blocks:</p> <p><b>Agri-HortAnimal-processing based farming system</b></p> <p>Activity Area</p> <p>A. <b>Cropping system:</b> 8 nali</p> <p>Paddy-wheat/yellow saron/lentil-moong/grain cowpea</p> <p>Capsicum-radish-cauliflower</p> <p>Paddy-Radish-garden pea-Frenchbean</p> <p>Maize+cowpea-Berseem/Oat+cabbage</p>

	<p><b>B. Horticulture 8 nali</b>  Mango/ Guava/Pomegranate+ (Cucurbits- Cabbage/cauliflower/onion/moong/cowpea/ginger/turmeric) as intercrop upto 6 years.  Polyhouse( for growing cut flowers -01no.)+ polytunnel-for growing seasonal vegetable seedling  Mushroom Production Unit  <b>C Livestock 2 nali</b>  a. Cow/buffalo 2no.  b. Backyard poultry 25 Birds  c. Beekeeping  <b>D. Vermicomposting/Processing- 2 nali</b>  Washing and cleaning of season vegetables, biogas/vermicompost/biopesticides  <b>Total cost : Rs 75,000.0</b>  <b>Total income : Rs 1.75 lakhs</b>  <b>Net income : Rs 1.00 lakh (Approx.)</b></p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for mango, plum, peach, guava and pear in all blocks.</li> <li>2. Establishment of Food Processing Units for mango at Kannalichinna, &amp; Malta and citrus at Bin, Munakot, kannalichinna, Berinag and Dharchula blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power weeder/tiller, Mini thresher and other equipments at Nyay Panchayat level in all blocks.</li> <li>5. Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Gangolihat and Dharchula for pickle making using wild Aonla, chilli, mango &amp; lemon.</li> <li>6. Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Didihat, Gangolihat and Dharchula for Ketch up of Tomato and jam- jellies of local fruits</li> <li>7. Promotion of common resources on custom hire basis viz. Power tiller in all blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Bin, Munakot, Kannalichinna, Gangolihat and Dharchula and other and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in all blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Grewia, Alnus, Quercusetc.) may be promoted in all blocks.</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Bin, Munakot, Kannalichinna, Didihat, Gangolihat and Dharchula blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate all blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adaption of integrated nutrient management techniques and promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in all blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Sowing of crops with recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ mushroom/poultry for small and landless farmers in all blocks.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Kannalichinna, Didihat, Berinag, Gangolihat, Dharchula, Munsyari blocks.</li> <li>3. Promotion of skill development in women and youth in all blocks.</li> <li>4. Creation of new SHGs in other villages of all blocks.</li> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Ensure Buy back of farmers' produce through common agencies.</li> <li>2. Announcement of Minimum Support Price of crop in each block by the government before sowing.</li> <li>3. Land consolidation is essentially required.</li> <li>4. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>5. Implementation of Soil Health Card Scheme in each block.</li> <li>6. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>7. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>8. Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>9. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>10. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Development of local hats at Block level on weekly basis.</li> <li>2. Establishment of linkages of farmers with the different private companies to ensure proper marketing.</li> <li>3. Farmer's produce collection center should be developed at road head of the villages.</li> <li>4. Creation of better transportation facilities with cool chain van at Block level.</li> <li>5. Creation of direct linkages with food processing industries for better prices.</li> <li>6. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>7. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>8. Installation of mini grading machines at village level.</li> <li>9. Establishment of godowns with latest technology in all blocks.</li> <li>10. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Pithoragarh**  
**Zone: B (1000 to 1500 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (UP-2572, VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507 and HPW 349), paddy (Irrigated condition - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85; Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209; Jethi dhan – Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158 in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>2. Promotion of high yielding varieties of corn (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2)</li> <li>3. Promotion of high yielding varieties of finger millets (VL Mandua 324, and VL Mandua 352) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>4. Promotion of high yielding variety of lentil (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19) and soybean (PS 1042, VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65 PS 1092) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>5. Promotion of high yielding varieties of vegetable pea (Pant Sabji Matar 3, G 10 and Arkel, Azad Pea 3, Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12, Pusa Pragati), Capsicum (VL Shimla Mirch 3 California wonder, Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, Pusa Dipti), Cabbage (T-621, Pragati, Indica,, Pusa Mukta , Sri Ganesh Gole), tomato (Himsona, Naveen 2000, Avinash 2, NP 7730, VL Tamatar 4), Onion (Agri found light red, Agri found dark red, Pusa red, Pusa ratnar, VL Piaz 3), Garlic (VL Garlic 1 and VL Lahsun 2) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>6. Promotion of high yielding varieties of Citrus (Malta : Blood red, Valencia; Kinnow; Lemon &amp; lime: Pant lemon 1, Kagzi lime, Orange), Apricot (DK 5, Harcot, New castle, Shakarpara, Charmagz), Peach (Alexander, Red Globe, Crest heaven, Glo Heaven etc Nectarine- Snow Queen), Pear (Max Bartlette, Red Bartlette, William, Starkrimson, Hokoi, Plum (Italian plum, Prunes viz Frontier) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Berinag and Gangolihaat blocks.</li> <li>7. Promotion of high yielding variety of fodder crop berseem (BL-10, UPB-10), Sorghum (SSG-988, PC-29, MP Chari, PCH-106), Fodder maize (Ganga-2, Ganga-5, QPM), Hybrid Napier (IGFRI-3,6,10 NB-21), Gini grass (PGG-1,9 Bundel gini ghas 1,2) in Bin, Munakot, Kanalicheena, Dharchula, Didihat, Barinag and Gangolihaat blocks.</li> </ol>
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	<p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Development of water harvesting and roof harvesting techniques for water storage in all blocks.</li> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all blocks.</li> <li>4. Creation of trenches for high percolation of water in most of the area of Kanalichhinna, Berinag, Gangolihat, Didihat, Munakot and Dharchula blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing orchards of Citrus, Pear, Peach, Plum and stone fruits (Almonds, Apricot, walnut) in Munsyari, Gangolihat, Berinag, Didihat, Kannalichhinna, Bin, Munakot and Dharchula.</li> <li>2. Promotion of onion, potato and garlic cultivation in all blocks of the zone.</li> <li>3. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in all blocks.</li> <li>4. Promotion of production of vegetable pea, Ginger, Turmeric in Bin, Munakot, Didihat, Gangolihat, Berinag and Kannalichhinna block.</li> <li>5. Promotion of production of hybrid rice in Kannalichhinna, Dharchula, Bin and Munakot block.</li> <li>6. Promotion of production of Urd, Mung and lentil in Kannalichhinna, Berinag, Gangolihat, Dharchula, Bin and Munakot block.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of wild Apricot, Jatropha, Cheura, lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in all blocks.</li> <li>4. Promotion of cultivation of Kilmaru, Ber, wild Aonla, Kafal, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of serrated sickle, wheel hoe, handle fork, handle kutla, power tiller, small wheat thresher, winnowing fan, small reaper, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol>
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	<p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available.</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available.</li> <li>3. Green House Cultivation for vegetables.</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of Fortification of composting unit, adoption of legume based cropping system and green manuring techniques in concern areas of all blocks.</li> <li>3. Organic cultivation of rice, millets, spices and local grains in all blocks.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder grasses like Gini grass, Hybrid Napier, Khadik, Bheemal, oats, fodder maize and berseem) &amp; medicinal (Gadryani, Jambu, Kuth, Uteesh) plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of INM, IPM and IDM modules.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices like mulching with local straw or black mulch in all blocks.</li> <li>8. Promotion to focus on integrated weed management.</li> </ol>
<p><b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b></p>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Jursey, HF, Sahiwal), buffaloes (Murrah, Neeli-ravi) and goats (Barbari, Jamunapari), sheep (Gaddi, selective breeding of local breed) fish (Silver carp, grass carp and common carp) in Bin, Munakot, Kannalichhinna, Didihat, Dharchula, Berinag, Munsyari and Gangolihat block.</li> <li>2. Establishment of Fodder Bank in Bin, Dharchula, Munsyari, Gangolihat, Didihat, Kanalichhinna and Berinag particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Munakot , Gangolihat, Berinag, kannalichinna and Bin block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at all blocks.</li> <li>5. Establishment of hatcheries for need of broiler or croiler in Berinag, Gangolihat, Didihat, Dharchula and Munsyari blocks.</li> <li>6. Availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross breed milch breed of animal for increasing income of marginal farmer.</li> </ol>

<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed in all blocks:</p> <p><b>Agri-HortAnimal-processing based farming system</b></p> <p>Activity Area</p> <p><b>A. Cropping system: 8 nali</b>  Paddy/Ragi/Barnyard millet-lentil/mustard/chickpea  Horsegram/soybean/pigeon pea-wheat  Rice-cabbage/cauliflower-frenchbean/capsicum/potato/summer squash  Hybrid napier/Rai grass on the boundry</p> <p><b>B. Horticulture 8 nali</b>  Peach/Pear/citrus (Malta)/Walnut+ginger/turmeric/fodder grass (As intercrop)  Polyhouses (for growing tomato/capsicum/cucumber)+  polytunnel(for raising vegetable seedling)  Water harvesting structure  Mushroom Production Unit</p> <p><b>C Livestock 2 nali</b>  d. Cow/buffalo 2no.  e. Backyard poultry 25 Birds  f. Goat farming 5+1  g. Bee kepping  h. Fisheris</p> <p><b>D. Vermicomposting/Processing- 2 nali</b>  Washing and cleaning of season vegetables,  biogas/vermicompost/biopesticides</p> <p><b>Total cost : Rs 90,000.0</b>  <b>Total income : Rs 2.0 lakhs</b>  <b>Net income : Rs 1.1 lakh (Approx.)</b></p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini fruit grading plant for plum, peach, pear and stone fruits in all blocks.</li> <li>2. Establishment of Food Processing Units for Malta and citrus at Bin, Munakot, kannalichinna, Berinag and Dharchula blocks.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Promotion of common resources on custom hire basis viz. Power weeder/tiller, Mini thresher and other equipments at Nyay Panchayat level in all blocks.</li> <li>5. Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Berinag, Gangolihat and Dharchula for pickle making using wild Aonla, chilli, mango &amp; lemon.</li> <li>6. Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Didihat, Gangolihat and Dharchula for Ketch up of Tomato and jam- jellies of local fruits</li> <li>7. Promotion of common resources on custom hire basis viz. Power tiller in all blocks.</li> </ol>



<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Contour making for arable purpose in waste land in Bin, Munakot, Kannalichinna, Gangolihat, Berinag, Gangolihat and Dharchula and other and other high hills areas.</li> <li>2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope in all blocks.</li> <li>3. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak etc.) may be promoted in all blocks</li> <li>4. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>5. Popularization of trenches or silages for percolation of water to avoid surface run off in Bin, Munakot, Kannalichinna, Didihat, Gangolihat and Dharchula blocks.</li> <li>6. Construction of check dam and artificial structure to maximize water percolation rate all blocks.</li> <li>7. Construction of tank for storage of water for lean season in all blocks.</li> <li>8. Establishment of storage system for rain water in monsoon season.</li> <li>9. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adaption of integrated nutrient management techniques and promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in all blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Sowing of crops with recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture/ mushroom/poultry for small and landless farmers in all blocks.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Kannalichinna, Didihat, Berinag, Gangolihat, Dharchula, Munsyari blocks.</li> <li>3. Promotion of skill development in women and youth in all blocks.</li> <li>4. Creation of new SHGs in other villages of all blocks.</li> </ol>

	<ol style="list-style-type: none"> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, etc. may be provided for better performance in all blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Ensure Buy back of farmers' produce through common agencies.</li> <li>2. Announcement of Minimum Support Price of crop in each block by the government before sowing.</li> <li>3. Land consolidation is essentially required.</li> <li>4. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>5. Implementation of Soil Health Card Scheme in each block.</li> <li>6. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> <li>7. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>8. Popularization of Udhyam and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>9. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>10. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Development of local hats at Block level on weekly basis.</li> <li>2. Establishment of linkages of farmers with the different private companies to ensure proper marketing.</li> <li>3. Farmer's produce collection center should be developed at road head of the villages.</li> <li>4. Creation of better transportation facilities with cool chain van at Block level.</li> <li>5. Creation of direct linkages with food processing industries for better prices.</li> <li>6. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>7. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>8. Installation of mini grading machines at village level.</li> <li>9. Establishment of godowns with latest technology in all blocks.</li> <li>10. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>

**District: Pithoragarh**  
**Zone: C (1500 to 2400 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 and UP 2572(from 1700 to 2400m amsl)) in Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Berinag and Gangolihaat blocks.</li> <li>2. Promotion of HYV of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2(upto 2000m amsl)</li> <li>3. Promotion of high yielding varieties of finger millets ( and VL Mandua 352 upto 2000m amsl) and Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207 upto 2000m amsl) in Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Barinag and Gangolihaat blocks.</li> <li>4. Promotion of high yielding variety of lentil (PL-4, PL-7, PL-8), Buckwheat (VL Ugal 7, PRB 1), soybean (PS 1042, PS 1092), Rajmash (VL Rajma 63, VL Rajma 125) in Munsyari, Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Barinag and Gangolihaat blocks.</li> <li>5. Promotion of high yielding varieties of vegetable pea (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown, Arkel, Azad Pea 3, Pusa Pragati, Punjab Agetha 6), French bean (VL Bean 2), Capsicum (VL Shimla Mirch 3 utp 1800m amsl, California wonder, Bull nose, Arka mohini, Arka Gaurav, Indira, Bharat, Pusa Dipti), Cabbage (T-621, Pragati, Indica,, Pusa Mukta, Sri Ganesh Gole), tomato (VL Tamatar 4 upto 1800m amsl, Avinash (A-2), Himsona), Onion (Agri found light red, Agri found dark red, Pusa red, Pusa ratnar, VL Piaz 3), Garlic (VL Lahsun 2) in Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Barinag and Gangolihaat blocks.</li> <li>6. Promotion of high yielding varieties of Apple (Early Red one, Washington spur Pink Lady, Oregeon), Citrus (Malta : Blood red, Valencia; Kinnow; Lemon &amp; lime: Pant lemon 1, Kagzi lime, Orange), Peach (Alexander, Red Globe, Crest heaven, Glo Heaven etc Nectarine- Snow Queen), Pear (Max Bartlette, Red Bartlette, Willium, Starkrimson, Hokoi, Plum (Italian plum, Prunes viz Frontier), Apricot (DK 5, Harcot, New castle, Shakarpara, Charmagz), kiwi (Allison, Bruno, Hayward, Tomari, Abbott, Monty) in Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Barinag and Gangolihaat blocks.</li> <li>7. Promotion of high yielding variety of fodder crop Hybrid Napier (IGFRI-3, 6, 10 NB-21), Gini grass (PGG-1,9 Bundel gini ghas 1,2), Bin, Munakot, Kanalicheena, Dharchula, Ddhat, Barinag and Gangolihaat blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Development of water harvesting and roof harvesting techniques for water storage in all blocks.</li> </ol>
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	<ol style="list-style-type: none"> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all blocks.</li> <li>4. Creation of trenches for high percolation of water in most of the area of Kanalichhinna, Berinag, Gangolihat, Didihat, Munakot and Dharchula blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing orchards of Citrus, Pear, Peach, Plum and stone fruits (Almonds, Apricot, walnut) in Munsyari, Gangolihat, Berinag, Didihat, Kannalichinna, Bin, Munakot and Dharchula.</li> <li>2. Promotion of onion, potato and garlic cultivation in all blocks of the zone.</li> <li>3. Promotion of off season vegetables (tomato, capsicum, cole crops, etc.) cultivation in all blocks.</li> <li>4. Promotion of production of vegetable pea, Ginger, Turmeric in Bin, Munakot, Didihat, Gangolihat, Berinag and Kannalichhina block.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of live fencing of wild Apricot, Jatropha, Cheura, lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.</li> <li>2. Enacting legislative measures for protection of crop from wild animals.</li> <li>3. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in all blocks.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved Naveen sickle, Dung collector, Vivek Millet thresher cum pearler and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>4. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health card to farmers for judicious use of fertilisers.</li> <li>2. Promotion of Fortification of composting unit, adoption of legume based cropping system and green manuring techniques in concern areas of all blocks.</li> <li>3. Organic cultivation of millets, spices and local grains in all blocks.</li> </ol>
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	<p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, High Value Crops like vegetable, fruits, spices, etc.</li> <li>3. Cultivation of fodder grasses like Tall fescue, Italian rye, Gini grass, Hybrid Napier, Bheemal) plants.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Promotion of efficient and timely use of INM, IPM and IDM modules.</li> <li>6. Compulsion of seed treatment through bio agent/ chemical in the cluster.</li> <li>7. Adoption of moisture conservation practices like mulching with local straw or black mulch in all blocks.</li> <li>8. Promotion to focus on integrated weed management.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Jersey, HF, Sahiwal), buffaloes (Murrah, Neeli-ravi) and goats (Barbari, Jamunapari), sheep (Gaddi, selective breeding of local breed), fish (Mahasheer, Silver carp, grass carp and common carp) in Bin, Munakot, Kannalichhinna, Didihat, Dharchula, Berinag, Munsyari and Gangolihat block and Angora rabbit in Dharchula, Munsyari and Didihat.</li> <li>2. Establishment of Fodder Bank in Bin, Dharchula, Munsyari, Gangolihat, Didihat, Kanalichhinna and Berinag particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Munakot ,Dharchula, Gangolihat, Berinag, kannalichhinna and Bin block.</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at all blocks.</li> <li>5. Establishment of hatcheries for need of broiler or croiler in Berinag, Gangolihat, Didihat, Dharchula and Munsyari blocks.</li> <li>6. Availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross breed milch breed of animal for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Following Integrated farming system model may be developed in all blocks:</p> <p><b>Agri-HortAnimal-processing based farming system</b></p> <p>Activity Area</p> <p><b>A. Cropping system:</b> 8 nali Rice/Ragi/Maize-lentil Horsegram/ricebean/soybean-wheat Tomato/Capsicum-cabbage/Cauliflower-frenchbean Hybrid Napier/Rai grass/Gini grass + forestry</p> <p><b>B. Horticulture</b> 8 nali Peach/Plum/Apricot/Walnut/Apple_ginger/garlic/turmeric +fodder grass (As intercrop) Polyhouses (for growing tomato/capsicum/cucumber)+ polytunnel(for raising vegetable seedling) Water harvesting structure: Mushroom Production Unit</p>

	<p><b>C. Livestock 2 nali</b></p> <ol style="list-style-type: none"> <li>Cow/buffalo 2no.</li> <li>Backyard poultry 25 Birds</li> <li>Goat/Sheep farming 5+1</li> <li>Bee keeping</li> <li>Rabbitary</li> </ol> <p><b>D. Vermicomposting/Processing- 2 nali</b>  Washing and cleaning of season vegetables,  biogas/vermicompost/biopesticides  <b>Total cost : Rs 90,000.0</b>  <b>Total income : Rs 2.0 lakhs</b>  <b>Net income : Rs 1.1 lakh (Approx.)</b></p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Development of mini processing unit at Munsyari, Dharchula blocks for rajma and local pulses and grains.</li> <li>Establishment of mini fruit grading plant for apple, plum, peach, pear and stone fruits in all blocks.</li> <li>Establishment of Food Processing Units for Malta and citrus at Bin, Munakot, kannalichinna, Berinag and Dharchula blocks.</li> <li>Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>Promotion of common resources on custom hire basis viz. Power weeder/tiller, Mini thresher and other equipments at Nyay Panchayat level in all blocks.</li> <li>Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Berinag, Gangolihaat and Dharchula for pickle making using chilli, &amp; citrus.</li> <li>Establishment of Food and Processing Units at Bin, Munakot, Kannalichinna, Didihat, Gangolihaat and Dharchula for Ketch up of Tomato and jam- jellies of Apple, Plum.</li> <li>Promotion of common resources on custom hire basis viz. Power tiller in all blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Contour making for arable purpose in waste land in Bin, Munakot, Kannalichinna, Gangolihaat, Berinag, Gangolihaat and Dharchula and other and other high hills areas.</li> <li>Afforestation of plants and perennial grasses in steep slope of more than 40% slope in all blocks.</li> <li>Plantation of Wild fruit plants, Fodder trees (Grewia, Quercus etc.) may be promoted in all blocks</li> <li>Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>Popularization of trenches or silages for percolation of water to avoid surface run off in Bin, Munakot, Kannalichinna, Didihat, Gangolihaat and Dharchula blocks.</li> <li>Construction of check dam and artificial structure to maximize water percolation rate all blocks.</li> <li>Construction of tank for storage of water for lean season in all blocks.</li> <li>Establishment of storage system for rain water in monsoon season.</li> <li>Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>

<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adaption of integrated nutrient management techniques and promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc.</li> <li>2. Provision of mechanization (Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.)</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in all blocks.</li> <li>4. Promotion of line sowing and balanced fertilizers application in crops.</li> <li>5. Sowing of crops with recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of apiculture / mushroom / poultry / fisheries / goatry / sheep production for small and landless farmers in all blocks.</li> <li>2. Promotion of cultivation and collection of medicinal plants in Kannalichinna, Didihat, Berinag, Gangolihat, Dharchula, Munsyari blocks.</li> <li>3. Promotion of skill development in women and youth in all blocks.</li> <li>4. Creation of new SHGs in other villages of all blocks.</li> <li>5. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Pickle making, Jam &amp; Jelly making, Spice cultivation, Ghee making &amp; packing, weaving of Sheep wool, woollen clothes, handlooms etc. may be provided for better performance in all blocks.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Ensure Buy back of farmers' produce through common agencies.</li> <li>2. Announcement of Minimum Support Price of crop in each block by the government before sowing.</li> <li>3. Land consolidation is essentially required.</li> <li>4. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>5. Implementation of Soil Health Card Scheme in each block.</li> <li>6. Increasing institutional support by providing subsidises and incentives to small and marginal farmers in all blocks.</li> <li>7. Labelling of organic inputs and certification mechanism for various crops in all three blocks.</li> <li>8. Popularization of Udhyan and KCC for widespread use of government incentives/ subsidies to farmers.</li> <li>9. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material in the state.</li> <li>10. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Development of local hats at Block level on weekly basis.</li> <li>2. Establishment of linkages of farmers with the different private companies to ensure proper marketing.</li> <li>3. Farmer's produce collection center should be developed at road head of the villages.</li> <li>4. Creation of better transportation facilities with cool chain van at Block level.</li> <li>5. Creation of direct linkages with food processing industries for better prices.</li> <li>6. Establishment of strong linkages with various stock holders to furnish information on crop produce and surplus.</li> <li>7. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>8. Installation of mini grading machines at village level.</li> <li>9. Establishment of godowns with latest technology in all blocks.</li> <li>10. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps / software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of community radio, TV talks and Whatsapp etc. for effective implementation of programme.</li> </ol>



## Technology Intervention Success Stories

### Example 1: Popularization of Large Cardamom in District Pithoragarh [Krishi Vigyan Kendra (Pithoragarh)]

<b>Location</b>	Village Jajurali of block Bin
<b>Cultivated area</b>	3-4 <i>nali</i> (1 ha = 50 <i>nali</i> ; 1 <i>nali</i> = 200 sq.m)
<b>Substrate used</b>	Large Cardamom is an important cash crop in low to mid hills of district Pithoragarh. Wild animals do not destroy its fruit which is a major problem in hills.

#### Impact:

<b>Cultivated area (<i>nali</i>)</b>	<b>Cost of cultivation (Rs. / <i>nali</i>)</b>	<b>Yield (kg / <i>nali</i> )</b>	<b>Income (Rs / <i>nali</i>)</b>
3-4	500	10-12	54000



**Example 2: Oyster Mushroom Cultivation Technology in District Pithoragarh  
[Krishi Vigyan Kendra (Pithoragarh)]**

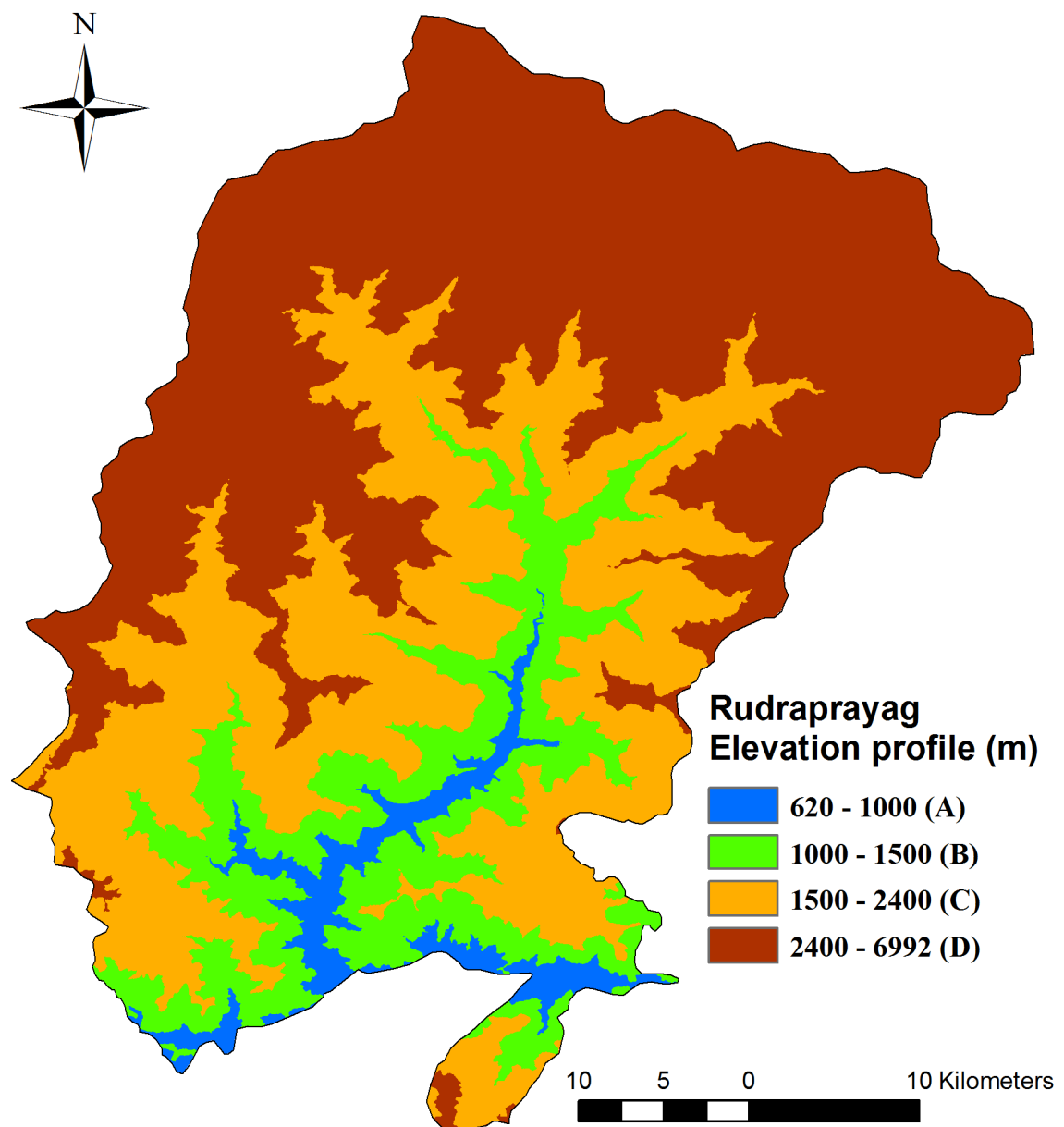
<b>Location</b>	Different blocks (Bin, Munakote, Dharchula, Munsyari, Didihat) in the district
<b>No. of farm families targeted (beneficiaries)</b>	200
<b>Size of bags</b>	05 kg substrate / bag
<b>Substrate used</b>	Wheat straw, paddy straw, finger millet straw

**Impact:**

<b>Yield per bag (kg)</b>	<b>Sale price (Rs/ kg)</b>	<b>Gross return (Rs/ha)</b>	<b>Cost of cultivation (Rs)</b>	<b>Net return (Rs)</b>	<b>B:C ratio</b>
2.80	100	1,400	350	1,050	3.00
2.20	100	1,100	350	750	2.14
2.25	100	1,125	350	775	2.21
2.90	100	1,450	350	1,100	3.14



**DISTRICT: RUDRAPRAYAG**



**Figure 16: District Rudraprayag elevation profile**



**District: Rudraprayag**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS-490, HS-507, HPW-349 and UP 2572), Barley (VL Jau 118 and VLB 94)</li> <li>2. Promotion of high yielding varieties of Paddy (Chaiti Dhan- VL Dhan 208 and VL Dhan 209, Jethi dhan – Vivek Dhan 154 and VL Dhan 157, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355 plus)</li> <li>3. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2)</li> <li>4. Promotion of high yielding varieties of Soybean (VLS 47, VL Soya 59, VL Soya 63, VL Soya 65, PS-1092, PRS 1, PS-1225, PS-1347, PS-19), Horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19)</li> <li>5. Promotion of high yielding varieties of Finger millet (VL Mandua 324, and VL Mandua 352).</li> <li>6. Promotion of high yielding varieties of Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207)</li> <li>7. Promotion of high yielding varieties of Urd (PU-31 and PU-40).</li> <li>8. Promotion of high yielding varieties of Arhar (Pant Arhar-291, VL Arhar 1, Pant Arhar-3)</li> <li>9. Promotion of high yielding varieties of Lentil (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514).</li> <li>10. Promotion of high yielding varieties of Toria/Sarson (PT-303, Uttara, PT-508 and VL Toria 3, Pant Pili Sarson-1, Pant Sweta).</li> <li>11. Promotion of high yielding varieties of tomato (VL Tamatar 4, Avinash A-2 , Himsona, Naveen2000+, Pusa Sheetal, Pusa Gaurav, Pant T-3).</li> <li>12. Promotion of high yielding varieties of chilli (Agni, Shikha, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3), VL Shimla Mirch 3, Onion (VL Piaz 3), Garlic (VL Garlic 1).</li> <li>13. Promotion of high yielding varieties of Pea (Vivek Matar 10 and Vivek Matar 12)</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Introduction, validation, adoption and pomotion of hybrids varieties in vegetable in valley and low hills areas.</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of Brinjal (Chhaya, Kanhaya, Ankur, Navkiran, Brinjal 704 (SunGro Seed), VNR212 (VNR Seed), Indan Supriya (Indo-American), Pant Rituraj, Pant Samrat and Kashi Taru.</li> <li>2. Promotion of high yielding varieties of Cauliflower (Early Kunwari, Pusa Kartiki, Pusa Early Synthetic, Snow Crown, Snow Queen.</li> </ol> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>2. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> </ol>
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	<p>3. Creation of trenches for high percolation of water in most of the area of Narayankoti, Tilwara, Kund, Bheeri belts of Agastaymuni, Jakholi blocks.</p> <p>4. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</p> <p><b>Adoption of cluster approach for holistic development</b></p> <p>1. Promotion of off season vegetables cultivation in low and valley areas of Nala and Narayankoti clusters.</p> <p>2. Establishment of high density orchards of Peaches at Sansari and Tilwara block.</p> <p>3. Rejuvenation of senile orchards of Gola pear with improved varieties viz. Kieffer and other tropical pears in Bheeri and Kund areas of Jakholi and Ukhimath blocks respectively.</p> <p>4. Cultivation of Cinnamon (Tejpatta) plants at low hills in Agastaymuni I block particularly Parkhandi, Fegu, Narayankoti clusters.</p> <p>5. Promotion of ginger cultivation in Jakholi and Agastaymuni Blocks.</p> <p>6. Promotion of organic cultivation of turmeric in Jakholi and Ukhimath Blocks.</p> <p>7. Promotion of production of lentil and Tor in Kabiltha, Kotma and Kalimath valley in Ukhimath Block.</p> <p><b>Management of wild animal problem</b></p> <p>1. Enacting legislative measures for protection of crop from wild animals against wild pig.</p> <p>2. Planting of xerophytes plants or agave against monkeys and baboons in Gaiwala clusters</p> <p>3. Construction of fencing and permanent structure for highly affected areas in Gair and Gadgoo areas clusters.</p> <p>4. Promotion of cultivation of lime/lemon at larger scale in Tamariya and Durghadhar areas of Jakholi block.</p> <p>5. Growing of lime/lemon in larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward of wildlife in cultivated field</p> <p>6. Promotion of cultivation of Kafal, Hishalu, and other wild fruits in different pockets in forest areas for wild animals.</p> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <p>1. Promotion of serrated sickle, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</p> <p>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyaypanchayat level in all three blocks.</p> <p><b>Management of soil health in low or valley areas</b></p> <p>Promotion of vermi compost unit and green manuring in all the villages of this zone.</p> <p><b>Availability of manures and use of fertiliser in cropping system</b></p> <p>1. High biological activities in low hills belts more supplementation of manures and fertilizers in all field and horticultural crops</p> <p>2. Use of NADEP, Heap method, Vermicomposting and vermiwash techniques for manure results in doubling of agricultural productivity.</p>
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	<p>3. Timely and judicious use of fertilizers based on LCC, soil and water testing reports, based on cropping system can enhance productivity in low hills and limited irrigated Sera areas.</p> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development</li> <li>2. Soil health improvement practices</li> <li>3. Selection of right crop &amp; variety</li> <li>4. All the field operation timely</li> <li>5. Use of only well decomposed FYM/ value added compost</li> <li>6. Seed treatment through bio agent strictly in the cluster</li> <li>7. Promotion of moisture conservation practices</li> <li>8. Focus on timely weed management</li> <li>9. Take care of IPM techniques based on organic inputs.</li> <li>10. Adoption of Farm mechanization (Power tiller, thresher, etc.)</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Improvement of local existing breeds with new breed like HF, Jersey, Red Dane in cattle, Murrah in Buffaloes, Replacement of Carp in fisheries and croilers dual purpose in mid and high etc.</li> <li>2. Need to establish fodder bank to supply good quality fodder seeds to farmers in rainy season.</li> <li>3. Creation of more green fodder production with growing of MPT and Napier production.</li> <li>4. Two hatchery plant in poultry to at Tilwara and Agstymuni to meet the need of broiler and croiler.</li> <li>5. Establishment of service bulls station at Nyayapanchayt level for breed improvement as per livestock breeding policy.</li> <li>6. Addition of fingerlings in Mandakini, Alkananada and other rivulets.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<ol style="list-style-type: none"> <li>1. Promotion of different Integrated Farming System modules such as :</li> <li>2. Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>3. Fodder production+ Mini dairy + Composting + Protected cultivation</li> <li>4. Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea) + Planting material supply + Mushroom</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Creation of larger facilities of infrastructure for reducing post harvest losses in horticultural commodities viz. Long term storage, warehouses, development of cottage industries at village level for unfinished products at Tilwara, Agastaymuni and Bheeri.</li> <li>2. More refrigerating van/Reefers for quick transportation for perishable commodities like flowers and vegetables.</li> <li>3. Pickle making of wild Aonla in Food and processing units at Agstyamuni</li> <li>4. Cluster approach is useful for small and marginal farmers to procure input and disposal of surplus in areas.</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Afforestation of MPT for fodder plants, growing of bael, or wild amla, cheura and other economical important plants in wasteland.</li> <li>2. Need to develop more forest nurseries to supply fodder plants to farmers in rainy season.</li> <li>3. Construction of check dam, making trenches and other water harvesting structures for water storage.</li> <li>4. Promotion of perennial grasses in Gaiwala, Sirsi, Chandrapuri and Fegu cluster for higher green grass production.</li> <li>5. Contour making for arable purpose in waste land in Mandakini and Alaknanda basin for maximum use of wasteland.</li> <li>6. Afforestation of MPT viz. Chancharu, Beemal, Sirish, Kanchnar and others and perennial grasses in steep slope in Jakholi and Agastymuni blocks.</li> <li>7. Promotion of plantation of mulberry, wild fruit plants in Bedubagar and Bansbeeda clusters in Agastyamuni block, wild fruit plants and fodder trees (Bheemal, Celtis and Toon) in Jakholi block.</li> <li>8. Popularization of soil bunds to save excessive loss of nutrients in wasteland of all blocks.</li> <li>9. Popularization of trenches for percolation of water to avoid surface run off.</li> <li>10. Construction of check dam and artificial structure to maximize water conservation in low and valley areas in Mandakini, Madhuganga basin, Madmaheshwar valley and Kotma valley to reduce the soil erosion.</li> <li>11. Construction of tank for storage of water for lean season in all blocks.</li> <li>12. Storage of rain water in monsoon season.</li> <li>13. Rejuvenation/repair of faulty/abandoned terraces in Gaiwala and Fegu clusters.</li> <li>14. Stabilization of eroded land using biological/ engineering measures.</li> <li>15. Plantation of suitable trees/brushes in waterlogged and eroded areas.</li> <li>16. All agricultural operations should be done on contours i.e. across the existing land slope.</li> <li>17. Temporary gully control structures (brush-wood dam, loose-rock dam, plank/slab dam, log dam, gabion check dam etc.) should be constructed to stabilize gullies using locally available materials.</li> <li>18. Permanent gully control structures (drop spillway, drop inlet spillway and chute spillway) should be constructed in badly eroded large gullies where temporary structures are inadequate or uneconomical.</li> <li>19. Diversion of runoff through ditches from upper slopes to safer places.</li> <li>20. Contour bunding up to 6% slope in areas with less than 800 mm mean annual rainfall and permeable soils; and graded bunding in areas with &gt; 6% slope and &gt; 800 mm mean annual rainfall.</li> <li>21. Contour trenching (staggered/continuous).</li> <li>22. Domestic wastewater may be reclaimed at house hold level for use in kitchen gardens.</li> <li>23. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
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<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Use of drudgery prone implements viz. improved sickle, small threshers, Tillers and other garden tools with reduce the drudgery and indirectly improve the production resulting in income of small farmers.</li> <li>2. Encourages use of well decomposed FYM or vermicompost, biofertilizers.</li> <li>3. Avoid broadcasting of seeds and other inputs in crop production program</li> <li>4. Need based application of pesticides, preferably use bioagents.</li> <li>5. Encourages optimum and recommended seed rate at optimum spacing and depth.</li> <li>6. Use of mulch (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>7. Use of modern techniques to use water use efficiency in horticultural crops.</li> <li>8. Tillers and other garden tools Tillers and other garden tools with reduce the drudgery and indirectly improve the production resulting in income of small farmers.</li> <li>9. Promotion of line sowing and balanced application of organic manures in crops.</li> <li>10. Promotion of recommended seed rate, spacing and depth.</li> <li>11. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>12. Promotion of hand tools in agricultural and horticultural operations.</li> <li>13. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>14. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>15. Promotion of modern irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Scope or potential of subsidiary occupation like silkworm, bee keeping, poultry, fish farming and mushroom will harness the potential of new or improved technology in farming occupation.</li> <li>2. Emphasis on promotion of religious tourism for panch kedar yatra to serve organic and local delicacy.</li> <li>3. Promotion of mushroom and bee keeping centre at Agastymuni to meet the requirement of compost and spawn.</li> <li>4. Promotion of apiculture for small and landless farmers in valley areas.</li> <li>5. Promotion of cultivation and collection of medicinal plants.</li> <li>6. Promotion of skill development in women and youth in all three blocks</li> <li>7. The encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance in all three blocks.</li> <li>8. New SHGs may also be created in other villages of three blocks.</li> </ol>

<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Institutional support in the form of subsidises and incentives can raise the farm production and income in larger interest of farmers.</li> <li>2. Mandatory meterological/ observatory at block level to get first hand information of climatic changes.</li> <li>3. Labelling of organic inputs and certification mechanism for more number of crops.</li> <li>4. Expand application scientific methods and mechanized cultivation.</li> <li>5. Issueing up of Udhyan and Krishak cards for widespread use of Govt. incentives/subsidies to farmers.</li> <li>6. Effective and workable Nursery act to avoid spurious or unreliable planting material in the state.</li> <li>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>8. Soil health card scheme be effective for each farmers.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Laisoning/linkages of various line departments to furnish information of crop produce and surplus.</li> <li>2. eMarketing of apple and amaranths in Triyuginarayan areas</li> <li>3. Establishment of mandis for temporary storage and sale of commodities at Agastymuni.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Rudraprayag**  
**Zone: B (1000 to 1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572)</li> <li>2. Promotion of high yielding varieties of Paddy (Irrigated - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85; Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209; Jethi dhan –Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158).</li> <li>3. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2).</li> <li>4. Promotion of high yielding varieties of Finger millet (VL Mandua 324, and VL Mandua 352, PRM 1)</li> <li>5. Promotion of high yielding varieties of Barnyard Millet (PRJ-1,VL Madira 172 and VL Madira 207)</li> <li>6. Promotion of high yielding varieties of Horsegram (VL Gahat 10, VL Gahat 15 and VL Gahat 19)</li> <li>7. Promotion of high yielding varieties of Lentil (PL-4, PL-7, PL-8, VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514)</li> <li>8. Promotion of high yielding varieties of Toria/Sarson (PT-303, 507,Uttara and PPS-1)</li> <li>9. Promotion of high yielding varieties of Urd (U-31, PU-35)</li> <li>10. Promotion of high yielding varieties of Arhar (Pant Arhar-291, VL Arhar 1, Pant Arhar-3).</li> <li>11. Promotion of high yielding varieties of Tomato (VL Tamatar 4, Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852)</li> <li>12. Promotion of high yielding varieties of Potato (Kufri Giriraj, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Jyoti, Kufri Chandramukhi)</li> <li>13. Promotion of high yielding varieties of vegetable pea (PSM-3, PSM-5, Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12, Pusa Pragati), french bean (VL Bauni Bean 1 and VL Bean 2.), VL Shimla Mirch 3, Onion (VL Piaz 3), Garlic (VL Garlic 1 and VL Lahsun 2).</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Introduction, validation, adoption and pomotion of hybrids varieties in vegetable in valley and low hills areas.</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of French bean (Pant Anupama, Pusha, Himlata, Swarna Lata, Laxmi, VL Lata Bean-17, Pusha Parvati, Pant bean-2, VL Bony-1, Arka Anoop, Arka Bold).</li> <li>2. Promotion of high yielding varieties of Cauliflower (Early Kunwari, Pusa Kartiki, Pusa Early Synthetic, Pusa Shubhra, Pant Shubhra, Hisar No.1, Snow crown, Pusa Snowball-16, PSBK-1, PSBK-25, Pusa Hybrid-2).</li> <li>3. Promotion of high yielding varieties of Cabbage (T-621, Pragati, Indica,Varun, Pusa Mukta , Sri Ganesh Gole, Green star and Pride of India).</li> <li>4. Promotion of high yielding varieties of Capsicum (Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna)</li> </ol>
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	<p>5. Promotion of high yielding varieties of Radish (Early Mino, Japanese White, Pusa Himani, Pusa Chetki, Pusa Reshmi, Arka Nishant).</p> <p>6. Promotion of high yielding varieties of chilli (Agni, Shikha, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3)</p> <p>7. Promotion of high yielding varieties of peach (Alexander, Red Globe, Crest heaven, Glo Heaven, Nectarine- Snow Queen)</p> <p>8. Promotion of high yielding varieties of Plum (Santa Rosa, Beauty, Burbank and Prunes).</p> <p><b>Introduction of new plant variety or type in non –conventional areas.</b> Low chill varieties of apple in above 2000 mts,</p> <p><b>Replacement of traditional stone fruit crop with kiwi or strawberry for high productivity in Khumera and Shisi clusters.</b> Introduction of exotic vegetables like Asparagus, Globe artichoke, Tulsi Thyme and others crops in cropping system in Rudrapryag and Tilwara clusters.</p> <p><b>Adoption of high yielding varieties and hybrids in vegetable crops.</b></p> <p><b>Construction of water harvesting tank in mid hills/mountain region.</b></p> <ol style="list-style-type: none"> <li>1. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>2. Creation of trenches for high percolation of water in Khhat, Rabigaon, Mayali, Chirbatia, Tulanga, Raunlak, Mansuna, Rampur, Badasu, cluster of this zone.</li> <li>3. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in all the blocks of this zone.</li> <li>4. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> </ol> <p><b>Timely supply of seed and other inputs</b></p> <ol style="list-style-type: none"> <li>1. Sufficient and assured supply of HYV Millets, seed and inputs in all nyaypanchayat /CD store of Agriculture Deptt.</li> <li>2. Supply of reliable planting material of temperate and subtropical plants to farmers.</li> <li>3. Use of IPM modules as per area and crop specific in field and vegetables.</li> </ol> <p><b>Application of modern techniques in crop production viz.</b></p> <ol style="list-style-type: none"> <li>1. Drips irrigation,</li> <li>2. Sprinklers and drip tapes</li> <li>3. Protected cultivation and structures.</li> </ol> <p><b>Canopy management in higher plants in apple, malta and peaches in Basukidhar and Rampur and Chopta areas of the distt.</b></p> <p><b>Rejuvenation of old and senile orchards in Malta in Ukhimath, Guptkashi, Raunlack and whole Madmaheshwar valley of Ukhimath.</b></p> <p><b>Strengthening of traditional water storage structure.</b> Recharging of old and traditional structure chaal, khaal and local structure for lean season demand in Bangar and remote areas.</p> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of peach, plum in Devar, Bansu, Basukidhar cluster of the zone.</li> </ol>
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	<ol style="list-style-type: none"> <li>2. Top working of local wild pear replaced with improved pear type in Lohara, Tulanga clusters.</li> <li>3. Cultivation of Cinnemon (Tejpatta) plants at Rampur, Shirsi and Nyalsu and masta cluster.</li> <li>4. Promotion of ginger, turmeric cultivation to ward off attack of wold animals in Jakholi and Ukhimath block.</li> <li>5. Promotion of off season vegetables cultivation Rasi, Kotma and Lohara cluster of this zone.</li> <li>6. Promotion of protected cultivation at Nyaypanchayat level.</li> <li>7. Encouragenent of plantation of forest plants like Bhimal, Khadik, Mulberry, Kachnar at the ridges of field for fodder purpose.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of cultivation of garlic, ginger and turmeric in all three blocks.</li> <li>2. Popularization of hill lemon and lime to get rid off animal problems.</li> <li>3. Promotion of cultivation of Kafal, Hishalu and other wild fruits in different pockets in forest areas for wild animals.</li> <li>4. Enacting legislative measures for protection of crop from wild animals.</li> </ol> <p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in low or valley areas</b></p> <ol style="list-style-type: none"> <li>1. Promotion of vermi compost unit and green manuring in all the villages</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in different blocks.</li> <li>3. Organic cultivation of local grain and millets in all the blocks of this zone.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development</li> <li>2. Soil health improvement practices</li> <li>3. Selection of right crop &amp; variety</li> <li>4. Timely and recommended cultural practices for higher production. timely</li> <li>5. Use of only well decomposed FYM/ value added compost</li> <li>6. Seed treatment through bio agent/ chemical means strictly in the cluster</li> <li>7. Focus on timely weed management</li> <li>8. Take care of IPM techniques</li> <li>9. Adoption of Farm mechanization (Power tiller, thresher, etc.)</li> </ol>
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<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Establishment of service bulls at block and nyaypanchayat for improvement of breed in cattle.</li> <li>2. Gadi breed for meat purpose in goat. Merino cross in Sheep.</li> <li>3. Growing of MPT and fast growing green grasses rich in digestible proteins viz. Bhemal, Utees and Oak in perennial trees and Napier as grass for lean season.</li> <li>4. More AI centre for breed improvement viz. Chandrapuri and Ukhimath.</li> <li>5. Availability of poultry feed with low prices.</li> <li>6. There is need to establish more of hatchery for chicks at Ukhimath and Guptkashi</li> <li>7. Timely health check-ups of animals.</li> <li>8. Regular Vaccination and medicine management against FMD and other parasitic pests in cattle.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<ol style="list-style-type: none"> <li>1. Promotion of different Integrated Farming System modules such as :</li> <li>2. Protected cultivation + Composting + Goatry/ backyard poultry</li> <li>3. Fodder production + Mini dairy + Composting+ Protected cultivation</li> <li>4. Seed production (Jethi rice, Lentil, onion, radish, frenchbean, Pea)+ Planting material supply + Mushroom</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of small processing units for Juice and pickle making of limited or heterogeneous stocks at Ukhimath, Chandranagar and Chaumasi.</li> <li>2. Establishment of mini grading fruit plant for malta at Ukhimath, Rampur and Banasur valley and klimath valley area.</li> <li>3. Pickle making of wild Aonla in Food and processing units at Nala, Kherakhal and Mandakini valley.</li> <li>4. Cluster approach is useful for small and marginal farmers to procure input and disposal of surplus in areas.</li> <li>5. Establishment of minimal processing plants in various location based on crop and area specific. Barnyard millet – Bangar and Jakholi centre , Fingermillet- Basukidhar area in mid hills.</li> <li>6. Establishment of small or cottage level processing units for market surplus in Gola Nashpati, Chullu, delicious local malta for food products. Establishment of wine factories for Goal, Chullu, Plum and other forest products. Food processing units of Deptt of Horticulture and Units of some NGOs.</li> <li>7. Processing unit with facilities of mechanical drying, farm level shed drying, cleaning and milling at Guptkashi.</li> <li>8. Mobile seed processing unit at village level for particular commodity</li> <li>9. Canning unit at Tulanga and Lohara areas for peaches.</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Construction of storage of wastewater by using low cost water harvesting technology as kuchha and Pucca tank. Polytank can be constructed as (5x3x2m) capacity to meet the lean season demand of seasonal vegetables and for non agricultural use also.</li> <li>2. In wasteland, a wide scope of fodder plantation of Morus, Chhanchru, Melilotus spp. can be utilized. In dry and unirrigated situation there is scope of bael, amla can be included. There is need to put fodder crops in wasteland.</li> <li>3. In a slope of more than 40% slope, plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Alnus, Celtis, Kachnar) may be promoted.</li> <li>4. Use of soil bunds to save excessive loss of nutrients in wasteland</li> <li>5. Use of trenches or silages for percolation of water to avoid surface run off.</li> <li>6. Construction check dam and artificial structure to maximize water percolation rate in marginal and denudated areas.</li> <li>7. Avenue plantation and development of shelterbelts in low areas.</li> <li>8. Popularization of trenches for percolation of water to avoid surface run off in all the blocks of this zone in Rabigaon, Phata and Bangar clusters.</li> <li>9. Construction of check dam and artificial structure in all the blocks of this zone to maximize water percolation rate.</li> <li>10. Construction of tank for storage of water for lean season at Nyaypanchayat area of all the blocks of this zone.</li> <li>11. Creation of rain water harvesting structure in all the blocks of this zone.</li> <li>12. Plantation of suitable trees/brushes in waterlogged and eroded areas viz. Badasu, Raunlak and Rasi.</li> <li>13. All agricultural operations should be done on contours i.e. across the existing land slope.</li> <li>14. Temporary gully control structures (brush-wood dam, loose-rock dam, plank/slab dam, log dam, gabion check dam etc.) should be constructed to stabilize gullies using locally available materials.</li> <li>15. Permanent gully control structures (drop spillway, drop inlet spillway and chute spillway) should be constructed in badly eroded large gullies where temporary structures are inadequate or uneconomical.</li> <li>16. Diversion of runoff through ditches from upper slopes to safer places.</li> <li>17. Gabion structures can be made along the hill roads as retaining wall, and along the stream banks for protection.</li> <li>18. Contour bunding up to 6% slope in areas with less than 800 mm mean annual rainfall and permeable soils; and graded bunding in areas with &gt; 6% slope and &gt; 800 mm mean annual rainfall.</li> <li>19. Contour trenching (staggered/continuous).</li> <li>20. Domestic wastewater may be reclaimed at house hold level for use in kitchen gardens in all blocks.</li> <li>21. Industrial wastewater must be purified by the concerned industries at their factory level, and should not be thrown into the streams/rivers.</li> </ol>
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	<p>22. The discharge from perennial/seasonal natural water springs must be stored in tanks to ensure continuous water supply for drinking and domestic uses.</p> <p>23. Efforts must be made to rejuvenate the drying springs or enhance the discharge of flowing springs by way of plantation and trenching in their recharge zone.</p> <p>24. Multistage filtration unit should be established to recycle the waste water for multiple purposes.</p> <p>25. Domestic wastewater from kitchen and bathroom should be treated before being used for irrigation in vegetables and other crops.</p> <p>26. Industrial wastewater should not be used for irrigation direct and must be treated by the concerned industries at their factory level as per norms to make it suitable for irrigation or other uses.</p> <p>27. Sewage water from cities should be treated by municipal corporations or other agencies.</p> <p>28. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</p>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Use of standard and time testing technology for higher yield and income.</li> <li>2. Adoption of mechanization techniques in land preparation , inter cultural operations.</li> <li>3. Encourages use of well decomposed FYM or vermicompost, biofertilizers and avoid or minimum use of chemical fertilizers.</li> <li>4. Avoid broadcasting of seeds and fertilizers in crop production program</li> <li>5. Need based application of pesticides, preferably use bioagents.</li> <li>6. Encourages optimum and recommended seed rate at optimum spacing and depth.</li> <li>7. Encouraging for use of hand tools in agricultural and horticultural operations.</li> <li>8. Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>9. Use of mulch (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. As per requirement and availability of various produce, following groups are formed: Gola Nashpati group at Agastymuni, Malta collection and procurement group, Raulak, Guptkashi, Cheura collection and extraction group, Sansari, Milk collection and chilling group, Guptkashi and Wool collection and sale group at Rassi.</li> <li>2. Scope or potential of subsidiary occupation like silkworm in Guptkashi and bansbeeda, bee keeping at Chaumasi and Tulanga and Bangar will harness the potential of new or improved technology in farming occupation.</li> <li>3. Emphasis on promotion of religious tourism for panch kedar yatra to serve organic and local delicacy.</li> </ol>



	<ol style="list-style-type: none"> <li>Promotion of mushroom and bee keeping centre at Agastymuni to meet the requirement of compost and spawn.</li> <li>Adoption of new cultural practices for cultivation of medicinal plants at Basukidhar and Gaid cluster.</li> <li>Dingri and button mushroom for small land holders at Bheeri, Raulack.</li> <li>Promotion of Farmers participatory approach model for crop production techniques under rainfed or hilly agricultural system.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Institutional support in the form of subsidies and incentives can raise the farm production and income in larger interest of farm.</li> <li>Declaration of minimum support price and crop insurance policy incentives is known on or before sowing season to avoid glut or deficiency.</li> <li>Mandatory meteorological/ observatory at block level to get first hand information of climatic changes.</li> <li>Use of crop insurance scheme for more crops including hail storm attack in stone and pome fruits.</li> <li>Labelling of organic inputs and certification mechanism for more number of crops.</li> <li>Expand application scientific methods and mechanized cultivation</li> <li>Establishment of wood bank at Dunagiri to meet the present and future demand of germplasm in horticultural crops.</li> <li>Effective and workable Nursery act to avoid spurious or unreliable planting material in the state.</li> <li>Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>Soil health card scheme be effective for each farmers.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>eMarketing of apple and amaranths in Triyuginarayan areas.</li> <li>Establishment of mandis for temporary storage and sale of commodities at Agastymuni.</li> <li>Direct linkages with food processing industries may be established for better prices.</li> <li>To establish strong linkages with various stakeholders to furnish information of crop produce and surplus.</li> <li>Procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>Mobile apps/ software for online management and evaluation at Distt level.</li> <li>eMarketing and kiosk at distt level to have information of surplus commodities at block level.</li> <li>Monthly review meeting at distt level for market surplus and situation of hill agriculture.</li> <li>Use of radio, TV talks and use of Whatsapp, FB user for effective implementation of program.</li> </ol>

**District: Rudraprayag**  
**Zone: C (1500 to 2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 and UP 2572(from 1700 to 2400m amsl)).</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2 (upto 2000m amsl).</li> <li>3. Promotion of high yielding varieties of Finger millet (PRM 1, and VL Mandua 352 upto 2000m amsl)</li> <li>4. Promotion of high yielding varieties of Barnyard Millet (PRJ-1, VL Madira 172 and VL Madira 207 upto 2000m amsl)</li> <li>5. Promotion of high yielding varieties of Lentil (PL-4, PL-7, PL-8)</li> <li>6. Promotion of high yielding varieties of Urd (U-31, PU-35)</li> <li>7. Promotion of high yielding varieties of Arhar (Pant Arhar-291, Pant Arhar-3).</li> <li>8. Promotion of high yielding varieties of Tomato (VL Tamatar 4 upto 1800m amsl, Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852)</li> <li>9. Promotion of high yielding varieties of cucumber (<b>For protected condition-</b> Hilton, Kian, Isatis and Malini.)</li> <li>10. Promotion of high yielding varieties of Potato (Kufri Giriraj, Kufri Chipsona 1, Kufri Chipsona 3, Kufri Jyoti, Kufri Chandramukhi)</li> <li>11. Promotion of high yielding varieties of Pea (PSM-3, PSM-5, Pusa Pragati, Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown)</li> <li>12. Promotion of high yielding varieties of Pea (Vivek Matar 10, Vivek Matar 11 for main season and VL Ageti Matar 7 for August sowing); Onion (VL Piaz 3 upto 1800m amsl); Capsicum (VL Shimla Mirch 3 upto 1800m amsl); French bean (VL Bean 2) and garlic (VL Lahsun2).</li> </ol> <p><b>Introduction, validation, adoption and promotion of hybrids varieties in vegetable in High hills.</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of French bean (Pant Anupama, Pusha, Himlata, Swarna Lata, Laxmi, Pusha Parvati, Pant bean-2, VL Bean 2, Arka Anoop, Arka Bold).</li> <li>2. Promotion of high yielding varieties of Cauliflower (Early Kunwari, Pusa Kartiki, Pusa Early Synthetic, Pusa Shubhra, Pant Shubhra, Hisar No.1, Snow crown, Pusa Snowball-16, PSBK-1, PSBK-25, Pusa Hybrid-2).</li> <li>3. Promotion of high yielding varieties of Cabbage (T-621, Pragati, Indica, Varun, Pusa Mukta, Sri Ganesh Gole, Green star and Pride of India).</li> <li>4. Promotion of high yielding varieties of Capsicum (VL Shimla Mirch 3 upto 1800m amsl, Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna), Onion (VL Piaz 3 upto 2000m amsl), Garlic (VL Lahsun 2).</li> <li>5. Promotion of high yielding varieties of Radish (Early Mino, Japanese White, Pusa Himani, Pusa Chetki, Pusa Reshmi, Arka Nishant).</li> </ol>
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	<p>6. Promotion of high yielding varieties of chilli (Agni, Shikha, Kashi Anmol, Pant C-1, Tajwasni, Pusa Sadabhar, Punjab Lal, Panjab Surkh, CH-1 and CH-3).</p> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Introduction, validation, adoption and promotion of temperate plants and nuts at high hills.</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of apple (Red Chief, Walspur, Oregon spur, Red spur, Early Red one, Washington spur Pink Lady, Oregon spur, Super chief and other new stains.)</li> <li>2. Promotion of high yielding varieties of pear (Max Bartlette, Red Bartlette, William and Starkrimson)</li> <li>3. Promotion of high yielding varieties of peach (Alxander, Red Globe, Crest heaven, Glo Heaven, Nectarine- Snow Queen).</li> <li>4. Promotion of high yielding varieties of Plum (Santa Rosa, Beauty, Burbank and Prunes).</li> </ol> <p><b>Cluster approach for holistic development in Horticultural sector and traditional millets and grains</b></p> <ol style="list-style-type: none"> <li>1. Repalcement of traditional grains and millets with improved cultivars in Gondar, Gadgoo and other high elevation areas.</li> <li>2. Promotion of Spur and colour mutatnts in apple in high hills in Chaumasi and Gaid areas.</li> <li>3. Replacement of traditional millets with new types developed at VPKAS Almora.</li> <li>4. Encouraging garlic production in Mohankhal, Bhanj and Chandranagar areas.</li> <li>5. VL chau 44 hold promise for high hills.</li> </ol> <p><b>Timely supply of seed and other inputs</b></p> <ol style="list-style-type: none"> <li>1. Sufficient and assured supply of HYV Millets, seed and inputs in all nyaypanchyat /CD store of Agriculture Deptt.</li> <li>2. Supply of reliable planting material of temperate and subtropical plants to farmers.</li> <li>3. Use of IPM modules as per area and crop specific in field and vegetables.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Limited management through legislative control of wild boar in field crops.</li> <li>2. Use of ITK in management of monkey, porcupines, baboon and others.</li> </ol> <p><b>Availability of manures and use of fertiliser in cropping system</b></p> <ol style="list-style-type: none"> <li>1. Use of NADEP, Heap method, Vermicomposting and vermiwash techniques for manure results in doubling of agricultural productivity.</li> <li>2. Timely and judicious use of fertilizers based on LCC, soil and water testing reports, based on cropping system can enhance productivity in low hills and limited irrigated Sera areas.</li> </ol> <p><b>Conservation and water harvesting techniques</b></p> <ol style="list-style-type: none"> <li>1. Use of mulch in fruit crops in juvenile stage.</li> <li>2. Construction of small plastic sheet tank (5x3x2mts) for water storage.</li> <li>3. Small sprinkler and drips for small and large land holding.</li> </ol>
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	<p><b>Adoption of Farm mechanisation (Power tiller, thresher etc)</b></p> <ol style="list-style-type: none"> <li>1. Promotion of serrated sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> <li>2. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in all the blocks.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health in high hills</b></p> <ol style="list-style-type: none"> <li>1. Promotion of vermi compost unit in each village to meet demand of compost.</li> <li>2. Organic cultivation of local grain and millets in different blocks of this zone.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Seed treatment through bio agent/ chemical means strictly in the cluster</li> <li>2. Judicious use of fertiliser</li> <li>3. Moisture conservation practices</li> <li>4. Focus on timely weed management</li> <li>5. Take care of IPM techniques</li> <li>6. Adoption of Farm mechanisation (Power tiller, thresher, etc.)</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Replacement of local breeds with high milch breeds viz. Cross bred jersey in cattle.</li> <li>2. Gaddi and Barbari breed for meat purpose in goat and Merino cross and Gaddi in high hills hold high income.</li> <li>3. Growing of MPT and fast growing green grasses rich in digestible proteins viz. Utees and Oak in perennial trees and Napier as grass for lean season.</li> <li>4. Availability of poultry feed with low prices.</li> <li>5. Timely health check-ups of animals.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+Goatry/backyard poultry</li> <li>2. Fodder production+ Mini dairy+Composting+ Protected cultivation</li> <li>3. Seed production (Amaranthus or Kuttu)+ Planting material supply</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of small processing units for local milk at Badula and Jaggi bagwan.</li> <li>2. Grading and packing units for apple and other temperate fruits at Triyuginaryan and Chaumasi.</li> <li>3. Establishment of wine factory at Tilwara.</li> <li>4. Potato storage at Makkumath.</li> <li>5. Ropeway for distant location in gaid and Gondar areas of the distt.</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Plantation of Mulberry plants in high hills to meet fodder and alternative off income.</li> <li>2. Wild fruit plants like Bhamora, chestnut, hazelnut and black walnut to meet future needs in Kotma valley.</li> <li>3. Use of soil bunds to save excessive loss of nutrients in wasteland</li> <li>4. Use of trenches or silages for percolation of water to avoid surface run off.</li> <li>5. Construction check dam and artificial structure to maximize water percolation rate in marginal and denudated areas.</li> <li>6. Avenue plantation and development of shelterbelts in low areas.</li> <li>7. Popularization of trenches for percolation of water to avoid surface run off in all the blocks of this zone in Rabigaon, Phata and Bangar clusters.</li> <li>8. Construction of check dam and artificial structure in all the blocks of this zone to maximize water percolation rate.</li> <li>9. Construction of tank for storage of water for lean season at Nyaypanchayat area of all the blocks of this zone.</li> <li>10. Creation of rain water harvesting structure in all the blocks of this zone.</li> <li>11. Plantation of suitable trees/brushes in waterlogged and eroded areas viz. Badasu, Raunlak and Rasi.</li> <li>12. All agricultural operations should be done on contours i.e. across the existing land slope.</li> <li>13. Temporary gully control structures (brush-wood dam, loose-rock dam, plank/slab dam, log dam, gabion check dam etc.) should be constructed to stabilize gullies using locally available materials.</li> <li>14. Permanent gully control structures (drop spillway, drop inlet spillway and chute spillway) should be constructed in badly eroded large gullies where temporary structures are inadequate or uneconomical.</li> <li>15. Diversion of runoff through ditches from upper slopes to safer places.</li> <li>16. Gabion structures can be made along the hill roads as retaining wall, and along the stream banks for protection.</li> <li>17. Contour bunding up to 6% slope in areas with less than 800 mm mean annual rainfall and permeable soils; and graded bunding in areas with &gt; 6% slope and &gt; 800 mm mean annual rainfall.</li> <li>18. Contour trenching (staggered/continuous).</li> <li>19. Domestic wastewater may be reclaimed at house hold level for use in kitchen gardens in all blocks.</li> <li>20. Industrial wastewater must be purified by the concerned industries at their factory level, and should not be thrown into the streams/rivers.</li> <li>21. The discharge from perennial/seasonal natural water springs must be stored in tanks to ensure continuous water supply for drinking and domestic uses.</li> <li>22. Efforts must be made to rejuvenate the dying springs or enhance the discharge of flowing springs by way of plantation and trenching in their recharge zone.</li> </ol>
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	<p>23. Multistage filtration unit should be established to recycle the waste water for multiple purposes.</p> <p>24. Establishment of waste water treatment plants based on phytoremediation technique at sewer drainage points.</p>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Encourages use of well decomposed FYM or vermicompost, biofertilizers and avoid or minimum use of chemical fertilizers.</li> <li>2. Avoid broadcasting of seeds and fertilizers in crop production program</li> <li>3. Need based application of pesticides, preferably use bioagents.</li> <li>4. Encourages optimum and recommended seed rate at optimum spacing and depth.</li> <li>5. Encouraging for use of hand tools in agricultural and horticultural operations.</li> <li>6. Use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Wheel Hand hoe, Manual/ power operated Wheat.</li> <li>7. Use of mulch (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Wool and Kargha business hold in high hills like Kham bugiyal, Chaumasi, Rassi and Unniyana of Ukhimath Block.</li> <li>2. Collection of milk and saling at Kedarnath at high price is highly remunerative business of Rampur, Badasu and Nyalsu areas of Kedarnath belts for farm women.</li> <li>3. The encouragement to existing SHSs for collective farming, opening small scale enterprise like honey collection.</li> <li>4. Collection and domestication of medicinal plants at Chaumasi, Nayankoti and Chirang areas is becoming popular.</li> <li>5. Collection and selling of Jangora to Food industries at exorbitant price is off farm income.</li> <li>6. Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance.</li> <li>7. New New SHGs may also be created other villages of the distt.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Extending MSP for number crops including all millets, Malta, spice crops and other crops. A separate provision of fund and identification of agency to procure and disposal of surplus produce to stockholder.</li> <li>2. Mandatory meteorological/ observatory at block level to get first hand information of climatic changes.</li> <li>3. Use of crop insurance scheme for more crops including hail storm attack in stone and pome fruits.</li> <li>4. Labelling of organic inputs and certification mechanism for more number of crops.</li> <li>5. Expand application scientific methods and mechanized cultivation</li> <li>6. Issuing up of Udyan and Kisan Cards for widespread use of Govt. incentives/subsidies to farmers.</li> <li>7. Effective and workable Nursery act to avoid spurious or unreliable planting material in the state.</li> </ol>

	<p>8. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</p> <p>9. Soil health card scheme be effective for each farmers.</p> <p>10. Institutional support in the form of subsidises and incentives can raise the farm production and income in larger interest of farm.</p> <p>11. Declaration of minimum support price and crop insurance policy incentives is known on or before sowing season to avoid glut or deficiency.</p>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<p>1. Laisoning/linkages of various line departments to furnish information of crop produce and surplus.</p> <p>2. eMarketing of apple and amaranths in Triyuginarayan areas</p> <p>3. Establishment of mandis for temporary storage and sale of commodities at Agastymuni</p>
<b>Strategy 10 : Online Management and Evaluation</b>	<p>1. Mobile apps/ software for online management and evaluation at Distt level.</p> <p>2. E Marketing and kiosk at distt level to have information of surplus commodities at block level.</p> <p>3. Monthly review meeting at distt level for market surplus and situation of hill agriculture.</p> <p>4. Use of radio, TV talks and use of Whatsapp, FB user for effective implementation of program.</p>

## Technology Intervention Success Stories

### Example 1: Ginger Cultivation: An Alternative to Organic Farming in Rudraprayag [Krishi Vigyan Kendra (Rudraprayag)]

Brief about the study area major technological interventions		
1.	Village (Rudraprayag distt)	Narayankoti
2.	No. of farm families targeted (beneficiaries)	120
3.	Net cultivated area targeted families (ha)	5
4.	No. of small farm families involved	250
5.	Total area under ginger cultivation after 2 years intervention (ha)	150
6.	Total production of the distt (approx) (tonnes)	150

### Impact of organic packages of practices in ginger

S. No.	Parameter (s)	Before intervention	After intervention	Percentage increase
1	Area (Ha)	25	150	600
2	Productivity (q/ha)	60	100	60

Treatments	Yield with Unit (q/ha)	% change in Yield	Incidence of rot (%)	% change in Parameter	Net Income (Rs)	BC Ratio
Farmer's practice	85.0	-	22.5	-		
Use of organic mulch and Bioagents + Pant Bioagent 3 as soil and seed treatment	100.0	17.64	8.0	64.44	1,82,540	2.22



**Example 2: Organic Honey Production with Indigenous Technology [Krishi Vigyan Kendra (Rudraprayag)]**

Brief about the study area major technological interventions		
1.	Village (Rudraprayag distt)	Madmaheshar valley and Vanasur valley
2.	No. of farm families targeted (beneficiaries)	120
3.	No. of small farm families involved	800
4.	Total production of the distt (approx)	50 tonnes

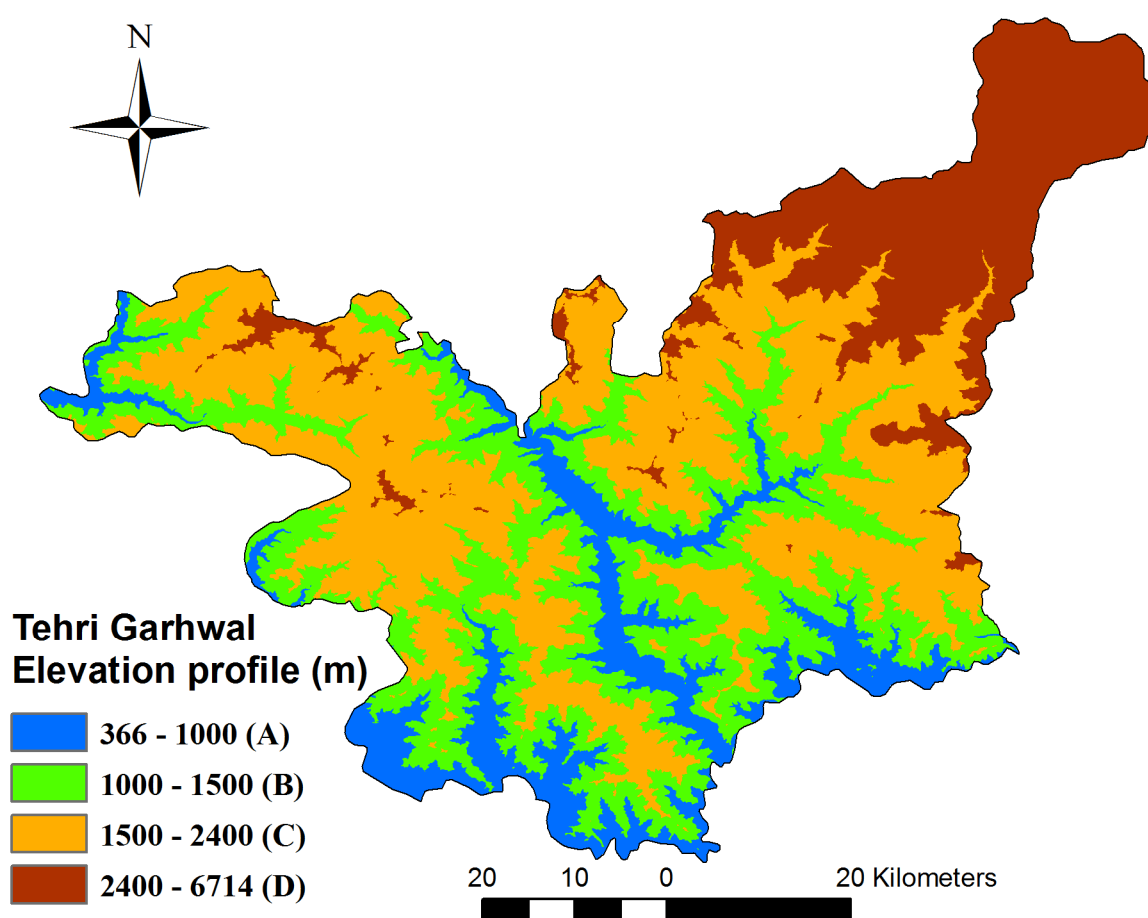
S. No.	Details	Numbers	Rate (Rs per)	Expenditure (Rs)
1	Bee Boxes	10	1500	15000
2	Stand and others	10	100	1000
	Total			16,000

Details	Production (kg)	Rate (Rs/kg)	Income (Rs)	Net Income (Rs)	% increase
Honey	60	600	36,000	36,000 -16000 = 20,000	125%





## DISTRICT: TEHRI GARHWAL



**Figure 17: District Tehri Garhwal elevation profile**



**District: Tehri Garhwal**  
**Zone: A (up to 1000 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572); paddy (Irrigated - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pant Dhan-19, Pusa Basmati 1509; Spring rice - VL Dhan 208 and VL Dhan 209; Jethi rice - Vivek Dhan 154 and VL Dhan 157); corn (Vivek QPM 9, Vivek Maize Hybrid 45, Vivek Maize Hybrid 53, CMVL Sweet Corn 1, CMVL Baby Corn 2) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>2. Promotion of high yielding varieties of Barley (VL Jau 118 and VLB 94) and finger millets (PRM 1, , VL Mandua 324, and VL Mandua 352) in Chamba, Narendranagar, Thauldhar, Kirtinagar and Devprayag blocks.</li> <li>3. Promotion of high yielding variety of lentil (Pant Lentil -8, VL Masoor 125, VL Masoor 126, VL Masoor 507 and VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (Pant Soaybean 1092, Pant Soaybean 1225, VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Pant Sanbji Matar-3, Vivek Matar 10, &amp; Vivek Matar 12), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (Heemsona, Arka Rakshak, Naveen 2000+ and VL Tamatar 4), Capsicum (VL Shimla Mirch 3), Onion (Agri Found Light Red, NHRDF Red &amp; VL Piaz 3) and garlic (VL Garlic 1) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Construction of water harvesting ponds/ tanks, check bunds to harvest the rain water.</li> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>4. Creation of trenches for high percolation of water in most of the area of Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol>
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	<p>6. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</p> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Cultivation of Cinnamon (Tejpatta) plants at low hills in Narendranagar particularly Nala, Pali and Rampur cluster and Devprayag blocks.</li> <li>2. Promotion of ginger cultivation in Narendranagar, Jhakhnidhar and Devprayag blocks.</li> <li>3. Promotion of organic cultivation of turmeric in Jakhnidhar, Devprayag and Narendranagar blocks.</li> <li>4. Promotion of production of tomato cultivation in Narendranagr, Devprayag and Thathyur block with proper crop rotation.</li> <li>5. Promotion of production of pigeon pea in Thauldhar, Chaka cluster of Jakhnidhar block and Devprayag block.</li> <li>6. Promotion of production of lentil in Chamni, Nakot clusters of Chamba block and Jakhnidhar, Anjanisain clusters of Jakhnidhar block.</li> <li>7. Promotion of organic production of basmati rice in Maletha and Pokhal clusters in Kirtinagar block; Tipali, Kot, Dadur clusters in Chamba block and Nala, Rampur, Jajal in Narendranagar block.</li> <li>8. Promotion of subtropical fruit crops Mango, Guava and Litchi in Narendranagar, Kirtinagar, Devprayag.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of protected cultivation of vegetables in Nagni, Jardhar clusters of Chamba block and in Thauldhar block.</li> <li>2. Promotion of live fencing of wild rose, Karonda plant in surrounding the field in Jakhnidhar block.</li> <li>3. Promotion of plantation Hishalu and other wild fruits in Van Panchayat area for wild animal in all blocks.</li> </ol> <p><b>Strengthening of farmers through skill training</b></p> <ol style="list-style-type: none"> <li>1. Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</li> </ol> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Power weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available, etc.</li> <li>2. 2 Drip Irrigation in integration with water harvesting structure where water for irrigation is limited.</li> <li>3. Green House Cultivation for Vegetables with drip irrigation.</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp.</li> <li>3. Adoption of well decomposed FYM and other compost.</li> </ol>
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	<p>4. Promotion of bio- fertilizers and recommended doses of FYM and vermi-compost to improve soil health.</p> <p>5. Promotion of soil nutrient and irrigation based full package of practices during cultivation of crop varieties.</p> <p><b>Other</b></p> <p>1. Promotion of biotic &amp; abiotic stress resistance varieties and alteration in cropping pattern.</p> <p>2. Promotion of Pusa Hydrogel technology in the cultivation of vegetables, pulses and cereals in all blocks.</p>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<p>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Narendranagar, Thauldhar and Chamba block.</p> <p>2. Establishment of Fodder Bank in Narendranagar, Thauldhar, Devprayag, Pratapnagar and Chamba block to meet fodder requirement of area particularly during lean period.</p> <p>3. Establishment of milk chilling plant at Narendranagar, Thauldhar and Chamba block</p> <p>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</p> <p>5. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Chamba and Devprayag block.</p> <p>6. Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</p> <p>7. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmers.</p> <p>8. Appointment of more numbers of veterinary experts at block level.</p> <p>9. Organisation of regular vaccination and diseases management on time.</p>
<b>Strategy 3 : Integrated Farming system</b>	<p>Development of following IFS model in each cluster for one acre.</p> <p><b>Cropping system (Area 4000 m<sup>2</sup>)</b> Rice-wheat Horsegram/Pigeon pea-Lentil Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b> Mango/Guava/Lemon (100 plants)</p> <p><b>Livestock</b> Cow (1)/ Buffalo (1) + Backyard poultry (100)</p> <p><b>Others</b> One vermicompost of 20 m<sup>2</sup> One Polytunnel of 10 m<sup>2</sup> for nursery raising Fodder production mainly hybrid napier (CO-4) in bunds</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<p>1. Installation of mini grading &amp; processing centres for Fruit &amp; vegetable at Chamba.</p> <p>2. Establishment of packing &amp; Storage facilities for Processed/raw fruits and vegetables.</p> <p>3. Development of Dehusker, Pearler, grader, miller and packaging unit for coarse grain cereals at each Nyaypanchayat level.</p> <p>4. Establishment of storage facilities like warehouses, cold storage and cold chamber at each block level.</p>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Promotion of practices developed by institutes like IISWC, Dehradun</li> <li>2. Plantation of Mulberry plants, Wild fruit plants (wild apricot, golden raspberry, Wild pear), Fodder trees (Bheemal, Utees, ) may be promoted at village level in each cluster.</li> <li>3. Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone A.</li> <li>4. Plantation of fodders like perennial grasses viz. Sita grass, Guinea, napier etc</li> <li>5. Contour making for arable purpose in waste land.</li> <li>6. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Judicious application specific fertilizers and micronutrients like Zinc, Boron &amp; Phosphorus etc. after soil testing in every block.</li> <li>2. Promotion of Custom Hiring Centre (CHC) for the use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.) at cluster or Nyaypanchayat level.</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>4. Establishment of sales and community centres at each cluster for easy and timely availability of seeds, seedlings, fertilizers.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Creation of SHGs and encouragement of micro-entrepreneurship and collective farming of all blocks.</li> <li>2. Promotion of value added product making.</li> <li>3. Promotion of Mushroom production, Honey Bee production, Sericulture woollen knitting and handicrafts for small and landless farmers in all blocks.</li> <li>4. Establishment of processing centres for fruits and vegetables and establishment of Vermi-composting units.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Implementation of Soil Health Card Scheme in each block.</li> <li>2. Establishment of soil testing labs at block level.</li> <li>3. Implementation of policies for control of wild animal menace in agricultural areas.</li> <li>4. Land consolidation in Tehri Garhwal district is essentially required.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all blocks.</li> <li>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of Mango, Guava and Citrus fruits etc.</li> </ol>



	<ol style="list-style-type: none"> <li>7. Addition of more crops in the PMFBY scheme.</li> <li>8. Policies may be made to attract rural youth in agriculture to check migration.</li> <li>9. Enhancement of subsidy in cases like polyhouse, fish tank, poultry etc. so that more number of farmers can take benefit.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini Mandis or Hatts and Mandis at each block level and connect it to Electronic National Agricultural Market (eNAM) for better pricing.</li> <li>2. Promotion of local Hatt at Tahsil level in all blocks. To check the interference of middle men in marketing of agricultural produce of the farmers, proper marketing network to be developed</li> <li>3. Creation of better transportation facilities with cool chain van at Block level.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Establishment of strong linkages with various stake holders to furnish information on crop produce and surplus.</li> <li>6. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>7. Installation of grading, processing and packaging facilities at block/village level.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. District level committees of State line departments with KVK experts may be formed for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Tehri Garhwal**  
**Zone: B (1000-1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349, HS-365, HS-507 and UP 2572); Barley (VL Jau 118 and VLB 94); paddy (Irrigated - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pant Dhan-19, Pusa Basmati 1509; Rainfed- Chatki Dhan- VL Dhan 208, VL Dhan 209; Jethi dhan –Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2).</li> <li>3. Promotion of high yielding varieties of finger millets (PRM 1, , VL Mandua 324, VL Mandua 352 7); Barnyard millet (PRJ-1, VL Madira 172 and VL Madira 207) and Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7 &amp; PRB 1) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>4. Promotion of high yielding variety of lentil (Pant Lentil 08, VL Masoor 125, VL Masoor 126, VL Masoor 129, VL Masoor 50 and VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (Pant Soaybean 1092, Pant Soaybean 1225, VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1, Pant Arhar-3 and Pant Arhar-291) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>5. Promotion of high yielding varieties of vegetable pea (Pant Sanbji Matar-3, Vivek Matar 10, Vivek Matar 11 &amp; Vivek Matar 12), Capsicum (VL Shimla Mirch 3, Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna), Potato (Kufri Giriraj, Kufri Chipsona 1, Kufri chipsona 3, Kufri Jyoti, Kufri Chandramukhi), French bean (Pusa Anupama, VL Bauni Bean 1 &amp; VL Bean 2), tomato (Heemsona, Arka Rakshak, Naveen 2000+ and VL Tamatar 4), Onion (Agri Found Light Red, NHRDF Red &amp; VL Piaz 3) and garlic (VL Garlic 1 &amp; VL Lahsun 2) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>6. Promotion of millets (Finger millet - , VL Mandua 324, and VL Mandua 352; Barnyard millet (VL Madira 172 and VL Madira 207) in Thualdhar, Jakhnidhar, Bhilangana and Pratapnagar blocks.</li> <li>7. Promotion of subtropical fruit crops Lemon, Pomegranate (Kandhari, Ganesh), peach (Floradasun, FL16-33), nectarine in Chamba, Thualdhar, Jakhnidhar, Bhilangana and Pratapnagar.</li> <li>8. Promotion of high density plantation of Pomegranate (variety Kandhari) and Nectarine (Snow queen).</li> <li>9. Promotion of Kiwi plantation (Allision, Havard, Monty, Brunno) in Chamba and Thatyur blocks.</li> </ol>
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	<p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Construction of water harvesting ponds/ tanks, check bunds to harvest the rain water.</li> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> <li>4. Creation of trenches for high percolation of water in most of the area of Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> <li>6. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of apple in Chamba and Thathur blocks especially Chamba-Mussouri fruit belt.</li> <li>2. Cultivation of Cinnamon (Tejpatta) plants at low hills in Narendranagar particularly Nala, Pali and Rampur cluster and Devprayag blocks.</li> <li>3. Promotion of ginger cultivation in Narendranagar, Jhakhnidhar and Devprayag blocks.</li> <li>4. Promotion of organic cultivation of turmeric in Jakhnidhar, Devprayag and Narendranagar blocks.</li> <li>5. Promotion of onion and garlic cultivation in Thauldhar, Narendranagar and Pratapnagar blocks.</li> <li>6. Promotion of production of vegetable pea and okra in Thauldhar and Pratapnagar blocks.</li> <li>7. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Chamba, Thathyur, Narendranagar, Pratapnagar and Devprayag blocks.</li> <li>8. Promotion of production of tomato cultivation in Narendranagar, Devprayag and Thathyur block with the use of proper crop rotation.</li> <li>9. Promotion of production of pigeon pea in Thauldhar, Chaka cluster of Jakhnidhar block and Devprayag block.</li> <li>10. Promotion of production of lentil in Chamni, Nakot clusters of Chamba block and Jakhnidhar, Anjanisain clusters of Jakhnidhar block.</li> <li>11. Promotion of organic production of basmati rice in Maletha and Pokhal clusters in Kirtinagar block; Tipali, Kot, Dadur clusters in Chamba block and Nala, Rampur, Jajal in Narendranagar block.</li> <li>12. Promotion of stone (Peanut, Apricot) and citrus fruits (Malta).</li> </ol>
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	<p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of protected cultivation of vegetables in Nagni, Jardhar clusters of Chamba block and in Thauldhar block.</li> <li>2. Promotion of live fencing of wild rose, Karonda plant in surrounding the field in Jakhnidhar block.</li> <li>3. Promotion of plantation of wild fruits like Kafal, Wild apricot (Chullu), wild pear in Van Panchayat area for wild animal in all blocks.</li> </ol> <p><b>Strengthening of farmers through skill training</b> Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Power weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, maize sheller, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp.</li> <li>3. Adoption of well decomposed FYM and other compost.</li> <li>4. Promotion of bio- fertilizers and recommended doses of FYM and vermi-compost to improve soil health.</li> <li>5. Promotion of soil nutrient and irrigation based full package of practices during cultivation of crop varieties.</li> </ol> <p><b>Other</b></p> <ol style="list-style-type: none"> <li>1. Promotion of biotic &amp; abiotic stress resistance varieties and alteration in cropping pattern.</li> <li>2. Promotion of Pusa Hydrogel technology in the cultivation of vegetables, pulses and cereals in all blocks.</li> </ol>
<b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey) and goats (Beetal, Sirohi &amp; Jamunapari) in Thauldhar, Thatyur, Pratapnagar and Chamba blocks.</li> <li>2. Establishment of Fodder Bank in Narendranagar, Thauldhar, Thatyur, Pratapnagar and Chamba block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Narendranagar, Thauldhar and Chamba block</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Chamba and Devprayag block.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of availability of feed material with low prices &amp; timely health check-ups of animals.</li> <li>Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmers.</li> <li>Appointment of more numbers of veterinary experts at block level.</li> <li>Organisation of regular vaccination and diseases management on time.</li> </ol>
<b>Strategy 3 : Integrated Farming system</b>	<p>Development of following IFS model in each cluster for one acre.</p> <p><b>Cropping system (Area 4000 m<sup>2</sup>)</b>  Rice-wheat  Horsegram/Pigeon pea-Lentil  Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b>  Stone fruits/Apple/Kiwi/pear (100 plants)</p> <p><b>Livestock</b>  Cow (1)/Goat/Sheep (10) + Backyard poultry (100)</p> <p><b>Others</b>  One vermicompost of 20 m<sup>2</sup>  One Polytunnel of 10 m<sup>2</sup> for nursery raising  Fodder production mainly hybrid napier (CO-4) in bunds</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>Installation of mini grading &amp; processing centres for Fruit &amp; vegetable at Chamba.</li> <li>Establishment of packing &amp; storage facilities for Processed/raw fruits and vegetables should be installed.</li> <li>Development of Dehusker, Pearler, grader, miller and packaging unit for coarse grain cereals at each Nyaypanchayat level.</li> <li>Establishment of storage facilities like warehouses, cold storage and cold chamber at each block level.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Promotion of practices developed by institutes like IISWC, Dehradun</li> <li>Plantation of Mulberry plants, Wild fruit plants (wild apricot, golden raspberry, Wild pear), Fodder trees (Grewia, Alnus, Quercus) may be promoted at village level in each cluster.</li> <li>Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone A.</li> <li>Plantation of fodders like perennial grasses viz. Sita grass, Guinea, napier etc</li> <li>Contour making for arable purpose in waste land.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>Judicious application specific fertilizers and micronutrients like Zink, Boron &amp; Phosphorus etc. after soil testing in every block.</li> <li>Promotion of Custom Hiring Centre (CHC) for the use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.) at cluster or Nyaypanchayat level.</li> <li>Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> </ol>

	<ol style="list-style-type: none"> <li>4. Establishment of sales and community centres at each cluster for easy and timely availability of seeds, seedlings, fertilizers.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> <li>7. Promotion of hand tools in agricultural and horticultural operations.</li> <li>8. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>9. Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Creation of SHGS and encouragement of micro-entrepreneurship and collective farming of all blocks.</li> <li>2. Promotion of value added product making.</li> <li>3. Promotion of Mushroom production, Honey Bee production, Sericulture woollen knitting and handicrafts for small and landless farmers in all blocks.</li> <li>4. Establishment of processing centres for fruits and vegetables and establishment of Vermi-composting units.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Implementation of Soil Health Card Scheme in each block.</li> <li>2. Establishment of soil testing labs at block level.</li> <li>3. Policies must be implemented for control of wild animal menace in agricultural areas.</li> <li>4. Land consolidation in Tehri Garhwal district is essentially required.</li> <li>5. Labelling of organic inputs and certification mechanism for various crops in all blocks.</li> <li>6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of Apple, Stone and Citrus fruits etc.</li> <li>7. Addition of more crops in the PMFBY scheme.</li> <li>8. Implementation of policies to attract rural youth in agriculture to check migration.</li> <li>9. Enhancement of subsidy in cases likes polyhouse, fish tank, poultry etc. so that more number of farmers can take benefit.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini Mandis or Hatts and Mandis at each block level and connect it to Electronic National Agricultural Market (eNAM) for better pricing.</li> <li>2. Promotion of local Hatt at Tahsil level in all blocks. To check the interference of middle men in marketing of agricultural produce of the farmers, proper marketing network to be developed</li> <li>3. Creation of better transportation facilities with cool chain van at Block level.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Establishment of strong linkages with various stake holders to furnish information on crop produce and surplus.</li> <li>6. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>7. Installation of grading, processing and packaging facilities at block/village level.</li> </ol>

<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>
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**District: Tehri Garhwal**  
**Zone: C (1500-2400 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties for increasing productivity</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat {VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 and UP 2572(from 1700 to 2400m amsl)}, Barley (VL Jau 118 and VLB 94 upto 1700 amsl) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2 (upto 2000m amsl).</li> <li>3. Promotion of high yielding varieties of finger millets (PRM 1, and VL Mandua 352 upto 2000m amsl); Barnyard millet (PRJ-1 and VL Madira 172 and VL Madira 207 upto 2000m amsl) and Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7 &amp; PRB 1) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>4. Promotion of high yielding varieties of vegetable pea (Pant Sanbji Matar-3, Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown), Capsicum (Shimla Mirch 3 upto 1800m amsl, Yellow Wonder, Pusha Dipti, Bharat, Indira, Aasha, Orobelle, Natasha, Swarna), Potato (Kufri Gurriraj, Kufri Chipsona 1, Kufri chipsona 3, Kufri Jyoti, Kufri Chandramukhi), French bean (Pusa Anupama, VL Bean 2), tomato (Heemsona, Arka Rakshak, Naveen 2000+ and VL Tamatar 4 upto 1800m amsl), Onion (Agri Found Light Red &amp; VL Piaz 3) and garlic (VL Garlic 1) in Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>5. Promotion of Kiwi plantation (Allision, Havard, Monty, Brunno) in Chamba and Thatyur blocks.</li> <li>6. Promotion of high yielding varieties of apple (Super Cheif, Red Cheif, Scarlet spur, Oregon Spur and Jeromine) in Chamba and Thatyur blocks; walnut cultivation (Gobind, CITH-1,2,3) in Chamba, Thatyur, Pratapnagar and Thauldhar blocks; Peach (Floradasun, FL16-33, July Elberta, Nectarines) and Plum (Santa rosa, Mariposa) in Chamba, Thatyur and Paratapnagar blocks.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b></p> <ol style="list-style-type: none"> <li>1. Construction of water harvesting ponds/ tanks, check bunds to harvest the rain water.</li> <li>2. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages of all blocks of the zone.</li> <li>3. Creation of rain water harvesting structure in private as well as government buildings in all the villages of the zone.</li> </ol>
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	<ol style="list-style-type: none"> <li>4. Creation of trenches for high percolation of water in most of the area of Chamba, Narendranagar, Jakhnidhar, Bhilangana, Thauldhar, Kirtinagar, Thathyur, Devprayag and Pratapnagar blocks.</li> <li>5. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> <li>6. Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants in low or valley areas of all the blocks of this zone.</li> </ol> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of apple in Chamba and Thathur blocks especially Chamba-Mussouri fruit belt.</li> <li>2. Cultivation of Cinnamon (Tejpatta) plants at low hills in Narendranagar particularly Nala, Pali and Rampur cluster and Devprayag blocks.</li> <li>3. Promotion of ginger cultivation in Narendranagar, Jhakhnidhar and Devprayag blocks.</li> <li>4. Promotion of organic cultivation of turmeric in Jakhnidhar, Devprayag and Narendranagar blocks.</li> <li>5. Promotion of onion and garlic cultivation in Thauldhar, Narendranagar and Pratapnagar blocks.</li> <li>6. Promotion of production of vegetable pea and okra in Thauldhar and Pratapnagar blocks.</li> <li>7. Promotion of off season vegetables (tomato, capsicum, cole crops etc.,) cultivation in Chamba, Thathyur, Narendranagar, Pratapnagar and Devprayag blocks.</li> <li>8. Promotion of production of tomato cultivation in Narendranagar, Devprayag and Thathyur block with the use of proper crop rotation.</li> <li>9. Promotion of production of pigeon pea in Thauldhar, Chaka cluster of Jakhnidhar block and Devprayag block.</li> <li>10. Promotion of production of lentil in Chamni, Nakot clusters of Chamba block and Jakhnidhar, Anjanisain clusters of Jakhnidhar block.</li> <li>11. Promotion of organic production of basmati rice in Maletha and Pokhal clusters in Kirtinagar block; Tipali, Kot, Dadur clusters in Chamba block and Nala, Rampur, Jajal in Narendranagar block.</li> <li>12. Promotion of subtropical fruit crops stone and citrus fruits.</li> </ol> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of protected cultivation of vegetables in Nagni, Jardhar clusters of Chamba block and in Thauldhar block.</li> <li>2. Promotion of live fencing of wild rose, Karonda plant in surrounding the field in Jakhnidhar block.</li> <li>3. Promotion of plantation of wild fruits like Kafal, Wild apricot (Chullu), wild pear in Van Panchayat area for wild animal in all blocks.</li> </ol> <p><b>Strengthening of farmers through skill training</b></p> <p>Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p>
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	<p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Popularization of multi crop thresher and Power Tiller/ Power weeder at Nyay Panchayat level in all the blocks.</li> <li>2. Promotion of improved sickle, Vivek Millet thresher cum pearler and Vivek small tool kit for reduction in drudgery of hill farmers.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania and Sunhemp.</li> <li>3. Adoption of well decomposed FYM and other compost.</li> <li>4. Promotion of bio- fertilizers and recommended doses of FYM and vermi-compost to improve soil health.</li> <li>5. Promotion of soil nutrient and irrigation based full package of practices during cultivation of crop varieties.</li> </ol> <p><b>Other</b></p> <ol style="list-style-type: none"> <li>1. Promotion of biotic &amp; abiotic stress resistance varieties and alteration in cropping pattern.</li> <li>2. Promotion of Pusa Hydrogel technology in the cultivation of vegetables, pulses and cereals in all blocks.</li> </ol>
<p><b>Strategy 2 : Livestock: Goatry, Poultry, Fisheries</b></p>	<ol style="list-style-type: none"> <li>1. Promotion of high milk breeds of cows (Shaiwal, Red Sindhi &amp; Jersey), buffaloes (Murrah) and goats (Beetal, Sirohi &amp; Jamunapari) in Narendranagar, Thauldhar and Chamba block.</li> <li>2. Establishment of Fodder Bank in Narendranagar, Thauldhar, Devprayag, Pratapnagar and Chamba block to meet fodder requirement of area particularly during lean period.</li> <li>3. Establishment of milk chilling plant at Narendranagar, Thauldhar and Chamba block</li> <li>4. Promotion of Urea, Molasses, and Mineral mixer blocks at Nyaypanchayat level.</li> <li>5. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at Chamba and Devprayag block.</li> <li>6. Promotion of availability of feed material with low prices &amp; Timely health check-ups of animals.</li> <li>7. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmers.</li> <li>8. Appointment of more numbers of veterinary experts at block level.</li> <li>9. Organisation of regular vaccination and diseases management on time.</li> </ol>

<b>Strategy 3 : Integrated Farming system</b>	<p>Development of Following IFS model in each cluster for one acre.</p> <p><b>Cropping system (Area 4000 m<sup>2</sup>)</b>  Rice-wheat  Horsegram/Pigeon pea-Lentil  Tomato/capsicum-Vegetable pea</p> <p><b>Horticulture</b>  Mango/Guava/Lemon (100 plants)</p> <p><b>Livestock</b>  Cow (1)/ Buffalo (1) + Backyard poultry (100)</p> <p><b>Others</b>  One vermicompost of 20 m<sup>2</sup>  One Polytunnel of 10 m<sup>2</sup> for nursery raising  Fodder production mainly hybrid napier (CO-4) in bunds</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Installation of mini grading &amp; processing centres for Fruit &amp; vegetable at Chamba.</li> <li>2. Establishment of packing &amp; storage facilities for Processed/raw fruits and vegetables should be installed.</li> <li>3. Development of Dehusker, Pearler, grader, miller and packaging unit for coarse grain cereals at each Nyaypanchayat level.</li> <li>4. Establishment of storage facilities like warehouses, cold storage and cold chamber at each block level.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Promotion of practices developed by institutes like IISWC, Dehradun</li> <li>2. Plantation of Mulberry plants, Wild fruit plants (wild apricot, golden raspberry, Wild pear), Fodder trees (<i>Grewia</i>, <i>Alnus</i>, <i>Quercus</i>) may be promoted at village level in each cluster.</li> <li>3. Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of the zone A.</li> <li>4. Plantation of fodders like perennial grasses viz. Sita grass, Guinea, napier etc</li> <li>5. Contour making for arable purpose in waste land.</li> <li>6. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Judicious application specific fertilizers and micronutrients like Zink, Boron &amp; Phosphorus etc. after soil testing in every block.</li> <li>2. Promotion of Custom Hiring Centre (CHC) for the use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.) at cluster or Nyaypanchayat level.</li> <li>3. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.</li> <li>4. Establishment of sales and community centres at each cluster for easy and timely availability of seeds, seedlings, fertilizers.</li> <li>5. Promotion of recommended seed rate, spacing and depth.</li> <li>6. Promotion of need based application of pesticides and other agricultural inputs.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of hand tools in agricultural and horticultural operations.</li> <li>Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>Promotion of pressurized irrigation techniques in horticultural crops.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>Creation of SHGS and encouragement of micro-entrepreneurship and collective farming of all blocks.</li> <li>Promotion of value added product making.</li> <li>Promotion of Mushroom production, Honey Bee production, Sericulture woollen knitting and handicrafts for small and landless farmers in all blocks.</li> <li>Establishment of processing centres for fruits and vegetables and establishment of Vermi-composting units.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>Implementation of Soil Health Card Scheme in each block.</li> <li>Establishment of soil testing labs at block level.</li> <li>Policies must be implemented for control of wild animal menace in agricultural areas.</li> <li>Land consolidation in Tehri Garhwal district is essentially required.</li> <li>Labelling of organic inputs and certification mechanism for various crops in all blocks.</li> <li>Promotion of eco-village tourism through rural youth.</li> <li>Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material of Apple, Stone and Citrus fruits etc.</li> <li>Addition of more crops in the PMFBY scheme.</li> <li>Policies may be made to attract rural youth in agriculture to check migration.</li> <li>Enhancement of subsidy in cases like polyhouse, fish tank, poultry etc. so that more number of farmers can take benefit.</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>Establishment of mini Mandis or Hatts and Mandis at each block level and connect it to Electronic National Agricultural Market (eNAM) for better pricing.</li> <li>Promotion of local Hatt at Tahsil level in all blocks. To check the interference of middle men in marketing of agricultural produce of the farmers, proper marketing network to be developed</li> <li>Creation of better transportation facilities with cool chain van at Block level.</li> <li>Creation of direct linkages with food processing industries for better prices.</li> <li>Establishment of strong linkages with various stake holders to furnish information on crop produce and surplus.</li> <li>Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>Installation of grading, processing and packaging facilities at block/village level.</li> </ol>

<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>
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## Technology Intervention Success Stories

### Example 1: Up scaling of Farmers through Food processing [Krishi Vigyan Kendra (Tehri Garhwal)]

<b>Name of the Village</b>	Chopadiyal Gaon
<b>Name of the Organization</b>	Himalayan Natural Food Products
<b>Name of the Entrepreneur/Farmer</b>	Sh. Ramkrishna Dabral
<b>Name of the Resource Person</b>	Er. Kirti Kumari, KVK Tehri Garhwal

Overall impact after five years (2013-2017)					
	2013	2014	2015	2016	2017
No. of Persons involved	2	4	6	6	7
Investment (Rs.)	400000	470000	550000	600000	700000
Gross income (Rs.)	700000	850000	1050000	1200000	1450000
Net Income (Rs.)	300000	380000	500000	600000	750000
B:C Ratio	1.75	1.80	1.90	2.0	2.07

**Products:** Malta Squash  
Rhodo Syrup  
Apricot Appetizer  
Pickles (Mango, Mix Veg, Hill Aonla, Guriyal, Timla, Green Chilli, Lehsun, Adrak)  
Apple Jam  
Apple Chutney  
Mix Fruit Chutney

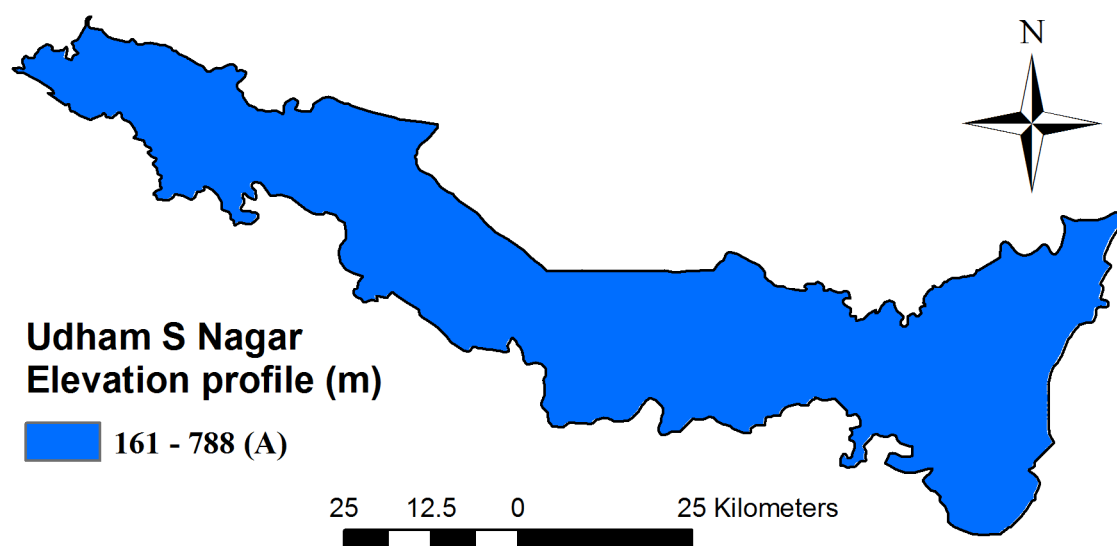
#### Food Processing



#### Products



**DISTRICT: UDHAM SINGH NAGAR**



**Figure 18: District Udham Singh Nagar elevation profile**





**District: U.S. Nagar**  
**Zone: A (up to 1000 m)**

<b>Strategy 1: Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties for cereals, vegetables, pulses and fruits in all blocks of the zone</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 953, DBW-16, DBW-17, PBW-373, PBW-502, PBW-527, PBW-550, HD-2687, HD-2967, UP-2526, UP-2554, UP-2565, UP-2784, UP-2785, WH-542, UP-2684, UP 2628, UP 2748, UP 2584, RAJ-3765, RAJ-3077).</li> <li>2. Promotion of high yielding varieties of Paddy (Pant Sankar Dhan-3, Pant Dhan-12, Pant Dhan-23, Pant Dhan-26, Narendra Sankar Dhan -2, Pusa Sankar Dhan -10, Pant Sugandh Dhan-25, Pant Sugandh Dhan-26, Pant Sugandh Dhan-27, Pusa Sugandh -5, VL Dhan – 85, VL Dhan-65, PR-113, Pant Basmati-1, Pant Basmati-2, Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355 plus).</li> <li>3. Promotion of improved varieties of speciality corn (CMVL Sweet Corn 1 and CMVL Baby Corn 2)</li> <li>4. Promotion of high yielding varieties of Sugarcane             <ol style="list-style-type: none"> <li>a. COP99214, CO-0238 COP 5224, COP3220 and CO5011 COLK97184</li> <li>b. Early Varieties : Co Pant 84211, Co Pant 94211, Co Pant 03220, CoS 88230, CoJ 85, CoS 96268, Co 238</li> <li>c. Mid-late varieties : Co Pant 84212, Co Pant 90223, Co Pant 96219, Co Pant 97222, Co Pant 99214, Co Pant 05224</li> </ol> </li> <li>5. Promotion of high yielding varieties of Urd ( PU-31, PU-35, PU-40, Shekhar-2) and Moong (Pant Moong-4, Pant Moong-5, Pant Moong-7, Pant Moong-8, PDM-11, Samrat, Narendra Moong-1).</li> <li>6. Promotion of high yielding varieties of Arhar (Pant Arhar-3, Pant Arhar-291, UPAS-120, Pusa-992, Bahar, Amar, Narendra Arhar-1).</li> <li>7. Promotion of high yielding varieties of Chickpea (Pant Kabli Chana-1, GNG-1969, Aman, GNG-1958, Aadhar, Pusa-547, Pusa-256, Pusa-1053, JGK-1).</li> <li>8. Promotion of high yielding varieties of Lentil (PL-4, PL-7, PL-8, DPL-15, DPL-62).</li> <li>9. Promotion of high yielding varieties of Toria/Sarson (PT-30, PT-303, 507, Uttara, PPS-1, Pant Sweta, Type-9, Bhawani, VL Toria-3, Urvashi, Rohini, Vardan, Vasanti, PR-20).</li> <li>10. Promotion of high yielding varieties of Litchi (Rose scented, calcuttia, gandaki Sampada, Gandaki lalima, Gandaki yogita (suitable for high density plantation) .</li> <li>11. Promotion of high yielding varieties of Mango (Dushari, Langra, Chausa, Amrapali, Mallika, Bombay green, Pusa surya, Pusa Arunima, Arunika, Pusa shreshta, Pusa Lalima).</li> <li>12. Promotion of high yielding varieties of Tomato (Avinash-2), Himsona, Pusa Hybrid-4, Pusa Hybrid-2, Rakshita, Manisha, Vaishali, DRL-304, NS-852).</li> <li>13. Promotion of high yielding varieties of Okra (Arka, Anamika, Parbhani Kranti), brinjal (Hybrid Pant brinjal-, Pant Rituraj, Pant Samrat) and chilli (Agni, Ragini Kashi Anmol, Pant C-1).</li> <li>14. Promotion of high yielding varieties of pea (Vivek Matar 10, Vivek Matar 12 &amp; VL Ageti Matar 7) and garlic (VL Lahsun 2).</li> </ol>
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	<p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Strengthening of traditional water storage structure</b> Promotion of water conservation techniques like mulch, sprinkler and drip in juvenile plants of all the blocks of this zone.</p> <p><b>Adoption of cluster approach for holistic development</b></p> <ol style="list-style-type: none"> <li>1. Rejuvenation of existing senile orchards of mango and litchi in Kashipur and Rudrapur block.</li> <li>2. Establishment of high density orchards of mango, guava, litchi, banana in Kashipur and Rudrapur block.</li> <li>3. Promotion of organic cultivation of turmeric in popular plantation in all blocks</li> <li>4. Promotion of onion and garlic cultivation as intercrop crop in autumn cane</li> <li>5. Promotion of off season vegetables cultivation in protected cultivation</li> <li>6. Adoption of high yielding varieties and hybrids for vegetables production like okra, chilli, brinjal and cucurbits in nearby areas of Kashipur, Rudrapur, Dineshpur, Kichha, Sitarganj.</li> <li>7. Promotion of production of uniform maturing vegetable pea and okra in all blocks.</li> <li>8. Promotion of production of black gram in late kharif in tribal cluster of Bajpur, Sitarganj, Khatima, and Gadarpur block.</li> <li>9. Promotion of production of lentil and blackgram in in tribal cluster of Bajpur, Sitarganj, Khatima, and Gadarpur block.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Surface irrigation in laser levelled land</li> <li>2. Micro- irrigation system in Sugarcane, Mango, Litchi, Guava and in Vegetables</li> <li>3. Drip Irrigation in Green House Cultivation for Cut Flowers and Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Promotion of vermi compost unit and green manuring in all the villages of this zone.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in all blocks.</li> <li>3. Management of soil health through balanced use of chemical fertilizers, liquid fertilizers and judicious use of pesticides.</li> </ol> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Cluster approach for holistic development.</li> <li>2. Adoption of Soil health improvement practices.</li> <li>3. Selection of right crop &amp; variety.</li> <li>4. Adoption of only well decomposed FYM/ value added compost.</li> <li>5. Seed treatment through bio agent/ chemical means strictly in the cluster.</li> <li>6. Judicious use of fertiliser.</li> <li>7. Improvement of moisture conservation practices.</li> <li>8. Drip irrigation</li> <li>9. Protected cultivation in vegetable crops</li> <li>10. Poly tunnel for nursery raising of vegetable crops</li> <li>11. Promotion to focus on timely weed management</li> </ol>
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	<p>12. Promotion and Adoption of IPM techniques</p> <p>13. Adoption of Farm mechanisation.</p> <p>14. Promotion of common resources centre for availability of implements on custom hire basis viz. Paddy dryer, combine, laser leveller etc</p> <p>15. Canopy management of Guava, Mango and Litchi in all blocks</p> <p>16. Rejuvenation of old and senile orchards in all blocks</p>
<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Pure genetic breed of dairy (Sahiwal, Gir and Red Sindhi) goat(Pantja, Jamuna Par) and poultry ( Layers for big farmers, Broiler for medium farmer and croiler for small and marginal farmers under backyard system) in all blocks.</li> <li>2. Proper use of suitable mineral mixture, protienaceous green fodder, timely deworming and vaccination of livestock and poultry birds in all blocks.</li> <li>3. Proper housing facilities and proper maintaining the records.</li> <li>4. Supply of quality fish seed , hybrid species &amp; species specific affordable formulated feed</li> <li>5. Promotion of high milk breeds of cows, buffaloes and goats in all the blocks.</li> <li>6. Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>7. Establishment of hatcheries for need of broilor or croilor at block level</li> <li>8. Introduction and promotion of cross Heiffer for increasing income of marginal farmer.</li> </ol> <p><b>Fisheries</b></p> <ol style="list-style-type: none"> <li>1. Mono culture with fast growing cat fish spp.</li> <li>2. Intensification of composite fish culture along with newly developed high yielding hybrids</li> <li>3. Integration of fish culture with duck &amp; poultry etc.</li> </ol>
<b>Strategy 3 : Integrating Farming system</b>	<p><b>Promotion of different Integrated Farming System modules in all blocks such as :</b></p> <ol style="list-style-type: none"> <li>1. Protected cultivation+ Composting+ Goatry/backyard poultry</li> <li>2. Fodder production+ Mini dairy + Composting + Protected cultivation</li> <li>3. Seed production + Planting material supply + Mushroom at block level</li> <li>4. Cereals + mushroom + bee keeping + vegetables</li> <li>5. Fisheries + livestock + vegetables+ fruits</li> <li>6. Cereals + Agro Forestry + Fisheries+ Horticultural crops</li> <li>7. Cereals + vegetables + livestock + fruits</li> <li>8. Cereals + pulses + livestock + fruits</li> </ol>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Grading, packing, storage warehouse and processing facilities need to be established to reduce post harvest losses and value addition at nayayapanchayat/block level.</li> <li>2. Establishment of mini fruit grading plant at all blocks.</li> <li>3. Establishment of small Processing Units at Kashipur, Gadarpur and Rudrapur block for Mango, Litchi and Guava fruit.</li> </ol>

	<ol style="list-style-type: none"> <li>Promotion of cluster approach for efficient procurement and disposal of surplus vegetables pea in Gadarpur, Rudrapur and Sitarganj block.</li> <li>Promotion of straw baler for easy storage of crop residues and to tackle the problem of burning crop residue and trash.</li> <li>Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>Promotion of common resources on custom hire basis viz. Mini Thresher and other equipments at Nyay Panchayat level in all blocks.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>Plantation of fruit crops ,Control of soil erosion at river catchment areas of kosi, plantation of forest and fodder trees, plantation of perennial fodder,</li> <li>Use of drip irrigation for orchards.</li> <li>Water treatment plants to be established near Rudrapur, Sitarganj Sidkul to check the discharge of pollutant into the soil &amp; natural water resources.</li> <li>Some of the major towns/cities are situated close to perennial rivers like Sharada, Gola, Kosi and Phikka. A battery of shallow tube wells may be constructed along these rives to augment domestic water supply and irrigation. This will help to reduce stress on groundwater.</li> <li>Plantation of bamboo on river banks and other water erosion prone areas.</li> <li>Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers in all blocks.</li> <li>Promotion balanced fertilizers application in crops.</li> <li>Promotion of recommended seed rate, spacing and depth.</li> <li>Promotion of need based application of pesticides and other agricultural inputs.</li> <li>Promotion of hand tools in agricultural and horticultural operations.</li> <li>Power weeders, Paddy threshers, Wheat threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers</li> <li>Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.</li> <li>Promotion of pressurized irrigation techniques in horticultural crops.</li> <li>Adoption of mechanization techniques in land preparation, inter cultural operations</li> <li>Paddy: Direct seeding may be promoted to reduce cost of cultivation</li> <li>Summer ploughing</li> <li>Deep tillage.</li> <li>Promotion of line sowing in tribal belts of Bazpur &amp; Sitarganj.</li> <li>Promotion of recommended seed rate, spacing and depth.</li> </ol>

	<p>15. Promotion of need based application of pesticides and other agricultural inputs.</p> <p>16. Promotion of hand tools in agricultural and horticultural operations.</p> <p>17. Promotion of use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Wheel hand hoe, Manual/ power operated Wheat/Paddy reapers.</p>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of subsidiary occupations like poultry, goatry, fish farming and mushroom production and poultry, fish farming in all blocks.</li> <li>2. Promotion of apiculture for small and landless farmers in Kashipur and Jaspur.</li> <li>3. Promotion of skill development in women and youth in all the blocks.</li> <li>4. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Pickle making of different fruits, Jam making, dal and dalia making, papad and murrabba making, masala making &amp; packing, etc. may be provided for better performance in all blocks.</li> <li>5. Creation and strengthening of new SHGs in other villages of all the blocks.</li> <li>6. Promotion of SHGs for value addition and primary processing and linking them to market (Buy back system).</li> <li>7. Increasing awareness towards education which helps in getting employment to the rural youth, farm women.</li> <li>8. Promotion of subsidiary occupations like poultry, fish farming, mushroom production and sericulture in Gadarpur and Rudrapur block.</li> <li>9. Promotion of skill development among women and youth through training centres to be established with renowned institutes like GBPUAT Pantnagar.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Increasing institutional support by providing production based incentive to small and marginal who are producing more than district average on production basis in all the blocks.</li> <li>2. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>3. Recharge of all reservoirs (Sharda, Nanak Sagar, Gola, Dhawra, Haripura, Kalagaarh, Tumariya) in the district through run off management in their catchment area of hilly regions in Nainital, Champawat and Pauri district.</li> <li>4. Ban on deepening of natural water ways through mining to maintain the ground water recharge.</li> <li>5. Promotion of farmer producers organizations.</li> <li>6. Implementation of Soil Health Card Scheme in each block.</li> <li>7. Proper infrastructure need to be developed for hi-tech grading especially for fruits, vegetables and spices in all the blocks</li> </ol>

	<p>8. In the district, paddy is grown intensively, leading to over exploitation of groundwater. The local farmers should be encouraged to adopt cultivating of other less water consuming crops along with paddy.</p> <p>9. High density plantation of mango</p> <p><b>Others</b></p> <ol style="list-style-type: none"> <li>1. Inclusion of pulse crop in cropping system</li> <li>2. Balanced fertilization and deep tillage</li> <li>3. Green manuring (Sasbenia/sanhemp)</li> <li>4. Promoted use of bio fertilizers</li> <li>5. Ban on summer rice</li> <li>6. Complete check on trash burning</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro-ecological region</b>	<ol style="list-style-type: none"> <li>1. Creation of better transportation facilities with cool chain van at Block level.</li> <li>2. Creation of direct linkages with food processing industries for better prices.</li> <li>3. Establishment of market chain of medicinal crop like mentha, alovera, artimicia, satavar, ashwagandha etc in all locks of this zone.</li> <li>4. Establishment of strong linkages with various stake holders to furnish information on crop produce and surplus.</li> <li>5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.</li> <li>6. Installation of mini grading machines at village level.</li> <li>7. Establishment of cold room of all blocks.</li> <li>8. To check the interference of middle men in marketing of agricultural produce of the farmers, proper marketing network to be developed.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation at district level.</li> <li>2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>3. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>4. Promotion on use of FM radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

## Technology Intervention Success Stories

### Example 1: Success Story of Sugarcane Production Technology [Krishi Vigyan Kendra (U.S. Nagar)]

<b>Name of farmer</b>	:	Chaudhary Satendra Singh
<b>Village</b>	:	Shahdora Farm (Kichha)
<b>Mob. No.</b>	:	09690458006
<b>Crop Variety</b>	:	Co0238, Co0239, CoS88230
<b>Cultivation Practice</b>	:	Trench Method
<b>Intercropping</b>	:	Chick pea
<b>Cane Length</b>	:	18 feet
<b>Cane weight</b>	:	3.5 kg
<b>Yield</b>	:	2225 q/ha
<b>Award</b>	:	Krishi Pandit Uttarakhand Government 2016

Component	Farmer Practice	Trench method
Yield (q/ha)	1000	2225
Cost (Rs/ha)	150000	215000
Gross return (Rs/ha @ 317/q)	317000	705325
Net Return	167000	490325
Net Return from inter crop	20000	30000
Total Profit (Rs/ha)	187000	520325
Change in income (Trench: Farmer practice)		2.78



अच्छी फसल—खुशहाल किसान

## Example 2: Integrated Fish Culture - A Boost to Farmers' Earning [Krishi Vigyan Kendra (U.S. Nagar)]

**Name of Farmer:** Shri Udaiveer Singh, Village Brahm Nagar,  
Kashipur, U.S. Nagar

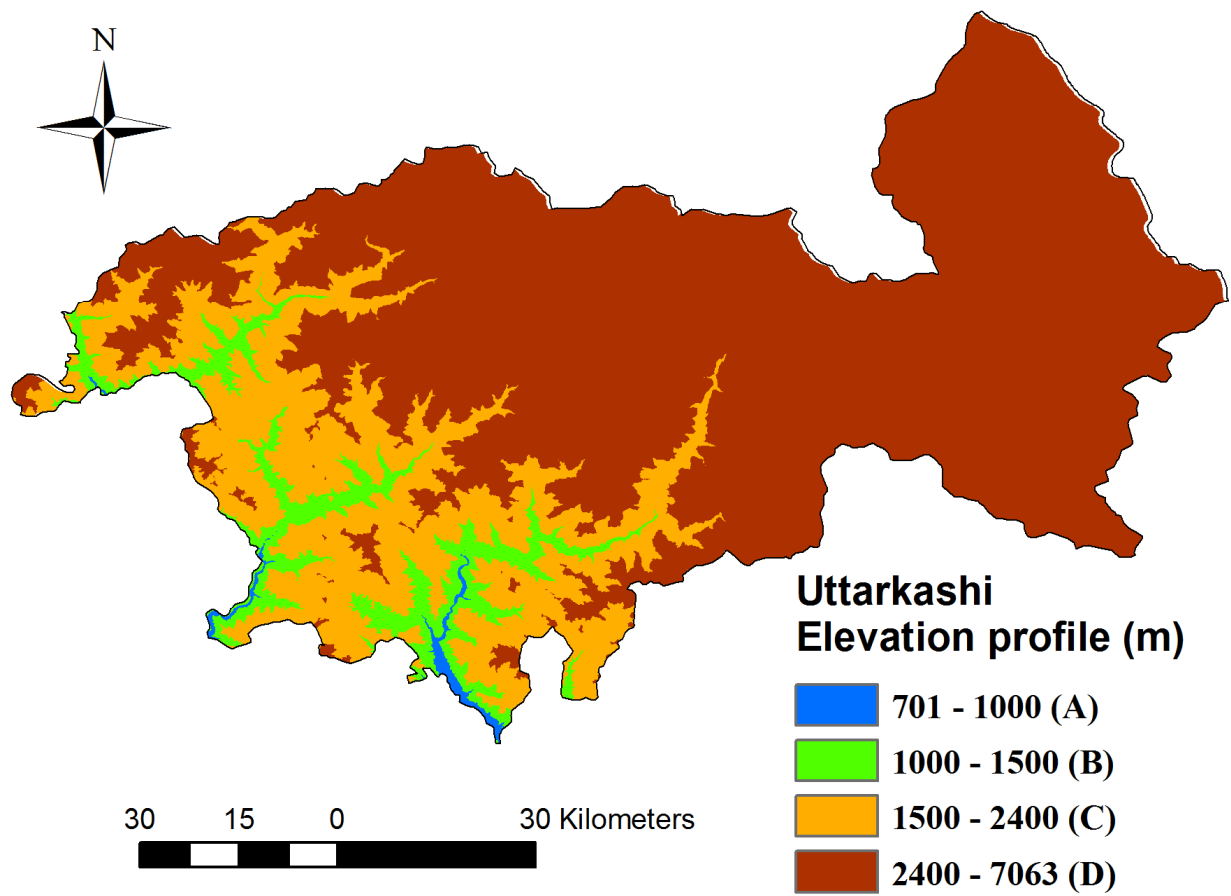


	Economics during 2012-13				Impact after integration (2016-17)			
Farming component	Area (ha) / No.	Cost of cultivation (Rs.)	Net income (Rs.)	BCR	Area (ha) / No.	Cost of cultivation (Rs.)	Net income (Rs.)	BCR
Sugarcane	0.5	38000	47500	2.25	0.5	42000	52500	2.25
Crop	0.8/2	26800	52700	2.96	0.4/2	14300	24700	2.72
Livestock	6	138000	107280	1.77	6	168000	217440	2.29
Fish production					0.4/2	31000	125800	5.0
Backyard poultry					50	1500	8000	6.3
Sericulture					1	6500	9200	2.4
<b>TOTAL</b>		<b>202800</b>	<b>207480</b>	<b>2.0</b>		<b>263300</b>	<b>437640</b>	<b>2.8</b>





**DISTRICT: UTTARKASHI**



**Figure 19: District Uttarkashi elevation profile**



**District: Uttarkashi**  
**Zone: A (up to 1000 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Promotion of efficient water management</b></p> <ol style="list-style-type: none"> <li>1. Efficient management of rain water harvesting with drip-fertigation system in Gamri, Bisht clusters.</li> <li>2. Creation of rain water harvesting structure in private and government buildings in all the villages of the zone.</li> <li>3. Promotion of water conservation techniques like mulch, micro irrigation system in juvenile plants in Kumrada, Baldogi and Barethi area.</li> </ol> <p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953 and UP 2572), paddy (Spring rice - VL Dhan 208 and VL Dhan 209; Jethi rice - Vivek Dhan 154 and VL Dhan 157; Irrigated Rice - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pusa Basmati 1509 &amp; PRH 10) Pant Dhan-19, HKR-127, PB-1509, PA 6444, VNR 2355; Barley (VL Jau 118 and VLB 94); Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Bisht and Barsali cluster.</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2).</li> <li>3. Promotion of high yielding variety of lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514), horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19), soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65) and Pigeon pea (VL Arhar 1) in Bisht, Dichali- cluster.</li> <li>4. Promotion of subtropical fruit crops Mango, Guava and Litchi in Bisht, Dichali- Gamri cluster.</li> <li>5. Promotion of high density plantation of Mango (variety Amarpali) and Guava (Pant Prabhat) in Kumrada, Mani, and Chinyalisaur area.</li> <li>6. Promotion of high yielding varieties of vegetable pea (Vivek Matar 10, Vivek Matar 12 &amp; Vivek Matar 11), French bean (VL Bauni Bean 1 &amp; VL Bean 2), tomato (VL Tamatar 4), Capsicum (VL Shimla Mirch 3), Onion (VL Piaz 3) and garlic (VL Lehsun 1) in Gamri, Bisht and Dichali cluster.</li> <li>7. Cultivation of hybrid Napier (CO-1) in bunds in each cluster.</li> <li>8. Promotion of efficient and timely use of IPM and IDM practices at village level of each cluster.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of protected cultivation of vegetables in Gamri cluster.</li> <li>2. Promotion of live fencing of wild rose, Karonda plant in surrounding the field in Bisht cluster.</li> <li>3. Promotion of ginger, garlic, turmeric and jackfruit in Gamri and Barethi area.</li> <li>4. Promotion of plantation of wild fruits like Kafal, Wild apricot (Chullu), wild pear in Van Panchayat area for wild animal.</li> </ol>
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	<p><b>Strengthening of farmers through skill training</b> Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Vivek Mandua/Madira Thresher and Vivek paddy thresher for drudgery reduction at each cluster.</li> <li>2. Promotion of serrated sickle, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmer.</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in Dichali and Bisht cluster.</li> <li>3. Adoption of well decomposed FYM and other compost.</li> </ol>
<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion pure genetic breeds of cow (Jersy, Sindhi and Sahiwal) and buffalo (Murrah) in Bisht &amp; Dichli Cluster.</li> <li>2. Adoption of suitable mineral mixture, green fodder in all cluster.</li> <li>3. Establishment of Fodder Bank in Barethi and Dunda to meet fodder requirement of area.</li> <li>4. Organisation of timely de-worming, de-horning and vaccination programmes of livestock.</li> <li>5. Establishment of milk collection centre &amp; chilling plant at Chinyalisaur &amp; Srikot.</li> <li>6. Promotion of Urea, Molasses, Multi-nutrient Blocks at Nyaypanchayt level.</li> <li>7. Introduction and promotion of cross Heiffer for increasing income of marginal farmer.</li> <li>8. Strengthening of traditional water bodies/rivulets with carps at Dharasu, Mani area.</li> </ol>
<b>Strategy 3 : Integrating Farming system</b>	<p>Following IFS model may be develop in each cluster for one acre.</p> <p><b>Cropping system (Area 4000 m<sup>2</sup>)</b> Rice-wheat Maize- Wheat Horsegram/Pigeon pea-Lentil Tomato/capsicum-Vegetable pea Okra-Potato</p> <p><b>Horticulture</b> Mango/Guava/Lemon (100 plants)</p> <p><b>Livestock</b> Cow (1)/ Buffalo (1) +Backyard poultry (100)</p> <p><b>Others</b> One vermicompost of 20 m<sup>2</sup> One Polytunnel of 10 m<sup>2</sup> for nursery raising Fodder production mainly hybrid napier in bunds.</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Installation of mini grading &amp; processing centres for Fruit &amp; vegetable should be installed at Chinyalisaur and Dunda.</li> <li>2. Promotion of packing &amp; storage facilities for Processed/raw fruits and vegetables should be installed at Chinyalisaur and Dunda.</li> </ol>

<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Plantation of Mulberry plants, Wild fruit plants (wild apricot, golden raspberry, Wild pear), Fodder trees (<i>Grewia</i>, <i>Alnus</i>, <i>Quercus</i>) may be promoted at village level in each cluster.</li> <li>2. Construction of trenches, LDPE tanks and check dams/ trenches at each clusters of zone A.</li> <li>3. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers may provided through custom hiring centre at each Nyay Panchayat.</li> <li>2. Adoption of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided at cluster level.</li> <li>3. Promotion of timely availability of seeds, fertilizers, insecticides, pesticides etc. at Nyaay Panchayat level.</li> <li>4. Implementation of Chakbandi of scattered land.</li> <li>5. Minimization of Rain fed condition.</li> <li>6. Organisation of trainings to increase scientific Knowledge.</li> <li>7. Promotion of practice of IPM and INM by farmers.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance at cluster level.</li> <li>2. Promotion to micro entrepreneur employment through Mushroom production, Honey Bee production, Sericulture, Processing of fruits, vegetables &amp; spices, Vermin composting units, Woollen knitting &amp; Handicraft, Bio fertilizer units, Agri-clinic at each cluster.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<p>Following activities may be performed in each cluster.</p> <ol style="list-style-type: none"> <li>1. Expend application of scientific methods and mechanized cultivation.</li> <li>2. Promotion of secondary agriculture.</li> <li>3. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>4. Promotion for checking migration by attracting rural youth in agriculture.</li> <li>5. Promotion of eco-village tourism through rural youth.</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Implementation of Soil Health Card Scheme in intensive mode in each cluster.</li> <li>8. Adoption of certain village/ clusters and initiate development process therein by Non-Resident-Uttarakhandies (NRUs).</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies at Chinyalisaur.</li> <li>2. Strengthening of Cooperative societies may become a tool of marketing channels.</li> <li>3. Promotion of better transportation facilities with cold chain van may be provided at Block level.</li> <li>4. Creation of direct linkages with food processing industries may be established for better prices.</li> <li>5. Installation of Fruit &amp; vegetable processing units should be in clusters.</li> <li>6. Incorporation of post harvest facilities including grading, packaging for Processed /raw fruits and vegetables in each clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of District level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Uttarkashi**  
**Zone: B (1000-1500 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Promotion of efficient water management</b></p> <ol style="list-style-type: none"> <li>1. Promotion of rain water harvesting and drip-fertigation system in Ramaserai, Dhanari and Barsali clusters.</li> <li>2. Construction of low cost LDPE tank for rain water harvesting in Kamal ghatti, Naugaon, Matli clusers.</li> <li>3. Promotion of water conservation techniques like mulch, micro irrigation system in juvenile plants in Khaladi, Matli and Dhanari area.</li> </ol> <p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Pigeon pea (VL Arhar-1), lentil (VL Masoor 125, VL Masoor 126, VL Masoor 507 &amp; VL Masoor 514) and Field pea (VL 42) in clusters namely Dhanari, and Barsali cluster.</li> <li>2. Adoption of high yielding varieties of wheat (VL Gehun 829, VL Gehun 892, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 and UP 2572), paddy (Irrigated - VL Dhan 65, VL Dhan 86, VL Dhan 68, VL Dhan 85, Pusa Basmati 1509 &amp; PRH 10; Rainfed- Chatki Dhan - VL Dhan 208, VL Dhan 209; Jethi dhan -Vivek Dhan 154, VL Dhan 157, VL Dhan 156 and VL Dhan 158) Pant Dhan-19, HKR-127, PA 6444, VNR 2355, ,); Barley (VL Jau 118 and VLB 94); Amaranthus (VL Chua 44); Buckwheat (VL Ugal 7) in Barsali, Matli, Ramaseri, Dhanari Kamal Ghati.</li> <li>3. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2).</li> <li>4. Promotion of small millets (finger millet - , VL Mandua 324, and VL Mandua 352; Barnyard millet - VL Madira 172 and VL Madira 207) mainly foxtail millet in Dhanari and Badagaddi cluster.</li> <li>5. Adoption of high yielding varieties of Soybean (VLS 47, VL Soya 59, VL Soya 63 and VL Soya 65); Horse gram (VL Gahat 10, VL Gahat 15 and VL Gahat 19); Lentil ((VL Masoor 125, VL Masoor 126, VL Masoor 507, VL Masoor 514).</li> <li>6. Promotion of high yielding varieties of Vegetable pea (Vivek Matar 10, Vivek Matar 11 and Vivek Matar 12); French bean (VL Bauni Bean 1 and VL Bean 2); Tomato (VL Tamatar 4, Manisha, Himsona, Navin 2000); Capsicum (VL Shimla Mirch 3); Onion (VL Piaz 3); Garlic (VL Garlic 1 and VL Lahsun 2)</li> <li>7. Promotion of subtropical fruit crops Lemon, Pomegranate (Kandhari, Ganesh), peach (Floradasun, FL16-33), nectarine in Barsali, Kamal Ghati, Naugaon, Dhanari and Matli cluster.</li> <li>8. Promotion of high density plantation of Pomegranate (variety Kandhari) and Nectarine (Snow queen) in Khaladi, Naugaon and Gangori area.</li> <li>9. Promotion of protective cultivation, use of polyhouses and polytunnel for off season vegetable cultivation in Bhandarsyun, Naugaon, Kharadi, Badagaddi, Gajana and Taknaur cluster.</li> <li>10. Cultivation of hybrid Napier in bunds in each cluster.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p>
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	<p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of ginger, garlic and turmeric in Barsali, Dhanari and Matli area.</li> <li>2. Promotion of live fencing of wild rose, Karonda plant in surrounding the field in Barsali, Badagaddi and Taknaur cluster.</li> <li>3. Promotion of lime and stone fruit in Bhandarsyun, Naugaon, Matli, Kharadi, Badagaddi, Gajana and Taknaur cluster.</li> <li>4. Promotion of plantation of wild fruits like Kafal, Wild apricot (Chullu), wild pear in Van Panchayat area for wild animal.</li> </ol> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Power weeder, Vivek Millet thresher cum pearler, VL Paddy thresher and Vivek small tool kit for reduction in drudgery of hill farmers in Dhanari, Ramaserai and Barsali Cluster.</li> <li>2. Promotion of small hand tools like serrated sickle, hand wheel hoe and fork for drudgery reduction of farm women in all the clusters.</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of legume crops like pea, soybean and green manuring in Matli, Badagaddi and Naugaon cluster.</li> <li>3. Adoption of well decomposed FYM and other compost.</li> </ol> <p><b>Strengthening of farmers through skill training</b> Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p>
<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Adoption of pure genetic breeds of cow (Jersey and HF) and buffalo (Murrah) in Matli, Barsali, Kamal Ghati and Naugaon Cluster.</li> <li>2. Selection of suitable mineral mixture, green fodder.</li> <li>3. Establishment of Fodder Bank in Naugaon &amp; Matli to meet fodder requirement of area.</li> <li>4. Organisation of timely de-worming, de-horning and vaccination programmes of livestock.</li> <li>5. Establishment of milk collection centre &amp; chilling plant at Naugaon and Gangori.</li> <li>6. Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>7. Introduction and promotion of cross Heiffer for increasing income of marginal farmer.</li> </ol>
<b>Strategy 3 : Integrating Farming system</b>	<p>Following IFS model may be develop in Region B for one acre.</p> <p><b>Cropping system (Area 4000 m<sup>2</sup>)</b> Maize- Wheat Paddy-Pea/wheat Soybean/Pigeon pea-Lentil Tomato-radish-Vegetable pea Paddy-Wheat-frenchbean</p> <p><b>Horticulture</b> Pomegranate/Stone fruit/Lemon (100 plants)</p> <p><b>Livestock</b> Cow (1)+Goat/sheep (10)</p>



	<b>Others</b> One vermicompost of 20 m2 One Polytunnel of 10 m2 for nursery raising Fodder production mainly hybrid napier in bunds.
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of large capacity (1000 MT) cold houses in fruit/vegetable producing blocks i.e. Bhatwari, Naugao and Purola blocks.</li> <li>2. Installation of mini grading and processing centres for Fruit &amp; vegetable at Gangori, Badkot and Brhamkhaal.</li> <li>3. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.</li> <li>4. Installation of packing and storage facilities for Processed/raw fruits and vegetables at Gangori, Badkot and Brhamkhaal.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak) may be promoted at each cluster.</li> <li>2. Construction of trenches, LDPE tanks and check dams/ trenches at each cluster.</li> <li>3. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adoption of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers may provided through custom hiring centre at each Nyay Panchayat.</li> <li>2. Adoption of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided at cluster level.</li> <li>3. Promotion of timely availability of seeds, fertilizers, insecticides, pesticides etc. at Nyay Panchayat level.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Promotion of secondary agriculture viz., Mushroom cultivation, Honey Bee production, Sericulture, Vermin composting units</li> <li>2. Promotion of woollen knitting &amp; handicraft work.</li> <li>3. Establishment of bio fertilizer units and agri-clinic at each cluster.</li> <li>4. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making etc. may be provided for better performance at cluster level.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	Following activities may be performed in each cluster. <ol style="list-style-type: none"> <li>1. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>2. Promotion of mechanization for low cost and drudgery reduction.</li> <li>3. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>4. Promotion of secondary agriculture</li> <li>5. Promotion of eco-village tourism through rural youth</li> <li>6. Implementation of Soil Health Card Scheme in intensive mode in each cluster.</li> <li>7. Adoption of certain village/ clusters and initiate development process therein by Non-Resident-Uttarakhandies (NRUs).</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies at Naugaon, Uttarkashi.</li> <li>2. Strengthening of cooperative societies may become a tool of marketing channels.</li> <li>3. Promotion of better transportation facilities with cold chain van at Block level.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Installation of Fruit &amp; vegetable processing units in clusters.</li> <li>6. Incorporation of Post harvest facilities including grading, packaging for Processed /raw fruits and vegetables in each clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of Mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of District level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Uttarkashi**  
**Zone: C (1500-2400 m)**

<b>Strategy 1 : Productivity Enhancement</b>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Adoption of high yielding varieties of wheat {VL Gehun 829, VL Gehun 907, VL Gehun 953, HS 507, HPW 349 (from 1500 to 1700m amsl), VL Gehun 832 and HPW 155, HS 365 and UP 2572(from 1700 to 2400m amsl)}; Barley (VL Jau 118 and VLB 94 upto 1700m amsl) and Amaranthus (VL Chua 44) in Upla taknor, Dhari Kalogi, Gaajana, Syuri, Jakhol, and Jogat.</li> <li>2. Promotion of high yielding varieties of specialty corn (CMVL Sweet Corn 1, CMVL Baby Corn 2 (upto 2000m amsl).</li> <li>3. Promotion of high yielding varieties of Vegetable pea (Vivek Matar 11 for main season &amp; VL Ageti Matar 7 for August sown); French bean (VL Bean 2); Tomato (VL Tamatar 4 upto 1800m amsl); Capsicum (VL Shimla Mirch 3 upto 1800m amsl); Onion (VL Piaz 3 upto 2000m amsl) and Garlic (VL Lahsun 2).</li> <li>4. Promotion of temperate fruit crops apple (Red spur, Royal spur, Organ spur), kiwi (Hayward/Allison/Monty+Tomari), peach (Flordasun, FL-16,33), walnut, nectarine (Snow queen) in Upla-taknor, Dhari Kalogi, Gaajana, Syuri, Jakhol, Netwad, Jogat, Tikochi and Silkyara cluster.</li> <li>5. Promotion of high density plantation of Apple (variety spur) and Nectarine (Snow queen) in Upla-taknor, Dhari Kalogi and Silkyara, Naitwar, and Tikochi cluster.</li> <li>6. Promotion of protective cultivation, use of polyhouses and polytunnel for off season vegetable cultivation in Upla taknor, Dhari Kalogi, Gaajana cluster.</li> <li>7. Cultivation of hybrid Napier in bunds in each cluster.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Management of wild animal problem</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Chestnut and stone fruits in Upla-taknor, Dhari Kalogi and Silkyara, Naitwar cluster.</li> <li>2. Promotion of plantation of wild fruits like Kafal, Wild apricot (Chullu), wild pear in Van Panchayat area for wild animal.</li> </ol> <p><b>Promotion of efficient water management</b></p> <ol style="list-style-type: none"> <li>1. Promotion of rain water harvesting and drip-fertigation system in Dhari Kalogi, Upla-taknor, Gaajana, Jogat and Silkyara cluster.</li> <li>2. Construction of low cost LDPE tank for rain water harvesting in Dhari Kalogi, Upla-taknor, Gaajana, Jakhol, Syuri, Jogat, and Silkyara cluster.</li> <li>3. Promotion of water conservation techniques like mulch, micro irrigation system in juvenile plants in Gajna, Syuri, Jogat, and Silkyara.</li> </ol> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Power weeder, Fruit harvester for drudgery reduction in Dhari Kalogi, Upla-taknor, Gaajana, and Jakhol.</li> <li>2. Promotion of small hand tools like Secateurs, serrated sickle, hand wheel hoe and fork for drudgery reduction of farm women in all the clusters.</li> </ol>
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	<p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Promotion of cultivation of legume crops like pea, soybean and green manuring in Upla-taknor, Dhari Kalogi, Gaajana and Naitwar.</li> <li>3. Promotion of well decomposed FYM and other compost.</li> </ol> <p><b>Strengthening of farmers through skill training</b></p> <p>Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p>
<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of pure genetic breeds of cow (HF, Jersey), sheep (Rambouillet, Marino) in Dhari-kalogi, Upla-Taknaur and Netwad Cluster.</li> <li>2. Selection of suitable mineral mixture, green fodder.</li> <li>3. Establishment of Fodder Bank in Bhatwar, Mori &amp; Purola to meet fodder requirement of area.</li> <li>4. Organisation of timely de-worming, de-horning and vaccination programmes of livestock.</li> <li>5. Organisation of regular training programmes &amp; awareness.</li> <li>6. Establishment of milk collection centre &amp; chilling plant at Purola, Mori &amp; Bhatwari.</li> <li>7. Promotion of Urea, Molasses, Multinutrient Blocks at Nyaypanchayat level.</li> <li>8. Introduction and promotion of cross Heiffer, Jersey and Sindhi for increasing income of marginal farmer.</li> <li>9. Strengthening of traditional water bodies/rivulets with carps at Dharasu, Mani area.</li> </ol>
<b>Strategy 3 : Integrating Farming system</b>	<p>Following IFS model may be develop in Region C for one acre.</p> <p><b>Cropping system (Area 4000 m2)</b></p> <p>Soybean-Lentil Cole crops-vegetable pea Maize-potato Pea-wheat-Radish</p> <p><b>Horticulture</b></p> <p>Apple/ Kiwi/Pear (100 plants)</p> <p><b>Livestock</b></p> <p>Cow (1)+sheep (10)</p> <p><b>Others</b></p> <p>One vermicompost of 20 m2 One Polytunnel of 10 m2 for nursery raising Bee keeping</p>

<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Establishment of mini grading &amp; processing centres for Fruit &amp; vegetable at Maneri, Silkyara, Netwad, Hudoli and Dhari cluster.</li> <li>2. Installation of packing &amp; storage facilities for Processed/raw fruits and vegetables at Maneri, Silkyara, Netwad, Hudoli and Dhari cluster.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak) may be promoted at each cluster.</li> <li>2. Construction of trenches, LDPE tanks and check dams/ trenches at each cluster.</li> <li>3. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adoption of Power tillers, Power weeders, Wheel Hand hoe, horticultural kits, power tree sprayers may provided through custom hiring centre at each Nyay Panchayat.</li> <li>2. Adoption of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided at cluster level.</li> <li>3. Promotion of timely availability of seeds, fertilizers, insecticides, pesticides etc. at Nyaay Panchayat level.</li> <li>4. Implementation of Chakbandi of scattered land.</li> <li>5. Minimization of Rain fed condition</li> <li>6. Organisation of trainings to increase scientific Knowledge.</li> <li>7. Promotion of practice of IPM and INM by farmers.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam &amp; Jelly making, Spice cultivation &amp; packing, etc. may be provided for better performance at cluster level.</li> <li>2. Promotion to micro entrepreneur employment through Mushroom production, Honey Bee production, Processing of fruits, vegetables &amp; spices, Vermin composting units, Woollen knitting &amp; Handicraft, Agri-clinic at each cluster.</li> </ol>
<b>Strategy 8 : Enabling Policies</b>	<ol style="list-style-type: none"> <li>1. Following activities may be performed in each cluster.</li> <li>2. Expend application of scientific methods and mechanized cultivation</li> <li>3. Promotion of secondary agriculture</li> <li>4. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>5. Promotion for checking migration by attracting rural youth in agriculture.</li> <li>6. Promotion of eco-village tourism through rural youth.</li> <li>7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>8. Implementation of Soil Health Card Scheme in intensive mode in each cluster.</li> <li>9. Adoption of certain village/ clusters and initiate development process therein by Non-Resident-Uttarakhandies (NRUs).</li> </ol>

<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies at Bhatwari, Purola, Mori.</li> <li>2. Strengthening of Cooperative societies may become a tool of marketing channels.</li> <li>3. Promotion of better transportation facilities with cold chain van at Block level.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Installation of Fruit &amp; vegetable processing units in clusters.</li> <li>6. Incorporation of Post harvest facilities including grading, packaging for Processed /raw fruits and vegetables in each clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and Whatsapp etc. for effective implementation of program.</li> </ol>

**District: Uttarkashi**  
**Zone: D (>2400 m)**

<p><b>Strategy 1 : Productivity Enhancement</b></p>	<p><b>Introduction, adoption and popularization of high yielding varieties</b></p> <ol style="list-style-type: none"> <li>1. Promotion of high yielding varieties of crops mainly French bean (VL Bean 2); pea (Pea (Vivek Matar 10 &amp; VL Ageti Matar 7); Garlic (VL Lahsun 2); rajmash (Local improved harshil rajma, VL Rajma 63 and VL Rajma 125) in clusters namely Upla-taknor, Netwad-Jakhol and Aarakot cluster.</li> <li>2. Promotion of temperate fruit crops high chilling apple (Delicious groups) and walnut, nectarine (Snow queen) in Upla-taknor, Jakhol, Aarakot and Netwad cluster.</li> <li>3. Promotion of scientific cultivation of medicinal crops (kutki, atees, paashan bhed, kala jeera, etc.) in Upla-taknor, Jakhol, Aarakot and Netwad cluster.</li> <li>4. Promotion of protective cultivation, use of polyhouses and polytunnel for off season vegetable cultivation in Upla-taknor, Jakhol, Aarakot and Netwad cluster.</li> <li>5. Promotion of efficient and timely use of IPM and IDM practices at village level of each cluster.</li> </ol> <p><b>Recommended package and practices will be followed for the above said crop varieties</b></p> <p><b>Promotion of efficient water management</b></p> <ol style="list-style-type: none"> <li>1. Promotion of efficient management of rain water harvesting with drip-fertigation system in Upla Taknor and Aarakot clusters.</li> <li>2. Creation of rain water harvesting structure in private and government buildings in all the villages of the zone.</li> <li>3. Promotion of water conservation techniques like mulch, micro irrigation system in juvenile plants in Harshil, Dharali, and Arakot area.</li> </ol> <p><b>Management of wild animal problem</b></p> <p>Promotion of plantation of wild fruits like Wild pear (Mehal) in Van Panchayat area for wild animal.</p> <p><b>Strengthening of farmers through skill training</b></p> <p>Organisation of regular trainings and feedback with experts regarding scientific methods of cultivation in each cluster.</p> <p><b>Adoption of farm mechanization</b></p> <ol style="list-style-type: none"> <li>1. Promotion of Power weeder, Fruit harvester for drudgery reduction in Upla-taknor, Arakot and Jakhol cluster.</li> <li>2. Promotion of small hand tools like Secateurs, serrated sickle, hand wheel hoe and fork for drudgery reduction of farm women in all the clusters.</li> </ol> <p><b>Adoption of efficient irrigation techniques</b></p> <ol style="list-style-type: none"> <li>1. Micro Irrigation (Drip and Sprinkler Irrigation) where water is available,</li> <li>2. Drip Irrigation in integration with water harvesting structure where irrigation water is not available</li> <li>3. Green House Cultivation for Vegetables</li> </ol> <p><b>Management of soil health</b></p> <ol style="list-style-type: none"> <li>1. Popularization of soil testing in intensive mode and distribution of soil health cards to farmers for judicious use of fertilizers.</li> <li>2. Adoption of well decomposed FYM and other compost.</li> </ol>
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<b>Strategy 2 : Livestock: Goatary, Poultry, Fisheries</b>	<ol style="list-style-type: none"> <li>1. Promotion of pure genetic breeds of sheep (Rambouillet, Marino) and Yak in Upla-Taknaur and Netwad Cluster.</li> <li>2. Development of pasture (Bugyal) for grazing.</li> <li>3. Establishment of Fodder Bank in Harshil and Netwad to meet fodder requirement of area.</li> <li>4. Organisation of timely de-worming and vaccination programmes of livestock.</li> </ol>
<b>Strategy 3 : Integrating Farming system</b>	<p>Following IFS model may be develop in Region D for one acre.</p> <p><b>Cropping system (Area 4000 m2)</b>  Rajma/chua- fellow  Protective cultivation  Cole crops-fellow</p> <p><b>Horticulture</b>  Apple high chilling varieties(100 plants)</p> <p><b>Livestock</b>  Sheep (20)</p> <p><b>Others</b>  One Polytunnel of 10 m2 for nursery raising  Bee keeping</p>
<b>Strategy 4 : Reducing post harvest losses and value addition</b>	<ol style="list-style-type: none"> <li>1. Installation of mini grading &amp; processing centres for Fruit, vegetable and wool at Harshil and Sankari cluster.</li> <li>2. Installation of packing &amp; storage facilities for Processed/raw fruits and vegetables at Harshil and Sankari cluster.</li> </ol>
<b>Strategy 5 : Waste land development and waste water treatment</b>	<ol style="list-style-type: none"> <li>1. Development of pasture (Bugyal) and Meadow for grazing.</li> <li>2. Construction of trenches, LDPE tanks and check dams/ trenches at each cluster.</li> <li>3. Establishment of waste water treatment plants based on phycoremediation technique at sewer drainage points.</li> </ol>
<b>Strategy 6 : Reduced cultivation cost</b>	<ol style="list-style-type: none"> <li>1. Adoption of Power weeders, horticultural kits, power tree sprayers may provided through custom hiring centre at each Nyay Panchayat.</li> <li>2. Promotion of specific fertilizers and micronutrients like Zink, Boron, Phosphorus, etc. may be provided at cluster level.</li> <li>3. Promotion of timely availability of seeds, fertilizers, insecticides, pesticides etc. at Nyay Panchayat level.</li> <li>4. Organisation of trainings to increase scientific Knowledge.</li> <li>5. Promotion of practice of IPM and INM by farmers.</li> </ol>
<b>Strategy 7 : Off-farm income</b>	<ol style="list-style-type: none"> <li>1. Encouragement to existing SHSs for collective farming, opening small scale enterprise like Pickle making, Jam &amp; Jelly making, &amp; packing, etc. may be provided for better performance at cluster level.</li> <li>2. Establishment of distillation unit for medicinal &amp; aromatic plants at Dharali and Sankari- Jakhol cluster.</li> <li>3. Promotion to micro entrepreneur employment through Bee keeping, Processing of fruits, vegetables, Woollen knitting &amp; Handicraft, Agri-clinic at each cluster.</li> </ol>



<b>Strategy 8 : Enabling Policies</b>	<p>Following activities may be performed in each cluster.</p> <ol style="list-style-type: none"> <li>1. Expend application of scientific methods and mechanized cultivation</li> <li>2. Promotion of secondary agriculture</li> <li>3. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>4. Promotion for checking migration by attracting rural youth in agriculture.</li> <li>5. Promotion of eco-village tourism through rural youth</li> <li>6. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.</li> <li>7. Implementation of Soil Health Card Scheme in intensive mode in each cluster.</li> <li>8. Adoption of certain village/ clusters and initiate development process therein by Non-Resident-Uttarakhandies (NRUs).</li> </ol>
<b>Strategy 9 : Marketing and value addition in specific agro- ecological region</b>	<ol style="list-style-type: none"> <li>1. Installation of mini mandies to be established at Harshil &amp; Sankari.</li> <li>2. Strengthening of Cooperative societies may become a tool of marketing channels.</li> <li>3. Promotion of better transportation facilities with cold chain van may be provided at Block level.</li> <li>4. Creation of direct linkages with food processing industries for better prices.</li> <li>5. Installation of Fruit &amp; vegetable processing units in clusters.</li> <li>6. Incorporation of Post harvest facilities including grading, packaging for Processed /raw fruits and vegetables in each clusters.</li> </ol>
<b>Strategy 10 : Online Management and Evaluation</b>	<ol style="list-style-type: none"> <li>1. Development of mobile apps/ software for online management and evaluation may be developed and farmers as well as concerned experts may be linked with it.</li> <li>2. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.</li> <li>3. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.</li> <li>4. Organization of monthly review meeting at district to solve the problems related with farmers.</li> <li>5. Promotion of use of radio, TV talks and use of Whatsapp etc. for effective implementation of program.</li> </ol>

## Technology Intervention Success Stories

### Example 1: Rainbow Trout Farming at High Altitudes in Champawat and Uttarkashi [ICAR-DCFR (Bhimtal)]

<b>Name of Site/Village</b>	Kathar (1700 msl)	Singot (2020 msl)
<b>Gram Panchyat</b>	Kathar	Singot
<b>Post Office</b>	Phunger	New Barsali
<b>Block</b>	Champawat	Uttarkashi
<b>District and State</b>	Champawat, Uttarakhand	Uttarkashi, Uttarakhand
<b>Number of fish ponds</b>	5	4

<b>Culture system</b>	Raceway culture
<b>Benefits</b>	Eco- friendly, easy adoptable, high valued fish.
<b>Average harvest</b>	700 Kg/30 m <sup>3</sup>
<b>Expenditure</b>	Rs. 2.23 lakh/30 m <sup>3</sup>
<b>Annual Income</b>	Rs. 3.5 lakh/30 m <sup>3</sup>
<b>Net profit</b>	Rs. 1.27 lakh/30 m <sup>3</sup>

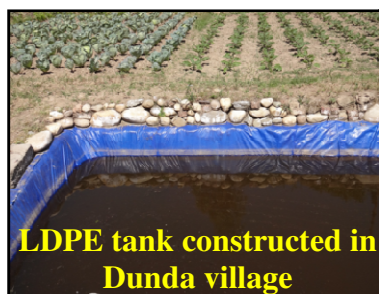
Overall impact after three years		
Parameter	Pre-project (2013)	During 2016
Pond area (M <sup>3</sup> )	0	270
No. of families practicing Trout farming	-	9 (5 + 4)
Av. annual family income (Rs)	67,000 (other resources)	194000 (2.9 times)



**Example 2: Harvesting the Water Drops - Reaping the Dividends: Successful Experiences of Small Water Kund in the Rainfed Area of Uttarakashi [Krishi Vigyan Kendra (Uttarkashi)]**

<b>Brief about the study area and major technological interventions</b>	
<b>Village (Uttarkashi district, Uttarakhand, N-W Himalayas)</b>	Dunda
<b>No. of LDPE tanks constructed</b>	20
<b>Size of LDPE tank (m<sup>3</sup>)</b>	12
<b>Storage capacities of 20 tanks (lit.)</b>	240000
<b>Life saving irrigation in net cultivated area (Nali)</b>	10
<b>Cost of interventions (Rs' lakhs)</b>	8000 / tank
<b>Farmers' contribution (labor, digging, etc.) (%)</b>	25

<b>Crop</b>	<b>Area (Nali) 50 Nali = 1 ha</b>	<b>Cost</b>	<b>Prod/ Nali (q)</b>	<b>Price</b>	<b>Net Profit (Rs)</b>
Pea (Arkel, VL 11)	3.0	2636	2.0	@ Rs 18 / kg = 10800	8164
Onion (VL Pyaz 3)	2.0	2866	4.0	@ Rs 20 / kg = 16000	13134
Okra (VL Bhindi 2)	4.0	3837	2.0	@ Rs 15 / kg = 12000	8163
French Bean (Contender)	3.5	3934	2.0	@ Rs 20 / kg = 14000	10066
Tomato (Himsona)	1.0	2978	6.0	@ Rs 22 / kg = 13200	10222
<b>Total Annual Cost/Profit</b>		<b>16251</b>			<b>49749</b>





## **7. Value Chain Development, Market Linkages and Trade Potential**

Value addition is one of important components of nutritional security. Sometimes surplus production is the cause of lower price of produce in market. Value addition coupled with marketing has the potentials of solving the basic problems of agricultural surplus or wastage and providing rural jobs, ensuring better prices to the growers. Development of cold chain infrastructure is an utmost requirement of the time as significant proportion of fruit and vegetable production is wasted due to the post harvest losses. These losses take place during post harvest operations.

Moreover, consumption of large marketable surplus available with farmers is outside the state and it further adds to the losses due to lack of proper infrastructure in form of cool chains, pack houses, mechanized grading and packing machinery, efficient transportation/connectivity, markets, etc. These losses can be minimized by investing in cold chain facilities which will also help in maintaining quality and freshness of the fruits particularly for exports. In hilly areas of the state, extent of post harvest losses are higher in areas where farmers are unable to get remunerative price of the produce. The shared cold chains can be set up on public private partnership (PPP) model which will benefit all the stake holders in the value chain i.e. farmers, private sector, public sector and government. The hilly regions of the state require special attention on the marketing interventions and infrastructure due to difficult terrains and limited bargaining and handling capacity of the growers resulting from lower size of holding and lack of resources.

Uttarakhand Krishi Utpadan Mandi Parisad (UKUMP) is the nodal agency for agricultural marketing in Uttarakhand which has created a network of markets for marketing of agricultural produce in the state. The agricultural marketing in the state is governed under the Agricultural Produce Market Committee (APMC) Act but the state lacks in number of regulated markets as well as proper facilities therein.

One of the important basic infrastructural facilities for quick movement of agricultural produce from producer to consumer is good road network. Besides roads, effective transportation facilities with cold chain van at block level is another requirement in agricultural market. Cold storage facility exists only with 9% farmers in the state. High wastages occur due to multi-layered marketing channels, lack of marketing infrastructure, fragmented cold chains, absence of sufficient cold storage and associated logistics as well as organized distribution system. So, there is need to establish Cold storage facility in all blocks of Uttarakhand

To compete in domestic as well as national market there is need to grade the commodity, but in hill region, no separate space for grading at farmers' fields, however, the farmers manage grading activity at their fields only. So for getting better prices there is need to establish mini fruit grading plant for fruits at block level.

Farmers of the state expressed dissatisfaction due to lack of storage facilities especially during the rainy season. Thus, the storage infrastructure is the basic necessity in all the agricultural markets to remove the market inefficiencies and it will be helpful for increasing the farmers' incomes. Some initiatives taken by the state government like gravity ropeways to provide road head access to the farm produce need to be taken to be taken at a larger scale.

Since Uttarakhand has immense potential for horticulture and floriculture-related business as there are numerous rare species of plants in diverse agro-geo climatic zones of the state. Private investment must also be encouraged in post harvest technology and infrastructure to bridge the gap in agricultural marketing.

## **8. Policy and Investment Requirements**

The Department of Agriculture and Cooperation introduced a central sector scheme, the 'Grameen Bhandaran Yojana,' in March 2002 to promote the construction of rural godowns with the main objectives of creation of a scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce and to prevent distress sale of produce. The scheme basically intends to build the storage capacity for the grains. Another scheme for development/strengthening of agricultural marketing infrastructure, grading and standardization was started by the Government of India for creation of market users common facilities like market yards, platforms for loading, assembling and auctioning of the produce, weighing and mechanical handling equipments, etc., functional infrastructure, value addition facilities, infrastructure for E-trading etc., will be for those states which undertake reforms in APMC Act to allow 'Direct Marketing' and 'Contract Farming' and to permit agricultural produce markets in private and cooperative sectors (NABARD). The evidences on the recent implementation of such scheme in the state are non-existent. So there is need to work out on these aspects.

The government monopoly in setting up agricultural markets has prevented the private sector from taking the initiative to develop marketing infrastructure. Majority of the farmers still receive market information through the traditional sources like regulated markets, traders and fellow farmers visiting the market yards. Information about market attributes is essential to keep the farmers and traders abreast about existing market prices, domestic and global agricultural supply and demand conditions, policy environment and other relevant factors influencing the prices. Around 48% farmers reported distress sale as a marketing constraint, which is quite obvious as there is lack of scientific storage and most of the horticultural commodities are perishable in nature. About 33% farmers reported lack of transportation facilities; as Uttarakhand is basically a hilly state and most of the produce from hills comes to the plain region of the state for disposal, it becomes important to provide specialized and improved transportation facilities for quality maintenance and timely delivery. Market interventions are required in terms of creating scientific storage, providing improved transportation services, adequate market information to prevent distress sale and also interventions aimed at improving the marketing system in the state. The main reason for poor performance of the markets in Uttarakhand is the poor market infrastructure that has been attributed to the fact that the market committees did not reinvest the market fee that has been collected for the development of infrastructure.

Since, a large part of Uttarakhand is hilly, around 71 per cent of holdings are marginal and area operated by this category of farmers is merely 0.35 hectare. Further, 18% of operational holdings are small operating less than 2 hectares of area. The size of these holdings is extremely tiny and therefore, scale of economies cannot be availed which makes crop husbandry unviable proposition. Generally, these farmers opt for subsistence farming due to their poor economic status and do not use expensive inputs. Urgent policy initiatives are needed for the development of small holdings. Land holding should be consolidated either forcefully or by mutual understanding at village level by government.

Organic inputs and certification mechanism should be labelled for various crops/fruits and vegetables for getting better prices in national and international market. Effective

and workable Nursery Act should be implemented to avoid spurious or unreliable planting material/seedlings in the state. Soil Health Card Scheme at gram panchayat level should be implemented for better soil health and it can facilitate in organic farming too. Policies for control of wild animal menace in agricultural area should be implemented.

A dynamic and growing, agricultural sector requires seed, fertilizer, plant protection chemicals, bio pesticides, agricultural machinery and credit at reasonable rates to the farmers. Input management has become an important component of modern agriculture. Balanced use of high quality inputs at the appropriate time brings in the much-desired results in terms of both production and productivity. Lack of physical infrastructure in hills makes distribution of inputs extremely difficult. Massive investment is needed to address this shortcoming. The government should give priority to this aspect in order to boost growth of agriculture in the state.

The state seeks to focus on developing access to credit and insurance for farmers. Considering the small landholdings and low income of farmers it is imperative to ensure that farmers get easy access to credit at reasonable rates which would enable cash starved farmers to exploit investment opportunities, reduce their vulnerability to shocks and this will help in promoting economic growth. Similarly, subsidized crop insurance – particularly in the context of highly volatile climatic conditions – should be an important source of reducing economic shocks to small farmers due to crop losses caused by scant or excessive rainfall, hails, landslides and other natural calamities. State interventions along with entry of appropriate insurance and financial institutions are required to support the markets. Micro credit institutions are required to cater to the credit needs of traders and farmers. Including setting up community owned and managed infrastructure and equipment.

### **Specific Policy Requirements**

1. Consolidation of land holdings either forcefully or by mutual understanding.
2. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables in all blocks headquarters.
3. Popularization of Udhyan, Krishak and Soil Health Cards for widespread use of government incentives/subsidies to farmers.
4. Ensuring quality inputs and their timely availability with ease of access.
5. Promote mechanization through small implements suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility with NRM activities (PMKSY, IWMP, MGNREGA, RKVY, NHM etc.), and protected cultivation of vegetables.
6. Creating new market for purchase of farm produce, especially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad. (Farm to Shop for creating employment)
7. Implementation of policies for control of wild animal menace in agricultural areas.
8. Payment for Ecosystem Services provided by Uttarakhand state to the nation.



## **9. Implementation Plan**

Agriculture being a State Subject, the implementation plan of DFI by 2022 will be generated by the State Departments associated with Agriculture and Allied Subjects. In this regard, the Uttarakhand State Department of Agriculture has constituted different Expert Groups comprising Scientists of SAUs and Officers of Line Departments of Agriculture, Horticulture and Animal Husbandry. The Government of Uttarakhand organized a Workshop entitled “Sankap se Siddhi : Doubling Farmers’ Income by 2022” on 15 December 2017 which was addressed by the Hon’ble Chief Minister and Minister of Agriculture & Horticulture of State Government of Uttarakhand. The Workshop was attended by Secretary (Agriculture), Secretary (Horticulture), Additional Secretary (Agriculture), Vice-Chancellor of G.B. Pant University of Agriculture & Technology (Pantnagar), Director of ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan (Almora), Representative of Director, ICAR-Indian Institute of Soil Water Conservation (Dehradun), Directors of State Departments of Agriculture, Horticulture and Animal Husbandry, Experts of G.B. Pant University of Agriculture & Technology (Pantnagar), Officers In-charge of Krishi Vigyan Kendras of Uttarakhand, Officers of NABARD, Officers of Apiculture, Sericulture, Medicinal & Aromatic Plants, Irrigation and various other departments of Uttarakhand, and a large number of Block and Panchayat level officials of different departments of Government of Uttarakhand. Various experts presented the action plan which will be followed for doubling farmers’ income in Uttarakhand. The Chief Minister emphasized that the plan should be implemented in letter and spirit so that its impact is visible in shortest possible time. The Agriculture Minister suggested that convergence of all the central and state government schemes should be made for successful implementation of the programme. He cautioned the officials that the entire budget available in different schemes should be utilized fully for doubling the farmers’ income by 2022. The officials were instructed to finalize the district level micro plan at the earliest so that a meeting of all the stake holders could be organized in near future. The Vice-Chancellor of G.B. Pant University of Agriculture & Technology (Pantnagar) and Director of ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan (Almora) assured that all the scientists working in the State will provide full technical support as and when required, as SAUs and ICAR Institutes stationed in Uttarakhand are Knowledge Partners of this programme. The GBPUAT informed the house about the Strategy Plan completed for this purpose by State Coordination Committee constituted by ICAR under the Chairmanship of Vice-Chancellor, GBPUAT (Pantnagar) with Director, ICAR-IISWC (Dehradun) as the Convener. The final plan has been submitted to Secretary (DARE) & Director General (ICAR) for submission to NITI Aayog and the PMO.

The specific plan, schemes and projects of the Departments will be converged to realize the benefit of technologies being advocated in the Strategic Plan generated by R&D organizations for all agricultural sectors taking into account agro-ecological conditions prevailing at different altitude levels within the State of Uttarakhand. To make it end user friendly, necessary policy supports and incentives will be provided in the implementation plan by the State/Central Government.



## **10. Summary and Recommendations**

### **Strategy 1: Productivity Enhancement**

#### **A. Introduction, adoption and popularization of high yielding varieties for increasing productivity**

1. Promotion of high yielding varieties of major field crops, vegetable crops, fruit crops, medicinal crops, fodder crops and ornamental crops.
2. Promotion of high yielding milk, meat, wool, egg & meat breed of different cattle's, Buffaloes, Sheep, Goat and poultry birds.

#### **B. Strengthening of traditional water storage structure**

1. Strengthening of existing water storage structures like ponds, Naula and Check dam in most of the villages.
2. Construction of water harvesting check bunds to harvest the rain water.
3. Construction of rain water harvesting structures (LDPE tank, Cemented tanks) in private as well as government buildings.
4. Construction of trenches for high percolation of water in valley area
5. Promotion of water conservation techniques like mulch, sprinkler and drip irrigation system in juvenile plants in low or valley areas.
6. Efficient management of rain water harvesting with drip-fertigation system.
7. Strengthening of existing Hydram system of irrigation.
8. Popularization of low cost lining material to check seepage in the region.
9. Establishment of roof top water harvesting structures in all households.

#### **C. Adoption of cluster approach for holistic development**

1. Strengthening of old fruit belt by introduction of new cultivars of fruits crops.
2. Popularization and promotion of zero energy cool chamber among farmer group at Nyay Panchayat level.
3. Promotion of organic cultivation of Ginger/ turmeric in low valley areas.
4. Promotion the cultivation off season vegetables (tomato, potato, capsicum, cole crops etc.).
5. Promotion of production of major area specific field crops.
6. Promotion of irrigated areas for seed production of rice and wheat.
7. Promotion of production of major area specific vegetable crops (tomato, vegetable pea, okra, French bean, onion, garlic with the use of proper crop rotation.
8. Promotion of organic cultivation of different crops (basmati rice, finger millet, barnyard millet, horse gram, bhata, ginger, turmeric).
9. Fallow land development under agro-forestry in the region.
10. Promotion of common minimum programme technology in vegetables to reduce the cost of cultivation and quality produce.

#### **D. Management of wild animal problem**

1. Promotion of live fencing of lime/ lemon at larger scale in fruit crops, ginger or turmeric in shady areas, Lemon grass to ward off wildlife in cultivated field.
2. Promotion of chilli, capsicum & okra as these are least affected by monkey menace.
3. Enacting legislative measures for protection of crop from wild animals.
4. Promotion of protected cultivation of vegetables (Tomato, Capsicum, Cabbage, Cauliflower and Cucumber) in the blocks of the state.

5. Promotion of cultivation of Kafal, Mango, Hishalu, wild walnut, Mahal and other wild fruits in different pockets in forest areas for wild animals.

**E. Adoption of farm mechanisation**

1. Popularization of multi crop thresher and Power Tiller/ Mini Tractor at Nyay Panchayat level in Uttarakhand.
2. Promotion of improved Naveen sickle, Dung collector, maize sheller & peeler for drudgery reduction of farm women in the state.
3. Popularization of manually operated mini crop harvesters for rice, wheat and millets.

**F. Management of soil health in low or valley areas**

1. Popularization of soil sampling and soil testing in intensive mode and distribution of soil health card to farmers for judicious use of Manure and fertilisers.
2. Promotion of vermi composting unit of this region and adoption of well decomposed FYM and other compost.
3. Promotion of cultivation of green manuring crops like Sesbania, Sunhemp, and lobia in Uttarakhand.
4. Popularization of biofertilizers like *Rhizobium*, *Azotobacter*, *Azospirillum*, PSB, PSM, K solubilising micro-organism and use of these biofertilizers with FYM at the time of sowing.
5. Fortification of FYM with *Pseudomonas* and *Trichoderma*.
6. Promotion of Bio-fertiliser/soluble fertiliser based farming specially in rainfed areas of Uttarakhand.
7. Adoption of integrated nutrient management in irrigated areas of rice and wheat.
8. Promotion of pulses crops in crop rotation to improve soil fertility and productivity.
9. Popularization of soil and water conservation measures by pulse based intercropping, contour farming and shoulder bunds in particular rainfed areas of Uttarakhand.
10. Organic cultivation of traditional crop viz., finger millet, barnyard millets, black soybean, horsegram, traditional rice of state.
11. Promotion of soil testing kits in all blocks of the state.

**G. Others**

**H. Cluster approach for holistic development.**

1. Seed treatment through bio agent strictly in the cluster
2. Promotion of timely and local availability of high yielding varieties of all the cereal, pulse, oil crops, High value crops like vegetable, fruits, spices, etc.
3. Protected cultivation in vegetable crops.
4. Cultivation of fodder and forage crops & medicinal plants.
5. Adoption of only well decomposed FYM/ value added compost.
6. Promotion of efficient and timely use of IPM and IDM practices.
7. Adoption of moisture conservation practices.
8. Promotion to focus on timely sowing and weed management.
9. Promotion of biotic & abiotic stress resistance varieties and alteration in cropping pattern.

10. Promotion of Pusa Hydrogel technology in the cultivation of vegetables, pulses and cereals.
11. Compulsion of seed treatment through bio agent/ chemical in the cluster.

### **Strategy 2: Livestock, Goatry, Poultry, Fisheries**

1. Promotion of high milk breeds of cows, buffaloes and goats while promotion of wool yielding breeds of sheep.
2. Introduction and promotion of cross Heiffer by Artificial Insemination (AI) for increasing income of marginal farmer at block level in the state.
3. Development of good nursery of fishes and availability of good species of fingerlings is required; fisheries should be promoted through favourable policies.
4. Establishment of Fodder Bank at each *block* / *Nyaypanchayat* level to meet fodder/feed block and mineral blocks requirement particularly during lean period.
5. Establishment of milk chilling plant at block level in the state.
6. Development of grass land in different villages of state.
7. Selection of more numbers of veterinary experts at *Nyay panchayat* level.
8. Promotion of urea, molasses, and mineral mixer blocks at *Nyaypanchayat* level.
9. Establishment of hatcheries for need of broiler / layer at block level in the state.
10. For need of broiler or croiler at district level to meet out the requirement of chicks to the farmers.
11. Strengthening of traditional water bodies/ rivulets with Mahaseer or carps at block level in state.
12. Availability of feed material with low prices & timely health check-ups of animals.
13. Introduction and promotion of Cross bred milch breed of animal for increasing income of marginal farmer.
14. Planning for establishment of *Gaushala* at block level to rear unproductive cattles to avoid the damage crops in cultivated areas.

### **Strategy 3: Integrated Farming system**

**Following Integrated farming system model may be developed:**

1. Protected cultivation+ Composting+Goatry/backyard poultry/Dairy
2. Fodder production+ Mini dairy+Composting+ Protected cultivation
3. Seed production (Lentil, Radish, Pea)+ Planting material supply+Mushroom
4. Vegetable based –protected cultivation + composting and Goatry/ Poultry
5. Live stock based- green fodder + Dairy, composting and Goatry/ Poultry+ Protected cultivation
6. Crop based- crop and vegetable+ Dairy, composting and Goatry/ Poultry.

### **Strategy 4: Reducing post harvest losses and value addition**

1. Establishment of mini fruit grading plant for fruits at block level in Uttarakhand.
2. Establishment of Food and Processing Units/ Value addition centre at fruit/vegetable belt for pickle, jam and jellies making.
3. Establishment of procurement centre for efficient marketing of surplus fruit, vegetables.
4. More refrigerating van/ Reefers for quick transportation for perishable commodities like flowers and vegetables.
5. Promotion of cluster approach for efficient procurement and disposal of surplus fruits and vegetables in all the blocks.

6. Promotion of common resources on custom hire basis viz. Power tiller, Mini Thresher and other equipments at *Nyaypanchayat* level.
7. Establishment of packaging infrastructure at village level with packaging, sewing, sealing and labeling facilities.
8. Establishment of marketing chain for efficient/timely supply of produce/product.
9. Creation of larger facilities of infrastructure for reducing post harvest losses in horticultural commodities viz. Long term storage, warehouses.
10. Development of cottage industries at village level for unfinished products.
11. Cluster approach is useful for small and marginal farmers to procure input and disposal of surplus in areas.
12. Establishment of storage facilities like warehouses, cold storage and cold chamber at each block level.
13. Gravity ropeways to be constructed to provide road head access to the farm produce need to be taken to be taken at a larger scale.
14. Private investment must also be encouraged in post harvest technology and infrastructure to bridge the gap in agricultural marketing.

#### **Strategy 5: Waste land development and waste water**

1. Contour bunding for arable purpose in waste land in high hills areas.
2. Afforestation of plants and perennial grasses in steep slope of more than 40% slope.
3. Need to develop more forest nurseries to supply fodder plants to farmers in rainy season.
4. Plantation of Mulberry plants, Wild fruit plants, Fodder trees (Bheemal, Utees, Oak etc.) may be promoted.
5. Popularization of soil bunds to save excessive loss of nutrients in wasteland of Uttarakhand.
6. Popularization of trenches or silages for percolation of water to avoid surface run off in Uttarakhand.
7. Construction of check dam and artificial structure to reduce run off and maximize the water percolation rate.
8. Construction of tank for storage of water for lean season.
9. Establishment of storage system for rain water in monsoon season.
10. Popularization of roof water harvesting system in different villages in the state.

#### **Strategy 6: Reduced cultivation cost**

1. Judicious application specific fertilizers and micronutrients like Zink, Boron & Phosphorus etc. after soil testing in every block.
2. Promotion of Custom Hiring Centre (CHC) for the use of Power tillers, Power weeders, Paddy threshers, Wheat threshers, Mandua/ Madira threshers, Maize Sheller, Wheel Hand hoe, Manual/ power operated Wheat/Paddy reapers etc.) Power sprayer, mechanical fruit harvester at cluster or *Nyaypanchayat* level.
3. Establishment of sales and community centres at each cluster for easy and timely availability of seeds, seedlings, fertilizers.
4. Promotion of Zero tillage method of sowing in cereals.
5. Promotion of well decomposed FYM, Vermicompost and Biofertilizers to minimize the use of chemical fertilizers.
6. Promotion of line sowing and fertilizers application in crops.
7. Promotion of recommended seed rate, spacing and depth.
8. Promotion of timely availability of seeds, fertilizers, insecticides, pesticides etc. at *Nyaay Panchayat* level.

9. Promotion of hand tools in agricultural and horticultural operations.
10. Promotion of mulching (bio or degradable plastic) to maintain moisture and reduce intercultural operation cost.
11. Promotion of need based application of pesticides and other agricultural inputs.
12. Promotion & use of trichocard, light trap & pheromones trap for control of insect-pest in different horticulture/vegetable/cereal.
13. Promotion of pressurized irrigation techniques in horticultural crops.
14. Implementation of *Chakbandi* of scattered land.
15. Minimization of Rain fed condition.
16. Organisation of trainings to increase scientific Knowledge.
17. Facilitation of farmers with weather updates.
18. Promotion of practice of IPM and INM by farmers.
19. Increase in number of sales and community centres for easy and timely availability of seeds, seedlings, fertilizers and required information in each block.
20. Avoid broadcasting of seeds and fertilizers in crop production program.
21. Use of modern techniques to use water use efficiency in horticultural crops.

#### **Strategy 7: Off-farm income**

1. Promotion of subsidiary occupations like poultry, fish farming and mushroom production.
2. Promotion of apiculture for small and landless farmers.
3. Promotion of sericulture in low hills or valley areas in Uttarakhand.
4. Promotion of cultivation and collection of medicinal aromatic plants in the state.
5. Emphasis on promotion of religious tourism for Panch Kedar Yatra to serve organic and local delicacy.
6. Promotion of skill development for Nursery raising techniques in fruits and vegetables, Handicraft, commercial dairy business, Orchard Management, Processing methods for women and youth.
7. Encouragement to existing SHGs for collective farming, opening small scale enterprise like Candle making, Pickle making, Jam & Jelly making, Spice cultivation, Ghee making & packing, aipen, jute bags, Woolen clothes, candle making, squash, pickles, mushroom production, home made/ value added products (bari, papad, namkeen, biscuit) etc. may be provided for better performance.
8. Promotion of SHGs for value addition and primary processing and linking them to market (Buy back system).
9. Increasing awareness towards education which helps in getting employment to the rural youth, farm women.
10. Development of online advisory centres by trained youths.

#### **Strategy 8: Enabling Policies**

1. Consolidation of land holding either forcefully implementation by govt or by mutual understanding at *village level*
2. Increasing institutional support by providing subsidises and incentives to *small and marginal farmers*.
3. Labelling of organic inputs and certification mechanism for various crops/fruits and vegetables.
4. Popularization of Udhyan and Krishak Cards for widespread use of government incentives/subsidies to farmers.
5. Establishment of mother orchard to meet the present and future demand of germplasm in horticultural fruit crops.

6. Implementation of effective and workable Nursery Act to avoid spurious or unreliable planting material/seedlings in the state.
7. Ensure sustainable agriculture through more efficient utilization of land, water and other resources.
8. Promote mechanization through small implement suitable for hills, provide maximum subsidy for sprinkler and drip irrigation facility and protected cultivation of vegetables.
9. Creating new market for purchase of farm produce specially horticulture crops at block level and providing facilities for maintaining cool chain for sending the produce from the state to distant market with in the country and abroad.
10. Floriculture has immense potential to boost the economy of farmers as well as the state therefore potential floriculture crops like Liliun, carnation, gerbera, rose, orchids and other bulbous flowering plant should be promoted in *all* the blocks.
11. Promotion and cultivation of Marigold for meeting the demand of religious in religious places of Uttarakhand.
12. Implementation of Soil Health Card Scheme at gram panchyat level.
13. Implementation of policies for control of wild animal menace in agricultural areas.

#### **Strategy 9: Marketing and value addition**

1. Establishment of cold storage in all blocks of Uttarakhand.
2. Creation of better transportation facilities with cold chain van at block level in Uttarakhand.
3. Creation of direct linkages with food processing industries for better prices.
4. Establishment of strong linkages with various stack holders to furnish information on crop produce and surplus.
5. Establishment of procurement and collection centre at Nyaypanchayat level for agricultural surplus with proper labelling.
6. Formation of district level committees of State line departments with KVK experts for field and as well as online monitoring, evaluation and feedback.
7. Installation of mini grading machines at village level in Uttarakhand.
8. Establishment of mini mandies at block level in the state.
9. Creation of direct linkages with food processing industries for better prices.
10. Establishment of strong linkages with various stack holders to furnish information on crop produce and surplus.
11. Promotion of local Hatt at Tahsil level in the blocks.
12. Development of proper marketing network to check the interference of middle men in marketing of agricultural produce of the farmers.

#### **Strategy 10: Online Management and Evaluation**

1. Development of Mobile apps/ software for online management and evaluation at district level.
2. Development of e-Marketing and kiosk at district level to have information of surplus commodities at block level.
3. Organization of monthly review meeting at district to solve the problems related with farmers.
4. Promotion of use of community radio, TV talks and mobile app etc. for effective implementation of programme.
5. Weather forecasting and contingency plan.



## References

- Anonymous (2010) *Uttarakhand State Perspective and Strategic Plan 2009-2027*. Watershed Management Directorate, Dehra Dun, Uttarakhand, 2010
- Anonymous (2016) *Agricultural Research Data Book 2015*. Indian Agricultural Statistics Research Institute, Pusa, New Delhi.
- Anonymous (2016) *Agricultural Statistics at a Glance 2015*. Directorate of Economics and Statistics, Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers' Welfare, Government of India.
- Anonymous (2016) *Fertilizer Statistics 2015-16*. The Fertiliser Association of India, New Delhi
- Anonymous (2016) *Uttarakhand at a Glance (2015-16)*. Directorate of Economics and Statistics, Department of Planning, Government of Uttarakhand, Dehradun.
- Anonymous Agriculture: Doubling Farmers' Income (Chapter 5), *Approach Paper by Department of Agriculture, Cooperation & Farmers' Welfare, MoA&FW, GoI*
- Chand, R. (2016). *Doubling Farmers' Income: Strategy and Prospects*, Presidential Address delivered at 76th Annual Conference of Indian Society of Agricultural Economics held at Assam Agricultural University Jorhat, Assam during 21-23 November, 2016.
- Chand, R. (2017). *Doubling Farmers' Income: Rationale, Strategy, Prospects and Action Plan*, NITI Policy Paper 01/2017 National Institution for Transforming India, Government of India, New Delhi.
- ICFA (2016) *Report on Doubling Farmer's Income by 2022: Farm Crisis and Farmers' Distress*. Indian Council of Food and Agriculture, 30 April, 2016, India International Centre, New Delhi
- Ranganathan, Thiagu (2015) Farmers' Income in India: Evidence from Secondary Data. *Agricultural Situation in India*, 72:30-70.
- Saxena R., Naveen P. Singh, Balaji S.J., Usha R. Ahuja, and Deepika Joshi. (2017). *Strategy for Doubling Income of Farmers in India*. Policy Paper 31. National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi.
- Swaminathan M.S. (2017) *Roadmap for Doubling Farmers' Income*. Presentation before Hon'ble Prime Minister, May 19, 2017, New Delhi.