

Request for Project Funding From the Adaptation Fund



**Climate Smart Actions and Strategies in North
Western Himalayan Region for Sustainable
Livelihoods of Agriculture-Dependent Hill
Communities**



REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat

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Washington, DC. 20433

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Email: secretariat@adaptation-fund.org



ADAPTATION FUND

DATE OF RECEIPT:

ADAPTATION FUND PROJECT ID:

(For Adaptation Fund Board Secretariat Use
Only)

PROJECT/PROGRAMME PROPOSAL



PART I: PROJECT INFORMATION

PROJECT CATEGORY: **REGULAR /SMALL - SIZED PROJECT**

COUNTRY: **INDIA**

TITLE OF PROJECT: **CLIMATE SMART ACTIONS AND STRATEGIES IN NORTH WESTERN HIMALAYAN REGION FOR SUSTAINABLE LIVELIHOODS OF AGRICULTURE-DEPENDENT HILL COMMUNITIES**

TYPE OF IMPLEMENTING ENTITY: **NATIONAL IMPLEMENTING ENTITY (NIE)**

IMPLEMENTING ENTITY: **NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT (NABARD)**

EXECUTING ENTITY: **BAIF DEVELOPMENT RESEARCH FOUNDATION**

AMOUNT OF FINANCING REQUESTED: **USD: 969,570**

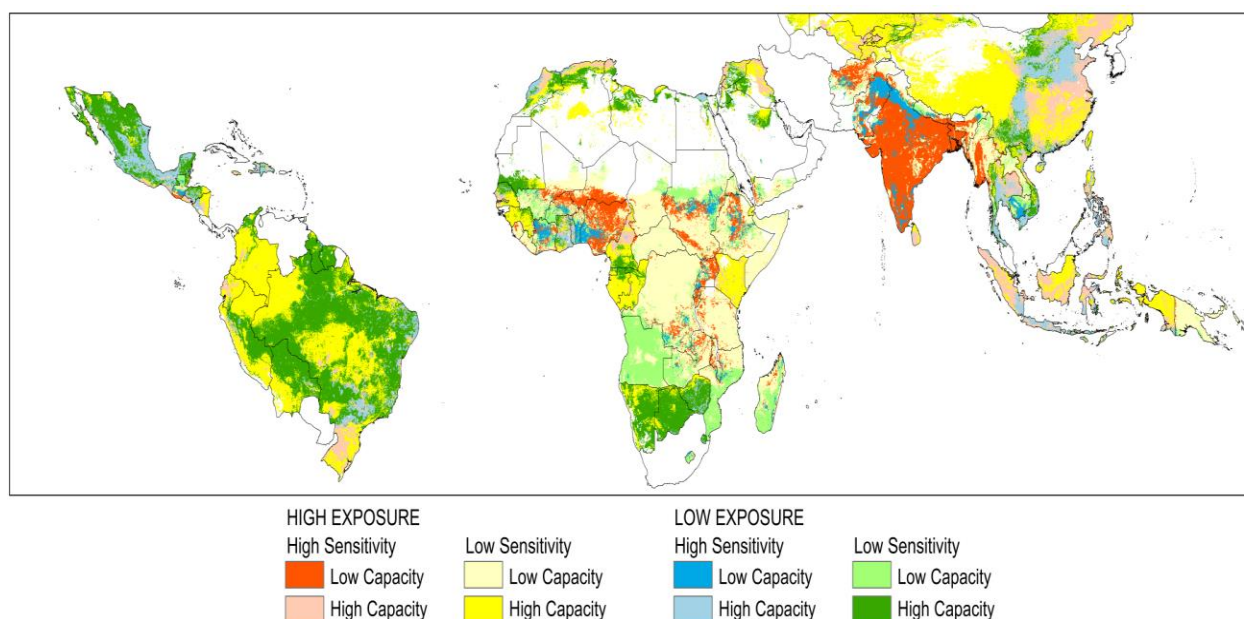
PART I: PROJECT BACKGROUND AND CONTEXT

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic, social, development and environmental context in which the project would operate.

CLIMATE CHANGE AND RURAL INDIA

Agriculture is by far the largest employer in the Indian economy, with an approximate 50 percent share, despite a shrinking contribution to gross domestic product (13.7 percent of GDP in 2013, down from 43 percent in 1970). One of the world's largest producers of food grains, coconuts, cashews, tea and milk products, India's agricultural sector features small-scale production on fragmented holdings, large areas of low productivity soils, high dependency on rain-fed conditions and low literacy rates that constrains the capacity of farmers to take up new technology. The majority of agricultural workers come from the poorer segments of the population, including scheduled tribes and castes, and have limited livelihood options¹.

Figure 1: India; Food Insecure and Highly Vulnerable to the Likely Impacts of Future Climate Change



Source: CCAFS report² No.5. Copenhagen, Denmark

¹FAO, 2011 "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation" Food and Agriculture Organization, Rome

²Ericksen, P., P. Thornton, A. Notenbaert, L. Cramer, P. Jones, M. Herrero. 2011. *Mapping Hotspots of Climate Change and Food Insecurity in the Global Tropics*. CCAFS Report no. 5. Copenhagen, Denmark

Climate change has emerged as a major threat to rural livelihoods in India, due to the high dependency on small-scale agriculture and natural resources, especially amongst the poor. The negative impact of climate change on agriculture is also likely to have a serious impact on poverty and food security, especially for the most vulnerable: the small and marginal landholders. Rain-fed agriculture, which is practiced in nearly 60 percent of the total agricultural area, and is dominated by poor farmers, will feel the main impacts. India has been identified as being not only highly vulnerable to the impacts of climate change, but also with a low capacity to adapt to the constraints and issues involved. See Figure 1.

India's mean temperature showed a warming trend of 0.51°C per hundred years during 1901-2007³. The Indian Network for Climate Change Assessment (INCCA)⁴ has observed accelerated warming during 1979-2007 in the winter and post monsoon seasons that have increased by 0.80°C and 0.82°C, respectively, in the last century. The mean temperature has increased by 0.20°C per decade during 1971-2007, with much steeper increase in the minimum temperature than the maximum temperature.

Maximum temperatures in India have shown an increase of 0.71°C per hundred years and the mean minimum temperature has increased by 0.27°C per hundred years. The frequency of hot days show a gradual increasing trend and frequency of cold days show a significant decreasing trend during the pre-monsoon season. The INCCA assessment also reports an increased precipitation trend over the country. The mean rainfall has been calculated at 848 mm with a standard deviation of 83 mm. This implies increased uncertainty in prediction of rain due to its increased variability, a trend that is reflected in the fact that 43 out of 139 years were either in excess or deficient in rainfall for the country as a whole.

India is highly vulnerable to climate change, not only because of high physical exposure to climate-related disasters (65 percent of India is drought prone, 12 percent flood prone, and 8 percent of the country is susceptible to cyclones), but also because of the dependency of its economy and majority of population on climate-sensitive sectors (e.g. agriculture, forests, tourism, animal husbandry and fisheries) and due to lack of access to technological and financial resources.

Adaptation to climate change is thus considered vital to support the livelihoods of the rural poor and to improve the productivity of the agriculture sector more broadly. Adaptation is also necessary to effectively address the poverty and food security issues for the people of rural India.

CLIMATE CHANGE CONTEXT IN THE INDIAN HIMALAYAN REGION (IHR)

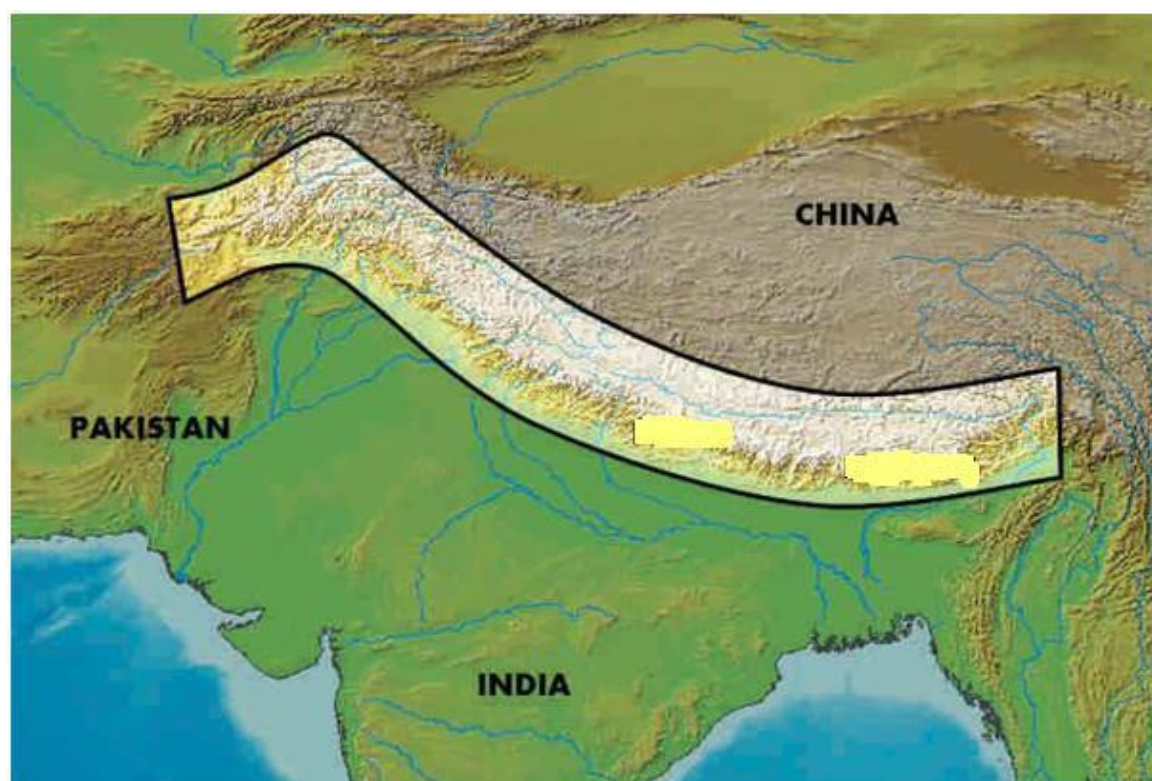
The Indian Himalayan Region (Figure 2) is an arc of 2,500 km that traverses 11 states of India. This region is inhabited by more than 50 million people, about 5 percent of India's population,

³Kothawale D.R. (2010), *Recent Trends in Pre-monsoon, Daily Temperatures, Extremes over India*, IITM, Pune, Maharashtra, India

⁴ INCCA report, 2010

and covers 18 percent of the geographical area of the country. The sensitive position of mountains has been clearly identified in recent Intergovernmental Panel on Climate Change (IPCC) reports, being especially vulnerable to the loss of glaciers and more extreme events. The IHR (plus neighboring countries such as Nepal and other territories outside of India's boundaries) is among the most fragile and vulnerable ecosystems in the world, yet exerts considerable influence on the weather patterns throughout South Asia and its influences extend into some South East Asian countries and island areas as well. The IHR has 69 percent of India's freshwater resources and is recognized as one of the world's key biodiversity hotspots.

Figure 2: Indian Himalayan Region



Sources: Annual Report, HIMMOTHAN

The entire Himalayan zone, including the high mountains, the foothills and the Tarai area, constitutes an extremely fragile ecological zone. From west to east, the IHR also has distinctive socio-cultural regions and sub-regions. In most of the region, the pace of economic growth is low. Communities here try to create livelihood opportunities in the difficult terrain with a dwindling resource base. In spite of inhabiting this originally resource-rich area, the socio-economic progress of its people is minimal.

The economy of the IHR is predominantly rural and highly dependent on climate sensitive sectors like agri-horticulture and livestock; other economic activities are limited. Agriculture is

mostly practiced on sloping lands and small parcels of terraced lands and relies entirely on the seasonal rainfall. Owing to the very small land holdings, families rely heavily on natural fodder resources including the forest areas to feed their livestock. There is continuous degradation of natural resources to meet the various needs of its growing population.

This already stressed situation has been further aggravated in recent times by the effects of climate change. Increasing variation in precipitation (both rainfall and snow), and temperature has altered the soil moisture availability, plant phenology and viable altitudinal range, and pest susceptibility. These effects are likely to be exacerbated due to the impacts of climate change, such as increased temperature, altered precipitation patterns, episodes of drought, and biotic influences. According to the IPCC, impacts are expected to range from reduced genetic diversity of species to glacial melt in the Himalayas leading to increased flooding that will affect water resources within the next few decades. The INCCA report has identified that communities inhabiting mountain ecosystems are particularly vulnerable to extreme weather conditions such as high temperatures, altering rainfall patterns, receding glaciers and permafrost thawing.

Effects of climate change on the project area and livelihood implications for the inhabiting communities in the IHR:

It is evident that the communities whose livelihoods are closely linked to natural resources are facing greater uncertainty than ever before. **Climate change has further accelerated the process of marginalization of the hill communities.**

The International Centre for Integrated Mountain Development (ICIMOD) and International Fund for Agricultural Development (IFAD) have carried out a study and documented people's perceptions of how climate change has impacted their immediate surroundings and livelihoods in Indian Himalayan Region.⁵ The main findings are summarized in Table 1:

Table 1: Adverse Effects due to Climate Change in IHR

Specific Changes	Specific adverse effects
Rising temperature The region has experienced an increase in maximum temperature up to 1degree Centigrade	<ul style="list-style-type: none"> ▪ Apple orchards shifting towards higher altitude seeking lower temperatures ▪ Increased vulnerability of agri-horti sectors and absence of any other livelihood options leading to migration of productive labor. ▪ Upward shift in various climatic zones with slight rise in temperature

⁵ The International Centre for Integrated Mountain Development (ICIMOD) based in Kathmandu, Nepal along with IFAD- have presented a preliminary report based on field assessment Ref: http://www.ifad.org/newsletter/pi/32_full.htm

Specific Changes	Specific adverse effects	
Less or absent winter rains Increased frequency of intense rainfall events	<ul style="list-style-type: none"> Decline in soil moisture hampering crop cultivation 	Drinking water sources are getting reduced thus adding to drudgery of women
Extreme weather events	<ul style="list-style-type: none"> Intense rainfall coupled with deforestation, sloping terrain and loose soil leading to soil erosion and loss of fertile soil, thereby making agriculture impossible Land degradation and loosening of soil 	
Sudden events leading to total loss of crops and property	<ul style="list-style-type: none"> Sudden weather events like hail storm in 2009 and resultant crop losses Cloud burst in June 2013, resulting in major devastation Increased instances of landslides compared to the past 	
Land and soil degradation due to intense rains Temperature variations	<ul style="list-style-type: none"> Increase in human-animal conflicts Increased pressure on forests resulting into decline of biodiversity Proliferation of invasive species Increased requirement for feed supplements for livestock Fodder scarcity and resultant drudgery for women 	

Overview of the Target State: Uttarakhand

Uttarakhand state is part of Zone I of the Indian Himalaya Region. It lies in the northern part of India between the latitudes 28°43'-31°27' N and longitudes 77°34'- 81°02'E having a maximum dimension of east - west 310 km and 255 km north - south covering an area of 53,484 km² with the elevation ranging from 210 to 7,817 meters above sea level. (See Figure 3)

The climatic condition of Uttarakhand varies greatly due to variation in altitude and proximity towards the Himalayan ranges. The spatial distribution of the rainfall varies depending upon the geographical location, slope and aspect of the place.

Given the terrain of the state and favorable climatic conditions, agriculture continues to be the major source of income for more than three-fourths of the state's population. Agriculture and allied activities contribute about 13 percent (at constant 2004-05 prices) of the state's gross domestic product during 2009-10, compared with the national average of 14.6 percent⁶.

⁶ SAPCC, Uttarakhand Report, 2012

During the last decade, the state has experienced frequent occurrence of extreme events such as cloud bursts and flash floods that have had devastating effects on communities. The nature of devastation is such that normalcy cannot return within a short time. Recent studies indicate that the devastation to livelihood support systems is likely to continue with increased frequency of such events. According to the recent report of Uttarakhand State Action Plan For Climate Change, climate change is likely to escalate the already existing social, ecological, economic and cultural vulnerabilities.

Figure 3: Uttarakhand State in IHR



As indicated in the recent *Uttarakhand State Action Plan for Climate Change, 2012*, climate change induced changes are already being experienced including receding glaciers and upwardly moving snowline, erratic rainfall, irregular winter rains, reduction in snow in winter, rise in temperature, increasing intensity and frequency of flash floods.

Table 2 gives a summary of climate related predictions as indicated in the SAPCC report.

Table 2: Projected Changes in Climate Parameters in 2030s with respect to 1970s

Parameter	Trend	1970-2030
Annual Temperature	Increase	$0.9 \pm 0.6^{\circ}\text{C}$ to $0.6 \pm 0.7^{\circ}\text{C}$
Net Increase in Temperature	Increase	1.7 to 2.2 $^{\circ}\text{C}$
Winter Temperature	Decrease	2.6 $^{\circ}\text{C}$
Temperature Extremes	Increase	1 to 4 $^{\circ}\text{C}$
Annual Rainfall (mm)	Increase	60 mm to 206 mm (5-13%)
Winter Rains	Increase	5 mm
Extreme Precipitation		2-12 %

Source: Uttarakhand, SAPCC⁷

Summary of sectoral effects of Climate Change in Uttarakhand

- i. **Agriculture:** Agriculture is based on traditional land use practices in Uttarakhand. Considerable area is under settled agriculture (terrace farming), which is dependent on natural resources like water and soil. Soil in the valley bottoms is more fertile than that found on the ridge top due to the presence of a large quantity of humus, mineral nutrients, moisture and suitable soil depth. This natural resource is depleting gradually, day by day, as soil erosion in the area is increasing with the increase in runoff caused by deforestation and overall land degradation. In general the agriculture can be characterized by low productivity, shortage of inputs, and lack of marketing that has confined many villages to produce only for self-subsistence farming. The variation in maximum and minimum temperature in the area is not very conducive for growth and development of plants, as increasing night temperature is leading to an increased loss of food material. Other than that, the **changing climate has also resulted in changing cropping patterns in the region**. Cultivation of hill food crops such as local millets, buckwheat, soybean and barley are in decline. Sowing time and the amount of precipitation have major impacts on crops both in rain-fed and irrigated areas. In rain-fed areas the sowing time, crop duration and productivity is directly linked to the quantum and distribution of rainfall, while in irrigated areas distribution of rainfall affects germination and harvesting of crops. In general, the output achieved from agriculture is much less considering the favorable soil and environmental conditions. On front of marketing of farm produce too there are few and scattered efforts. Markets are dominated by a few private players; the regulated markets are not so active. Almost entire horticultural produce of the area is either consumed locally or is collected by some contractors on behalf of the wholesale purchasers in Dehradun.

Main issues and challenges in agriculture in Uttarakhand can be summarized as:

- Majority of cultivators have small, marginal and fragmented land holdings
- Predominance of rain-fed and subsistence agriculture
- Unexplored potential of land favorable temperature
- Soil erosion, as the terrain is hilly
- Higher cost of production in hills
- Low (and often unavailability of timely) inputs and
- Access to last mile connectivity for extension services in agriculture
- Long distances to end markets and limited added value

⁷Uttarakhand State Action Plan for Climate Change – Transforming crisis in to Opportunity, Government of Uttarakhand, 2012 (supported by UNDP): 4 X 4 Assessment by Ministry of Environment and Forest- The projection/forecast of climate change on the Himalayan Region.

The role of women in agricultural activities in hill communities is crucial. An estimated 20 percent of rural households are de facto female headed due to widowhood, desertion or migration of the male member leading to feminization of agricultural work and labor in the Himalayan hills. As a result of this, the women in the hills have been identified as being more vulnerable to the effects of climate change.

- ii. **Livestock:** Large populations and low productivity is the hallmark of livestock in Uttarakhand, across all animal species. Majority of this population is nondescript and low in productivity, across all species. Over 80 percent of rural households own livestock and earn a part of their living from livestock. Major hurdles in transforming livestock rearing as main source of livelihood for small holders are lack of fodder, poor management practices and low genetic potential. Besides that there are limited avenues for marketing and value addition that result in lower returns from the livestock sector. For example, there are issues on milk collection and marketing in the state because of its hilly terrain and lack of access. Uttaranchal Cooperative Dairy Federation Ltd (UCDFL) also known as “Anchal Dairy” has district level Milk Co-operatives in all 13 districts of Uttarakhand for the marketing of milk and its value added products. Collection of fresh milk from village producers is constrained by difficulty of access. In addition, in recent times there have been more small-scale dairies and milk collection centers emerging throughout the region.

Main issues and challenges in livestock can be summarized as:

- Limited land under fodder crops in hills, mostly rain-fed
- More than 62 percent of land is under reserve forest hence grazing and harvesting of fodder from these areas is restricted
- Remote and geographically difficult terrain and limited road connectivity increases the transportation cost of fodder from plains, and constrains product marketing (e.g. fresh milk collection)
- Majority of the cattle and buffalo populations are non-descript and low yielding leading to low productivity per animal
- Poor infrastructure facilities at Veterinary Hospitals, Dispensaries and Production Support Institutions
- Limited mobility due to difficult terrain
- Animal husbandry practiced as an ancillary activity only

- iii. **Water:** Uttarakhand has two distinct hydro-geological regimes, namely the Gangetic alluvial plain and the Himalayan mountain belt. The state being predominantly hilly, offers much less potential for large-scale development of ground water. Ground water in the hilly region occurs mostly emerges as springs. The springs are amenable to small-scale development of ground water resources. **Deforestation, grazing and trampling by**

livestock, erosion of top fertile soil, forest fires and development activities (e.g. road-widening, mining, building construction, etc.) cause failure of the watershed, which results in unchecked flow of water during the monsoon to cause a sudden swelling of streams and rivers, leading to flash-floods in the foothills and even in the plains, and droughts in the villages located on the slope of the mountains. In terms of overall impact on communities, it has been realized that **climate change has also accelerated the process of degradation of the natural resource base.**

The effects of climate change are more severe on women and poor marginalized groups including small and marginal farmers residing in the hill areas. It has also been noticed that hill communities do not know how to cope up with this sudden change. Similarly there is limited access to finance and other Climate Smart Technology resources. Reversal of this situation will require addressing climate change vulnerabilities through resource use optimization and introduction and adoption of Climate Smart Technologies for creating livelihood opportunities and for sustaining the existing livelihoods. It is equally important to build the capacities of local villagers by imparting necessary skills and knowledge.

The above backdrop highlights the need for quick response and urgent actions without further delay to be able to build the required resilience of poor hill communities and their livelihood resources in project area.

Overview of Project District: Champawat

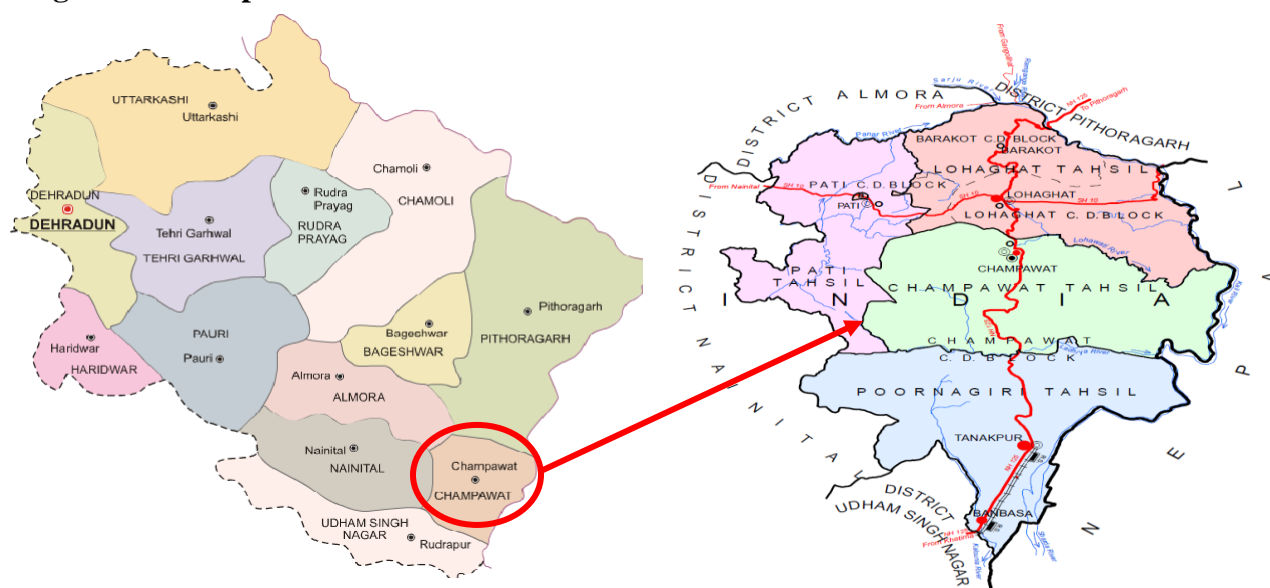
Champawat district of Uttarakhand located at 29°5' and 29° 30 ' North and 79° 59' and 80°3' East. The district mainly consists of mountain ranges, large valleys, uneven landscapes, rivers and rivulets. Out of 717 villages, only 35 villages falls in terai region (plain area) having altitude of 200-250m, which has abundance of water and good quality soil. Shivalik region (altitude height-250-1200 m) represents sloping and uneven topographical land consisting of dense forest. Most of the villages of Champawat district fall in this region. Out of the total geographical area of 1766 sq km, 65 percent of the area is forest. Only 10% of the total geographical area is net sown area, out of which 9% of the area is irrigated. Hill communities mainly practice subsistence farming and only traditional crops are grown.

In this district 65 percent of the area is under forest and net sown area is less than 10 percent. Only about 9% of the sown area is irrigated and agriculture is manly rainfed. Main source of irrigation, other than rain-water, is canals and bore wells. Small and scattered land holdings are making agriculture economically nonviable. More than 70 percent of the land holdings are less than one hectare in size and the average land holding is about 0.91 hectare. Due to poor soil health and soil erosion, caused by heavy rainfall and landslides, productivity is affected in the area.

Around 82 percent of workers are engaged in agriculture and there are negligible workers in household or non-household industry. It is quite evident that, in just 10% of net sown area 82% of the population is directly or indirectly dependent on agriculture for livelihood. Other factor contributing to poor economy of the district is decadal growth of the population which is quite evident from increasing population density of the area (2001-127/sq km & 2011-147/sq km). Lack of agricultural land and resources is largely contributing to the poor economic status of the hill communities.

The poor economy of the hill area has forced the youth population of the district to migrate to cities for their alternate livelihood options. The household is more or less dependent on the money order system. Therefore, there is large number of women headed households in the district.

Figure 4: Champawat district in Uttarakhand State



The district is economically and socially backward with acute poverty and society ridden with outmoded traditions and even superstitions. The status of women is coupled with discrimination against girl child. The women suffer from all kinds of social disabilities and at the same time handling each and every responsibility of domestic work as well as collection of fuel and fodder and in large cases drinking water from distant places. All these factors adversely affect educational development of girls especially of poorer sectors of society and those living in remote areas which is quite evident from the female literacy rate that is 66.56% in comparison to the male literacy of male (92.24%).

The climate of the district is very differential. Terai area (plain area) is hot whereas the hilly region is comparatively cold. High mountain ranges are covered with snow. The climatic condition of Terai and plains are similar, the seasonal rain is very high (about 20 cm. yearly). Summers are too hot and winters are too cold and foggy in Terai region. The climate of Shivalik

is more or less same but the lower region of Himalayas experience cold climate throughout the year. In summers, Champawat district is pleasant. The temperature varies from 1 degree Celsius in the year to 35 degree Celsius. Summer months are May, June and July whereas Dec and Jan are very cold.

Other challenges as identified and shared by the participant communities are:

- Continued vicious cycle of low production, low productivity, low input supply, low level of awareness of new technologies and inadequate extension support leaves the farmer practicing inefficient farming operations
- Lack of technical knowledge of farmers and gradual erosion of traditional knowledge is additional factor working towards vulnerability of these communities.
- Deforestation and degradation of natural forest along with plantation of inappropriate plant species
- Ignorance/indifference towards common property resources such as community pastoral lands
- No job opportunities locally, hence migration adopted as a coping strategy, mostly by able bodied men
- Geographical isolation, remote and scattered clusters in hills as well as limited efforts for organized marketing, collection and processing of hill produce

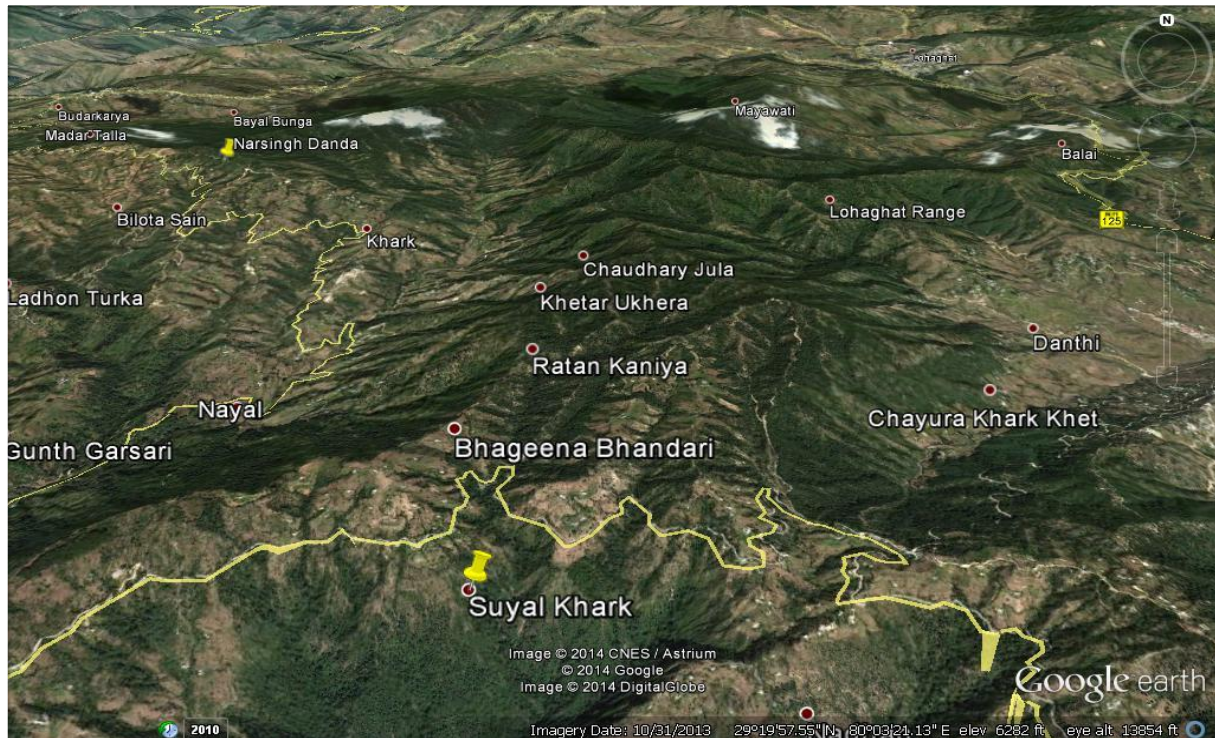
Socio-economic profile of targeted cluster:

The project proposed is to be implemented in a cluster of 10 villages / gram panchayats which is mainly administrative part of 3 blocks (Champawat, Pati, Lohaghat) of Champawat district. All villages are in the spread of 3,543 sq km having 30% of the area as forest, 10 % of the land as pasture land and 51% of the area as cultivable land. Out of the total cultivable land only 28% of the area is net sown area. All the farmers are highly dependent on rains for agricultural activities as only 5% of the total net sown area has irrigation facility. **Average landholding of the cluster is 1.3 ha. Out of total 1357 families 1272 families have land holdings of less than 2 ha. Agriculture and to certain extent livestock are main income generation activities for nearly 70% of the households in this part.** Rain fed agriculture being primary occupation of the communities which expose them to greater risk and make them more vulnerable to climate change effects.

Average annual income per household in all 10 villages (gram panchayats) is Rs. 28,000 (\$476 yearly) only. As per Census 2011 data, 358 ha have been classified as Pasture land in this cluster. These are disjointed pieces of lands which are managed by village panchayats as per Vanpanchat Act of state of Uttarakhand. None of these Vanpanchayats lands are properly managed and collective actions are lacking for its conservation and restoration (Vanpanchayat lands are the stretch of community lands managed by villagers to meet the fodder and fuel demands since ages)

Figure 5: Google Image Indicating 10 Hilly Villages in Champawat District

As per the Population Census 2011, total of 6,364 persons are residing in 10 villages (gram panchayats), having almost equal ratio of male and female. The economy is termed as, "Money order economy" as most of the able bodied male members out migrate to the nearby cities in search of better options for income and employment. Many have also joined Indian Army. Thus it is the women in hills who have to manage the agriculture and livestock rearing activities. Women bear all the burden of farming operations, livestock rearing, cooking and water and fuel



wood collection and storage etc. **Out of the total households in this cluster nearly 40 percent are women headed as can be seen from the table no. 3.** It is also gathered that 18% of the total population is Schedule Caste and these families are scattered in 3-4 villages having maximum population in village Narsinghdanda.

Table 3: Demographic Detail of 10 Proposed Villages[#] (Gram Panchayats)

Particulars	Khalkariya	Suyalkhark	Digdai	Bhageena Bhandari	Narsingh Danda	Tapnial	Goshani	Tyarshun	Manar Malla	Bangaon	Total
Block	Champawat	Champawat	Champawat	Champawat	Champanawat	Pati	Pati	Pati	Pati	Lohaghat	Total
Demographical Profile											
Total Households	76	105	79	160	162	87	419	100	125	44	1357
Total Population	332	422	446	713	833	435	1858	484	666	175	6364
Male	173	215	235	336	442	208	921	254	340	82	3206
Female	159	207	211	377	391	227	937	230	326	93	3158
SC Population (% of total Population)	0 (0)	0 (0)	19 (4)	70 (10)	827 (99)	7 (2)	118 (6)	97 (20)	6 (1)	9 (5)	(1153)18
Literacy Rate (%)	81.0	70.4	68.2	73.4	70.1	77.5	77.5	68.2	74.8	69.7	74
Female Literacy rate (%)	69	59	51	73	50	78	71	52	65	67	64
Sex Ratio	919	963	898	1122	885	1091	1017	906	959	1134	985
Women headed (HH)	33	36	27	30	60	46	189	44	58	33	556
Geographic Profile											
Barren Land (in Ha)	12	1	0	12	4	0	1	10	4	1	44
Pasture Land (in Ha)	44	47	28	78	2	50	30	17	45	17	358
% of Net Sown area out of total cultivable land	41	19	20	57	80	42	68	76	62	47	28
Un-irrigated Land out of net sown area (in %)	65	100	100	100	100	70	100	100	100	100	95%
Economic Profile											
Cultivators	73.2	74.8	92.6	37.8	41.6	84.4	46.3	50.6	72	90	60.6

(Main working population) %									.6	.7	
Avg. Land Holding	1.1	1.7	2.7	2.5	0.7	2.8	0.7	1.1	1.1	1.5	1.3
Small & Marginal Farmers (in %)	89	94	81	92	98	93	96	94	98	88	923

(#Note: table 3 has been revised based on the updated information provided by Executing Entity)

The above data is taken from official Census Report of 2011 district Champavat which is a published document by Government of India.

Selection criteria for Project Participants

It is mentioned in many reports and also seen in the field, that climate change will have differentiated impacts on sections of the population, and that impact could be more severe for women, and poor and marginalized groups, especially small and marginal farmers that have no other livelihoods. The project envisages introducing a package of climate smart actions at the family level. Remaining villagers from the project villages will be covered and benefited indirectly through capacity building, awareness generation and sensitization efforts. They will also be benefited by area based/ landscape based development actions

The project participants would include 800 vulnerable small and marginal farming families whose livelihoods are solely dependent on primary sectors such as agriculture and livestock. Since this is the first of its kind effort in the IHR to pilot test the package of a combination of climate smart technologies at the family level (household level), initially a small number of families will be covered.

Before selecting the required number of participant families, project orientation meetings will be conducted involving men, women and youth from the project villages as well as members of local self-government. These orientation meetings will help the community to understand the objectives and approach of the project and facilitate developing rapport with the community members.

At the village level, project planning, implementation and monitoring will be done with the participation of all village level groups. Care will be taken to ensure that there is proper representation from different age groups, caste, class, religion and ethnicity of the villages. The major purpose of this process is (i) to provide a platform to participate in planning project interventions, implementing and monitoring; (ii) to provide space for women and marginalized communities to participate in decision making; and to (iii) create ownership of all project activities implemented in the village.

The following criteria will be shared with the villagers to identify project participants:

- Families with sole dependence on agriculture / primary sector which are climate sensitive as only source of income and livelihoods
- Families staying in remote hill areas ,where alternative livelihood options are limited
- Farmers with basic minimum resources to meet their livelihood requirements
- Women headed families where productive men have migrated to cities and thus females are taking care of farming and thus bear direct burden of degradation of natural resources due to falling effects of climate change /variability
- Poor households(Including Scheduled caste households) to be jointly identified by villagers using participatory processes (considering poverty and marginalization perspectives of the villagers

Vulnerable Groups:

The project envisages introducing a package of climate smart actions at the family level of around 800 vulnerable families whose livelihoods are solely dependent on primary sectors such as agriculture and to certain extent livestock. Following have been identified are most vulnerable households and under project these households would be selected :

Small and Marginal Farmers having lands less than 2 Ha:

Sixty percent of the population is directly dependent on agriculture and related activities; they are the most vulnerable group. Within these also the small and marginal farmers /households having land holding of less than 2 Ha of land are more vulnerable. This is because resources that are there at their disposal are very limited. They have no other livelihood generation options and income from agriculture too is very meager due to overall nature of rain fed, low productive and less diversified farming.

Within Small and Marginal Farmers, following two sections of population would be focused:

1. Women headed Households:

In hills, women have been identified as more vulnerable to effects of climate change, owing to their active and major involvement in agriculture and allied sectors. Uttarakhand in general and project location in specific, is considered as money order economy as productive men mostly migrate to other locations for better income opportunities. It is women who are mostly staying back in hill villages along with other elders in family who bear the major burden of performing agricultural operations and gathering supplies for household needs such as fodder and firewood, preparing manure, collecting drinking water, etc. which is quite evident from cluster profile of all the villages, where 40% of the household are headed by women. Hence, women are solely responsible for the livelihood of their family because of that, they work extensively in for both productive and reproductive work related to family. Out of the total workforce in the selected cluster, 40% of the workforce is women, out of which 62 % of the total women workforces are marginal workers, mainly involved in agriculture. They are

responsible for production of major grains and millets, in land preparation, seed selection and seedling production, sowing, applying manure, fertilizer and pesticide, weeding, transplanting, threshing, winnowing and harvesting. In animal husbandry, women have multiple roles, ranging from animal care, grazing, fodder collection and cleaning of animal sheds to processing of milk and livestock products. Keeping milch animals, small ruminants and backyard poultry is an important source of income for poor farm families and agricultural laborers. Women also augment family resources through tasks such as collection of fuel, fodder, drinking water. The increased feminization of agricultural work and labour mentioned in the earlier sub-section means concentration of women in a sector which is already experiencing severe decline.

Due to climate change there has been increased work pressure on women because of loss of their productive labour (mainly in agriculture) leading to physical and mental stress. Women also face social and economic barriers in Indian society that limit their coping capacity. Other than that, climate change is disproportionately affecting women, as they have unequal access to resources and to decision-making processes in the rural society.

Keeping this in mind, the primary strategy for Climate smart agriculture intervention is planned to be able to provide gender sensitive adaptation response. The women have been identified as primary stakeholders of this project. Further, most of the activities are designed after considering hardship of women and steps are planned to improve the natural resource base and thereby improve direct and indirect gains for hill women.

2. **Schedule Caste/Schedule Tribe Households:** Though climatic uncertainties have implications on many sectors, rural livelihoods are most affected by changes in climatic patterns. Schedule Caste who are highly dependent on earnings from agricultural labour and, livestock rearing dependent on forests and other common lands have fewer resources and options to combat the damages to the resource base because of climate change. The internalization of discrimination and exclusion continue to deprive them of their social, economic and political rights and opportunities. Their locational, social and economic vulnerabilities place a greater strain on their adaptive capacity to climate change and ability to deal with shocks, stresses and change. In the proposed cluster profile, **18%** of the population belongs to Schedule Caste and Scheduled Tribes. For this segment of population also, individual household activities planned as per their landholding.

Remaining villagers from the project villages will be covered and benefited indirectly through other project components such as capacity building, awareness generation and sensitization efforts. They will also be benefited by proposed area based/ landscape based development actions too. All the components proposed in the project will directly or indirectly benefit the whole community.

For better understanding of the community and proper identification of the problem in Champawat district, a series of village level meetings and focus group discussion had been held to assess the vulnerability and existing coping strategies as adopted by the hill communities.

During these preliminary field visits it was noticed that the climate change and variability are having a direct bearing on the livelihoods of these communities. Considering the type of vulnerabilities, the project activities are proposed to facilitate the introduction of mix of climate smart technologies at the household as well as community level.

Identification of vulnerability and required adaptation measures

A series of village level meetings and focus group discussions could be held to assess the vulnerability and existing coping strategies as adopted by the hill communities. During these preliminary field visits it was noticed that climate change and variability are having a direct bearing on the livelihoods of these communities. Considering the type of vulnerabilities, the project activities are proposed to facilitate the introduction of a mix of climate smart technologies (covering important livelihood resources mainly, water, livestock and vegetation and crop resources) at the household and landscape level. As a part of project activities, it is proposed to provide required technical back up. The project strategy also includes building partnerships with relevant scientific and technical institutes for backup services. Table 4 shows the main problems identified already and the suggested solutions.

Table 4: Problem Identification and Suggested Technology Solutions

Main Problems identified during the consultation with the villagers	Suggested Technology Solutions arrived in consultation with other stakeholders
<ul style="list-style-type: none"> Growing scarcity of water (surface and sub-surface) for drinking and irrigation purposes due to unseasonal , irregular, less consistent, unpredictable rains in hills <p>Drying up of natural water sources, mainly springs</p>	<ul style="list-style-type: none"> Recharging of Natural Springs- through site specific mechanical and vegetative measures Roof top rainwater harvesting Innovative water use efficiency demonstrations Ways for creating in situ natural water reserves in hills
<ul style="list-style-type: none"> Growing scarcity of fodder resources in hills to support livestock Loss of habitats and increased neglect of common pastoral 	<ul style="list-style-type: none"> Fodder promotion on private and community lands through Vanpanchayats Introducing ways and measures for perennial green fodder availability

lands	
<ul style="list-style-type: none"> ▪ Absence of optimum development of horticulture e.g. cultivation of high value vegetables as a source of livelihood in spite of favorable conditions ▪ Sudden and extreme weather events posing threat to cultivation in open lands ▪ Limited options for crop and income diversification 	<ul style="list-style-type: none"> ▪ Promotion of horticulture under protected conditions (low cost bamboo based small poly houses). ▪ Main crops to be promoted under the protective cultivation would be vegetables (e.g. Tomato, Capsicum, and Cucumber) ▪ Piloting actions for organized production intensification, collection and marketing of farm produce by villagers
<ul style="list-style-type: none"> ▪ Low productivity of cattle and limited realization of livestock yield potential ▪ Absence of organized milk collection and marketing efforts 	<ul style="list-style-type: none"> ▪ Improved breeding services (using semen of suitable milk cattle breeds) at the door step of hill families and training and inputs for scientific and climate friendly livestock management ▪ Piloting efforts for organized milk collection and marketing, linkage development with government promoted dairy. Anchal dairy has an operational base throughout most of the state
<ul style="list-style-type: none"> ▪ Eroding base of the agro biodiversity and diverse landraces (mainly, niche crops and sturdy and nutritious millets of the hills) Ex: <i>Mandua</i> (finger millets), <i>ramdana/chua</i> (amaranthus), <i>rajma</i> (common kidney beans), <i>ogal</i> (buckwheat), <i>urad</i> (green gram), <i>moong</i> (black gram), <i>naurangi</i> (mix of pulses), <i>gahath</i> (horsegram), <i>bhat</i> (soybean), <i>lobiya</i> (French beans), <i>kheera</i> (cucumber) 	<ul style="list-style-type: none"> ▪ Participatory conservation and characterization of indigenous pulses & millets (native varieties) ▪ Establishing community seed banks for conservation and multiplication ▪ Live trials for production enhancement, multiplication and pure seed production ▪ Improved market services for producers and buyers

<ul style="list-style-type: none"> ▪ Absence of scientific and farmer friendly weather data service and reach of weather based crop advisory services in a region there by increasing community's vulnerability 	<ul style="list-style-type: none"> ▪ Linkage development and increased partnership with local research and scientific institutes in a region for required technical inputs
<ul style="list-style-type: none"> ▪ Absence of crop diversification efforts due to absence of techno-managerial inputs and lack of knowledge about required agro technology for introduction of temperate fruit varieties such as Plum, Malta, Apple, Peach, and Walnut in the field despite favorable climate conditions 	<ul style="list-style-type: none"> ▪ Introduction of high value, temperate horticulture fruit types and grafts on private lands to develop orchard based income source with required techno managerial and input support ▪ Improved market services for producers and buyers
<ul style="list-style-type: none"> ▪ Enhanced degradation of existing natural resources in the region thereby adding hardship for hill women 	<ul style="list-style-type: none"> ▪ Planned combination of climate smart and resource based development interventions to be able to enhance water, fodder, farm produce base in project villages

Vulnerable Group Wise Identified/ Observed Risks during Consultation :

Out of total 4 consultations held to understand the nature of climate hazards and type of vulnerability, two were held directly in the villages i.e (1) During August 2012 in villages of Pardhyani, Kapdi, Manar, Gambhir, Baaj, Sujan, Dikti of Khetikhan cluster of District Champawat, Tapanipal . (2) On 5th April, 2014, in village Nariyal Gaon, district Champavat where villagers from other project villages such as SuyalKhark, Bhaganabhandari, Khark, Haripur (Narsingh Danda), Dingdai, Gosni, Manar, Tapnival, BanjGaon, Tyarso were also present. Although 100% households could not participate in village level meetings, there was good representation of each of the vulnerable sections such as Small and Marginal Farmers, Women headed households, Scheduled Caste Households etc. For instance representatives from village Narsingh Danda where nearly 99% of households belong to SCs participated in consultations on 05th April 2014. Accordingly, interventions have been designed taking into account feedback from representatives of Scheduled Caste and other vulnerable groups

Table 5: Vulnerable group-wise analysis

Identified Most Vulnerable Groups	Status	Identified Risks due to Climate Change	Expected coping mechanisms : Views as shared during village level consultation
<p>1. Small and Marginal Farmers having lands less than 2 Ha:</p>	<p>Sixty percent of the population is directly dependent on agriculture and related activities, they are the most vulnerable group. Within these also the small and marginal farmers /households having land holding of less than 2 Ha of land are more vulnerable. This is because resources that are there at their disposal are very limited. They have no other livelihood generation options and income from agriculture is very meager due to overall nature of rain fed, low productive and less diversified farming.</p> <p>This farming community suffer from socio-economic marginality, inaccessibility, and from absence of</p>	<p>Due to irregular rainfall and sudden climatic events , the agriculture is turning as a gamble for these section of population</p> <p>Agriculture & horticulture crops have been affected the most as these are highly climate sensitive and there are huge losses owing to sudden climatic events and higher incidence of pest and diseases.</p> <p>It was noticed that this section of farmers are ill-equipped to deal with the climate change issue as they are not organized, have less access to new technologies and farming practices etc.</p>	<ul style="list-style-type: none"> • Improved water resources and creation of long term water reserves in hills • Innovative efforts for agriculture diversification to diversify risks • Promotion of farming under protected conditions to reduce risks of crop loss due to sudden climate events • Linkage development with local scientific and research institutes such as agriculture universities, institutes working on Himalayan ecosystem to ensure better access to climate smart agriculture technologies

	livelihood opportunities.		
1.1) Women headed Households:	<p>Nearly 40% of the project households have women headed households.</p> <p>It is women who are mostly staying back in hill villages along with other elders in family who bear the major burden of performing agricultural operations and gathering supplies for household needs such as fodder and firewood, preparing manure, collecting drinking water, etc.</p> <p>The region also has seen increased feminization of agricultural work and labour as productive men out migrates for better income opportunities.</p>	<p>Climate change has resulted in increased work pressure on women and loss of their productive labour.</p> <p>Women also expressed concerns over absence of any climate change technology options due to remoteness and due to less exposure to modern technologies and limited access to women</p>	<ul style="list-style-type: none"> Many women participants expressed need to have project interventions aiming at water resource development, fodder resource development , alternatives for fuel wood, enhanced use of bio energy for reducing their work pressures Many women indicated need to have improved / sustained <i>natural resource base</i> in the hill region to make their living better .
1.2) Schedule Caste Population	<p>In the proposed cluster nearly 18% of the population belongs to Schedule Caste (SCs) .</p> <p>This population is</p>	<p>SC population have comparatively less lands (average 0.7 Ha) .</p> <p>The community is thus resource poor. Agriculture and</p>	<ul style="list-style-type: none"> Need to create alternative livelihood opportunities Need to introduce practices for improved production and

	concentrated in the project villages viz. Bhaganabhandri, Narsingh Danda, Gosni, and Tyarshu.	labour constitutes main livelihood sources for this section of population. Risks associated with the climate change has further aggravated situation.	productivity from small piece of lands
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Climate change implications as shared during the consultations involving the vulnerable groups :

- Main adverse change of climate change rated by people is reduced incidence of snow fall during winter due to warmer winters. The good snowfall during winter used to provide required temperature conditions for satisfactory growth of temperate fruit and vegetable crops, this used to help maintaining the required temperature and soil moisture and also used to help reducing pests.
- Other adverse effects mentioned were increase in maximum temperatures, decrease in minimum temperatures both during winter and summer.
- Unseasonal, irregular, unequal and less consistent and unpredictable rains as compared with earlier periods. (In olden days people used to term rain fall as ‘Satzhadi’ meaning – ‘Rain which does not stop continuously for seven days’). People mentioned that this is not seen now.
- Late monsoon leading to drought like situation and resulting in failure of main crops sown in March.
- People also mentioned changes such as, Increase in mosquitoes, early flowering in rhododendron trees. New pests on capsicum, Need for fans which were not seen in hills before.

Sectorial implications of climate change and variability and growing vulnerability captured during series of consultations:

- **Agriculture & horticulture sectors have been affected the most.** This has also resulted in changing cropping pattern in this region. Cultivation of hill food crops such as local millets, buckwheat, soybean and barley are on decline. Crops that need freezing temperatures, such as apples, are on the decline. The lack of chilling temperatures is leading to a decrease in fruit setting. Crops that were not originally grown in this belt are now increasingly cultivated Ex:- Tomatoes, capsicum, flowers etc. This has resulted in people depending upon plain markets for the supply of basic food produce.
- **Water** is other important resource whose availability is influenced adversely in hills. Water in hills was never anticipated as a problem earlier but this year people had to purchase water. Many people are digging up wells which is a new development. Many people had to struggle hard to fill up water from natural springs in hilly terrains. People

do not seem to be aware about different proven techniques of harvesting, storage and use of water in hills.

- **Livestock:** Livestock resource is affected due to shortage of nutritive fodder even in monsoon. Due to this shortage, castles have been released in to forests this year.
- **Agriculture including crop and livestock based production system being rainfed and climate sensitive, stands most affected in study region**
- The vulnerability is also seen growing as there is limited knowledge available with the farmers about Climate Smart Agriculture Technologies
- Emerging changes in climatic factors are posing newer challenges for livelihood generation, through it's impact on important livelihood resources like land, soil, water , crops and livestock in a region
- **Helplessness as expressed by the community:** While interacting with communities to understand their take on climate change adaptation measures , it was noticed that people are clue less, disoriented and ill-equipped to deal with climate change phenomena. The mountain communities are thus most vulnerable to climate change effects.
- Greatest handicaps that people expressed were not having any assured and timely weather forecasting data service at the level of village. This creates the feeling of helplessness amongst the agriculture dependent communities. Over all farmers were seen unable to cope up with this situation
- In terms of overall impact on communities, from this field level exercise, it is thus realized that climate change has also accelerated the process of degradation of natural resource base. This is also causing damage to biodiversity and is resulting in to growing marginalization of the hill communities.
- The increased hardship of women is also realised as main effect of climate change during the consultation and field observations Thus need was felt to generate some women friendly strategies with respect to water resource development, fodder resources, fuel wood, bio energy for reducing their work pressure. Such considerations have been taken in to account while designing the project measures

The observations and issues of these consultations have been used as a base to arrive at the set of interventions that would benefit the vulnerable groups i.e- Resource Poor Small and Marginal Farmers , Women headed households, Scheduled caste households in selected villages.

Listed interventions in consultation with the local villagers

- Community mobilization to revive and regenerate vegetation cover on degraded community pasture lands (Vanpanchayats) and fodder promotion would lead to ecological restoration of common property resources, sustained ecosystem services and ensuring long term access and availability of green fodder for livestock.
- Demonstrating and standardizing other livelihood options having potential in the hills such

as livestock rearing, horticulture and high value vegetable cultivation will help developing risk and income diversification options

- Scouting and demonstrating techniques of promotion of cultivation of vegetables under controlled or protected conditions to ensure production despite sudden climatic events and weather variations, which are common in hills
- Soil and water conservation measures and site specific measures for ground water recharge will help rejuvenation of springs, which is important natural and perennial source of water in hills
- Community based agro biodiversity conservation and revival of niche crops from hills will improve risk mitigation, seed sovereignty and food security in the region
- Introduction of climate smart technologies in important sectors will help reduce the hardship of hill women
- Innovative actions for promotion of producer owned agri businesses/ marketing efforts, and improved market access

Project approach

Many studies support the hypothesis that strengthening adaptive capacities of farmers requires a variety of strategies ranging from diversification of production systems to improved institutional settings and enabling policies (Tubiello, F.N., Soussana, J. and Howden, S. M., 2007. Crop and pasture response to climate change⁸)

Through this project, the field actions will be introduced into a cluster of 10 villages (Gram Panchayats – GPs). The interventions are planned at the level of individual households, community managed landscapes / common property resources and at the community level. The project actions are planned to be introduced with the active participation of various village level primary groups such as Self Help Groups, Livestock Keeper Families, and Seed savers groups, Farmer's collectives, *gram sabhas*, *Van panchayat* members and Water User's Associations, PRIs, etc. As a strategy, linkages and partnerships will be developed with relevant technical and scientific institutes in the region for required technology back stopping.

BAIF and Network of Institutions to Support the Project

BAIF has contributed to the cause of rural and tribal development in country by introducing number of innovative natural resource based livelihood development program interventions in other parts of country. Many of these programme approaches have now been internalized as government-sponsored pro poor livelihood development programmes. It is also recognized as an Institute of National Importance by the Indian Council of Agricultural Research. BAIF has

⁸ Tubiello, F.N., Soussana, J. and Howden, S. M., 2007. Crop and pasture response to climate change

its own team of experts who would be consulted and involved from time to time for livestock, fodder and agriculture diversification, institution strengthening and marketing components of project. BAIF is also very experienced in networking and drawing on the knowledge and expertise of others to help provide sustainable development solutions for poor hills communities.

BAIF already has had a programmatic base in the state of Uttarakhand since 1994. Currently, a livestock breed improvement program is ongoing in 12 districts of Uttarakhand benefiting around 60,000 families. Farmers are also getting educated about scientific management of livestock. These centers are providing improved breeding services and scientific management inputs at the door-step of hill families. Since past 5 years, a special program of **Hill Area Development** has been ongoing. (Ref. Annexure 8). Through this BAIF is evolving and demonstrating suitable development models aimed at enhanced livelihood opportunities and improved natural-resource management in challenging niche areas. Under this initiative, the Center for Development in Fragile Hill Areas⁹ has been set up. Field work has been done in Augustmuni cluster in Rudraprayag district, in the Garhwal region; and Khetikhan cluster in Champawat district, in the Kumaon region. A range of interventions for sustainably improving incomes of local communities have been demonstrated. The approach taken is to promote context-specific and altitude-specific technologies and processes at the household and community levels for: sustainably increasing returns from agriculture and animal husbandry, increasing availability of water, increasing production of fodder, diversifying land-based livelihoods, promoting alternative income-generation activities, and reducing drudgery of women; through enabling processes like conservation and revival of biodiversity resources, formation and strengthening of people's institutions, and building partnerships with research institutes and likeminded organisations having a similar mandate.

BIRD- UK is also one of the partners in NAIP (National Agriculture Innovation Project) supported by Indian Council of Agriculture Research, Government of India. As such a working partnership is developed with many other consortium partners which includes research and scientific institutions of repute

As a strategy it is proposed to develop linkages with relevant scientific and technical institutes involved in similar work and aim at networking with likeminded development organizations and programs in North Western Himalayan region like Vivekananda Parvatiya Krishi Anusandhan Sansthan (Almora), G.B.Pant University of Agriculture Technology (Pantnagar), GB Pant Institute Of Himalayan Environment and Development, (Kosi, Almora), etc. It has close linkages with the Central Institute of Tropical Horticulture, Mukteshwar and Central Soil and Water Research Training Institute, Dehradun. The working relationships have also been developed with local NGOs such as People Science Institute, Himalayan Action Research

⁹ This Thematic Center was set up with support from Sir Dorabji Tata Trust (SDTT), Mumbai.

Centre (HARC), Himalayan Conservation Studies and Conservation Organization HESCO in Dehradun, Uttarakhand Dairy Cooperation Federation Etc.

The collaborative areas will include strategic research technology demonstrations and transfer, applied field-based research, capacity building and outreach in dairy animal development, goat development, natural resource management, agro forestry, tree based farming systems, climate change mitigation, conservation of animal and plant genetic resources, post-harvest technologies, etc.

Further linkages are also being sought with on-going Climate Adaptation programs in North Western Himalayas such as HICAP, IHCAP on-going with support of SWISS Agency for Development Corporation, ICIMOD-Nepal, newly launched program of Department of Science and Technology, Government of India DST –TIME (Technology Initiatives in Mountain Ecosystems), MGNREGS scheme, local Krishi Vigyan Kendra etc. The ultimate aim is to facilitate synergistic efforts and transfer of suitable technologies at the level of vulnerable and agriculture-dependent hill families.

Importantly, BAIF has already demonstrated and introduced similar interventions in Hill conditions as a part of its effort to set up a context-specific development model in hill conditions. This previous experience has proven to be very useful to arrive at realistic designs, operational methods and implementation arrangements, as well as a sound base for costs and income projections. (See Annexure: 8)

PROJECT / PROGRAMME OBJECTIVES:

List the main objectives of the project

The project aims to improve the adaptive capacity of rural small and marginal farmers including hill women in North Western Himalayan region by introducing a combination of Climate Smart Farming Technologies along with required social engineering and capacity building processes. These packages of activities is expected to improve /sustain the livelihoods of vulnerable hill communities, show ways of diversification of income while also initiating the process of natural resource management in the region.

The main five outcomes, as shown in the Project Results Framework (refer Table no.: 21) are as follows:

The project will deliver this objective through achieving five outcomes:

- Outcome 1:** Improved community mobilization to collectively plan and undertake climate change adaptation
- Outcome 2.1:** Building resilience through increased water availability and efficient water use in hill region
- Outcome 2.2:** Adoption of climate smart agriculture technologies and farm diversification options for climate resilient livelihoods
- Outcome 2.3:** Improved potential of livestock resources as an option for livelihood stabilization in hills
- Outcome 3:** Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and stakeholders as well as for better policy inputs

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well-defined interventions / projects.

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
Component 1: Community Mobilization and Organization	Output 1.1: Local level awareness generation and mobilization of the community for climate related hazards.	Outcome 1: Improved community mobilization to collectively plan and undertake climate change adaptation	68,133
	Output 1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability		
Component 2: Introduction of Water Resource Development and Climate Smart Farming Technology	Output 2.1.1 Creation of water reserves in regions through rain water tapping interventions	Outcome 2.1: Building resilience through increased water availability and efficient water use in hill region	731,575
	Output 2.1.2 Adoption of efficient water use practices and technologies		
	Output 2.2 Introduction to climate smart farming technologies with hill specificity	Outcome 2.2: Adoption of climate smart agriculture technologies and farm diversification options for climate resilient livelihoods	
	Output 2.3 Introduction of improved breeding service at door step of farmers with required management practices including fodder and feed	Outcome 2.3: Improved potential of livestock resources as an option for livelihood	

Project Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
	management	stabilization in hills	
Component 3: Knowledge Management including knowledge creation and wider dissemination actions	Output 3.1: Knowledge generation through field action component	Outcome 3: Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and stakeholders as well as for better policy inputs	16,667
	Output 3.2: Wider dissemination of acquired knowledge		
Project/Programme Execution cost			76,595
Total Project/Programme Cost			893,970
Project/Programme Cycle Management Fee charged by the Implementing Entity			75,600
Amount of Financing Requested			969,570

PROJECTED CALENDAR:

Indicate the dates of the following milestones for the proposed project/programme

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	November 2015
Mid-term Review (if planned)	December 2017
Project/Programme Closing	November 2019
Terminal Evaluation	March 2020

PART II: PROJECT JUSTIFICATION

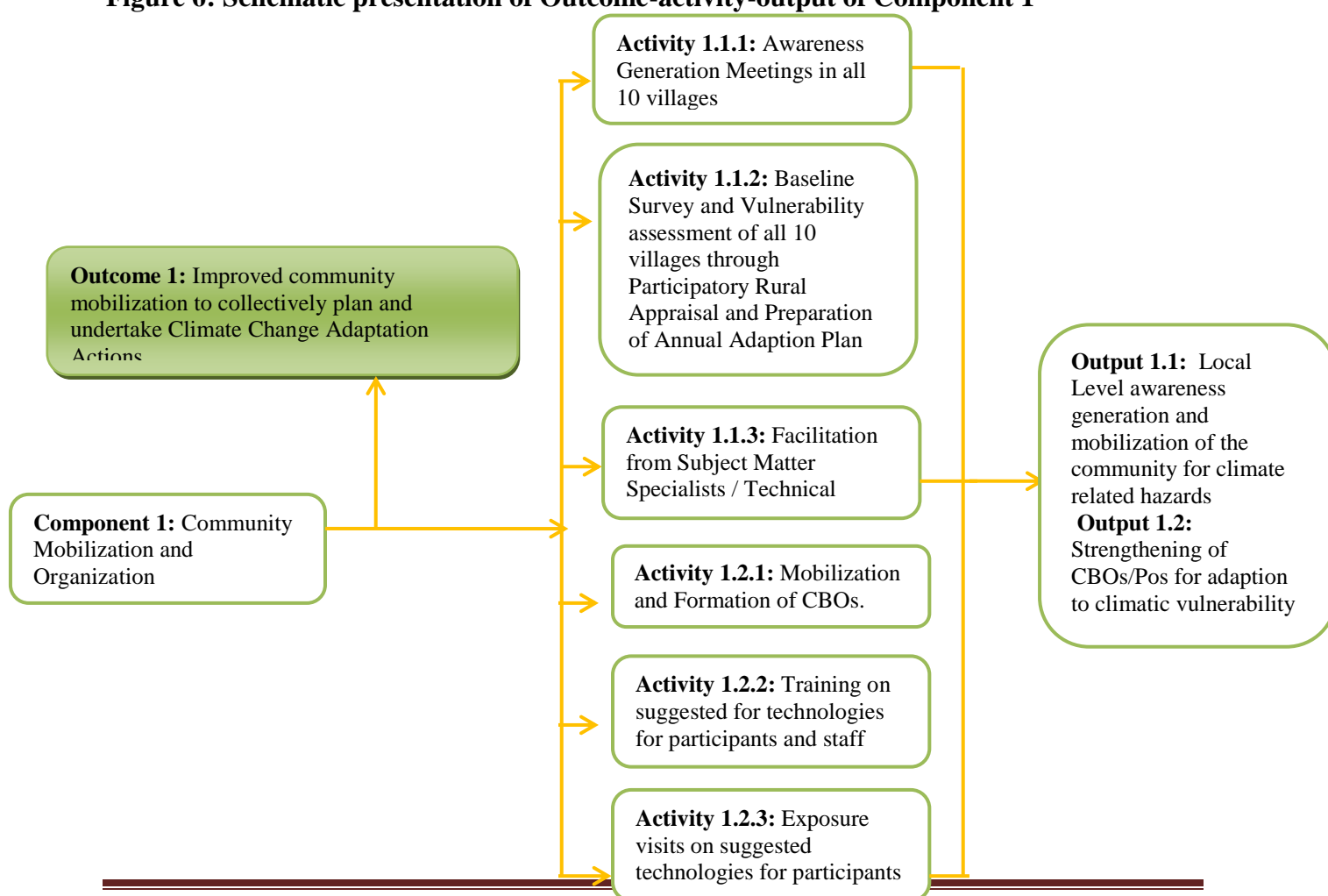
A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience.

Component 1: Community Mobilization and Organization

Outcome 1: Improved community mobilization to collectively plan and undertake Climate Change Adaptation

In the proposed 10 villages (Gram Panchayats – GPs) of Champawat district, the communities are not currently organized to tackle the climate change issue collectively. There are limited efforts to organize them properly, form informal and formal groups and plan a collective response to be able to face climate change effects. The project thus proposes to take up actions to generate awareness amongst the hill community about different climate change related issues and associated risks. Thereafter the actions will be introduced to strengthen existing local level institutions through mobilization and involvement of the CBOs in participatory vulnerability assessment exercises, planning awareness events for enhancing their knowledge on various climate smart technologies. Actions are planned to build their capacities and skills after understanding the nature of climate risks, its sectoral implications and required coping strategies.

Figure 6: Schematic presentation of Outcome-activity-output of Component 1



Proper use of science and technology and IEC tools is also proposed for improved awareness and response mechanisms. These efforts are expected to result in improved adaption planning and collective response to future effects in a project cluster.

Output 1.1: Local level awareness generation and mobilization of the community for Climate related hazards

Activity 1.1.1: Awareness Generation Meetings

In the initial 3-4 months, awareness generation meetings will be held with the communities of the proposed 10 villages/ gram panchayats, which will help the communities to understand the climate related risks and hazards as well as the techniques available for minimizing the risks involved. These introductory meetings will be organized with the Panchayat and other leading farmers along with youth, women and small and marginal farmers of the villages / gram panchayats. In this phase, for proper functioning of the activities in the project area, a **Village Committee** will be formed (refer Table 5). Along with that, during awareness generation meetings, based on the promptness and eagerness to take up these activities in the village, a group consisting of women, youth and other farmers called **Climate Adaptation Group** will be formed to lead various activities in the village.

Following table is summarized format of groups and members formed at village level for proper functioning and monitoring of the activities during various phases of project:

Table 5: Roles and Responsibilities of different Stakeholders

Institutions/Agencies	Members	Roles and responsibilities
Village Committee	Panchayats Members, Technical Expert related to activities, Women Participants, Farmers, Representative from Executing Entity (overall 10-15 members)	<ul style="list-style-type: none"> ▪ Village level planning and execution of project activities through participation ▪ Selection of Climate Adaptation Group based on preparedness and willingness to take up the activities ▪ Monitor and ensure equitable sharing of benefits under different project activities ▪ Final Authority for any type conflict resolution
Climate Adaptation Group	Farmers consisting of youth, women and landless farmers, Field Officer of BAIF, Technical Experts (5-10 members)	<ul style="list-style-type: none"> ▪ Conducting PRA at village level ▪ Finalization of Annual Adaptation Plan ▪ Monitoring of strategy and timeline as proposed in Annual Adaptation Plan ▪ Selection and monitoring of different groups as per the requirement of project

Institutions/Agencies	Members	Roles and responsibilities
Resource Person (part of Climate Adaptation Group)/Marketing Group/Milk Collection Group	As selected by Climate Adaptation Group	<ul style="list-style-type: none"> Information Dissemination of concerned technology Collective Marketing of the produce
Other User Group	As per the requirement of the Project	<ul style="list-style-type: none"> Responsible for smooth functioning of the activities

Overall functioning of these groups will be monitored and guided by the project co-coordinator along with the field team of executing entity.

Activity 1.1.2: Vulnerability assessment of all 10 villages/ gram panchayats through Participatory Rural Appraisal and preparation of Annual Adaptation Plan

As the analysis shown in Part I have mainly dealt with the overall impact of climate change on Uttarakhand as a state, vulnerability assessment through PRA of the proposed villages will help in analyzing the village specific issues related to climate change and refining the strategies as per the requirement. Through PRA activities, the vulnerability assessment of the individual community will be done. PRA tools, such as, timeline, will help in identifying the timeline of climate change in the respective village in participatory manner. In the similar manner different PRA tools will help in understanding the community residing in the village with respect to changing climate in the area. During this activity, special focus will be given on vulnerability assessment of the community. Information related to climate change vulnerabilities and the adaptation capacities of the community will be collected in the project villages. These activities will provide an open platform to the participating community in identifying the problems/issues and empower them in decision making to resolve those issues. For each village, one Vulnerability Impact Assessment (VIA) Report will be prepared to understand the exact nature of risks in the hills; inputs would be sought from Scientific and Research institutes and Subject Matter Specialists.

The information derived from these activities will also help in preparation of Annual Adaptation Plans for all 10 villages / gram panchayats along with technical input availed from different technical expert empanelled under this project. PRA will provide the opportunity for the participating community in identifying the problems/issues and empower them in decision making to resolve those issues.

These decisions will be documented in the form of **Annual Adaptation plan (10)** which will mainly consist of strategy derived from vulnerability assessment of each village to enhance the adaptive capacity of the villagers. Minimal revision will be done based on the requirement of the

villagers every year. Based on the analysis, a participatory Annual Adaptation Plan (1) will be prepared at the cluster level indicating required preparedness, early warning systems, zoning, land use planning, and final strategies for each important livelihood support system such as backward linkage and forward linkage for different activities proposed.

Activity 1.1.3: Facilitation from Subject Matter Specialists/Technical Advisories

Under the project a panel of Subject Matter Specialists will be formed for technical/crop based advisory consisting of the different technical experts from KVK, Lohaghat, HESCO, Pantnagar University, Livestock Development team, BAIF and Technical team of Uttarakhand.

The following is the list of Technical Partners from who will be empanelled in the Technical Advisory Committee:

- **Krishi Vigyan Kendra (KVK), Lohaghat:** Krishi Vigyan Kendra is field level organization under the Indian Center for Agriculture and Research. This government functionary is mainly instrumental in transferring innovative technologies and research to the local farms for adoption and replication. This is the nearest institute (approx. 20 km) from selected villages / gram panchayats who will be providing technical know-how about agriculture-based interventions.
- **GB Pantnagar University, Pantnagar:** GB Pantnagar University is one of the most renowned Agriculture Universities in India. This university also provides advisory and consultancy services to Govt. and non-govt. organizations from time to time. The executing agency, working mostly in livelihood-based projects, has previously provided advice to BAIF and vice versa for different projects. It is almost 60 km from the project villages / gram panchayats.
- **Himalayan Environmental Studies and Conservation Organization (HESCO), Dehradun:** HESCO have been applying knowledge of the environmental sciences and simple technologies to bring consistent development to the rural villages/ gram panchayats of the Himalayas. Their innovative and ecologically-sound solutions, have yielded outstanding results in their target regions, and have brought them national recognition. Bhabha Atomic Research Center (BARC) has its research center for isotopes techniques in the HESCO campus. So, HESCO Dehradun, around 400km from Champawat, will be facilitating BARC for providing technical training at their campus to project participants regarding spring rejuvenation in the project area.
- **Livestock Development Team of BAIF:** BAIF, the executing entity, has vast experience in livestock development and has an. experienced Livestock Development related team in its state societies (refer Annexure: 8) and a Central Research Station at Urulikanchan¹⁰, Pune, where all research and development work related to livestock is co-ordinated.

¹⁰ http://www.baif.org.in/central_research_station.asp

Other invitees will be:

- **Central Institute of Temperate Horticulture, Mukteshwar:** To harness the vast potential of temperate horticultural crops, Indian Council of Agricultural Research (ICAR) has established this institute as a premier institute for carrying out basic strategic and applied research on major temperate horticulture crops. They will be instrumental in providing technical input, training and exposure visit regarding horticulture plantation proposed in the project. It is around 121 km from the project area.
- **Vivekanand Parvatiya Krishi Anushandhan Sansthan (VPKAS), Almora:** It was also established by ICAR for hill agricultural research for the North-Western Himalayan region of India. It is also working for the improvement of agriculture in hill areas. Other than that, transfer of technology, research on extension methodology, organizing specialized training and consultancy on hill agriculture is one of the mandates of this organization. It is located around 135 km from the project area.

(The executing entity has a MoU with the Indian Council of Agriculture and Research ((ICAR)), one of the premier agriculture research organizations under Govt. of India, for knowledge sharing and technology transfer with their concerned organization). They will be responsible for disseminating technical know-how of different technologies proposed and also other technologies available with research institutes and Govt. schemes. As per the requirement of the villagers, this team will provide technical input to the villagers through conducting meeting or on-field demonstration. **The team will also be responsible for training one resource person in each village in the various technology proposed.** He/she will then act as facilitator for such technologies in future in the village for free while for other nearby villages / gram panchayats they will charge nominal honorarium.

Output 1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability

Activity 1.2.1: Mobilization and Formation of CBOs

For the sustainability of different activities proposed under the project, capacity building and strengthening of the CBOs is of utmost importance. Here, the main emphasis is to educate and train the community in order to increase awareness, institution building through fostering co-operation among communities building collective coping strategy at local level as well as creating enabling environments through accountability mechanism so, that institutions can operate in efficient way. On the same principle, the project envisages to mobilize and strengthen the local CBOs.

In the initial 3-4 months, the communities will be mobilized and made aware about the climate change and related coping mechanism to increase the resilience of the community. This will lead to identification of the target participants as well as need based prioritization of activities will be done. This will also help in finalizing the entry point activity in the village.

For each village it is proposed to mobilize 5 existing CBOs and formation of 5 new CBOs. As described in Table 5, each village has 1 Climate Adaptation group (formed within 5-6 months), 1 vegetable and fruit marketing group (within 1 year), 2-3 milk marketing groups (within 2 years), and 4-5 water user groups (within 1-2 years).

Overall **50 CBOs** will be mobilized and strengthened in all 10 villages / gram panchayats and **50 new CBOs** will be formed as above. These CBOs will be the backbone of all the proposed activities as it will provide an institutional framework to all the activities for proper and smooth functioning. All the operational guidelines will be laid down in consultation with project participants along with the technical advisor. This will help in achieving the desired objective in the said time frame. Through different types of training and exposure visits proposed in the project, these CBOs will strengthen themselves to be sustainable even after completion of the project.

Activity 1.2.2: Training on suggested technologies for participants and staff

Capacity building of the participants about the technologies introduced to them is the most integral part of the project, to achieve the desired results from it. Training activities will be organized before starting up of any activity proposed under this project to provide technical specifications to the participants. For example, before implementation of drip-irrigation activity or construction of rain-water harvesting structure, a technical training will be provided by the technical partners or field team.

In few cases, such as Spring rejuvenation Activity (for Isotopes technology), our field staff will be trained by HESCO/BARC team on the technology, for which Training of Trainers (ToT) will be organized and our trained staff will then guide the community regarding the know-how of the activity and will implement in the field. These technical trainings will be imparted in collaboration with our technical partners and our field teams.

Activity 1.2.3: Exposure visits on suggested technologies for participants

Training and awareness generation meetings are proposed under this component including exposure visits to the NGOs/Research Institutes. It will certainly give the community a first-hand experience of technical and managerial know-how about the project component as well as the impact they can create over the years.

A total of **15** exposure visits are planned over the project period. The exposure visits are planned in KVK, Lohaghat (for exposure about the demonstration plots of agri-horti wadi activities and after care involved in that), HESCO campus and its study area (for isotopes techniques and water harvesting structure), BAIF's successful Cattle Development Center (for livestock management

practice exposure), visit CITH, Mukteshwar & Srinagar for temperate horticulture development, visit to Pantnagar Agriculture University (to know the mechanism of weather based agro advisory system), successful operational of rain water harvesting structure, etc. The team for visit will comprise of at least 2 people per village selected under different activities. They will in turn act as resource persons for that individual activity in the village and will be responsible to disseminate the information in the village for further propagation.

Component 2: Introduction of Water Resource Development and Climate Smart Farming Technologies

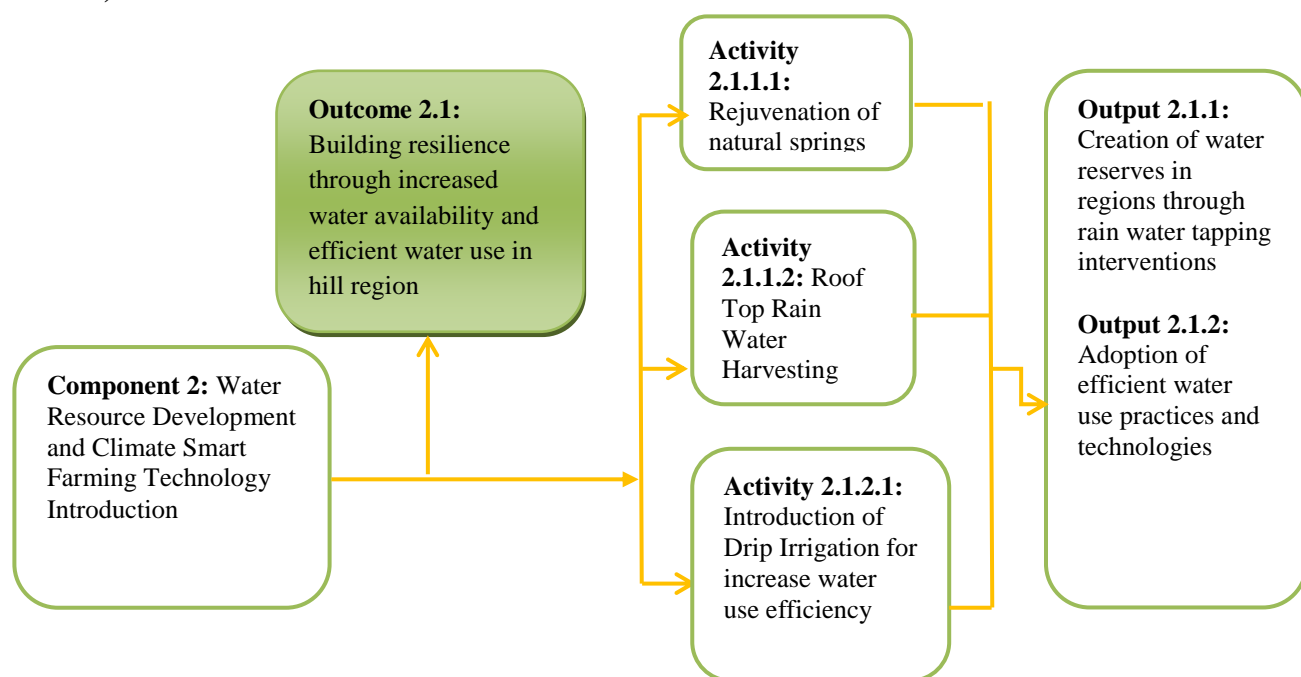
Realizing that increased frequency of sudden climate events is likely to affect communities' livelihood adversely, two types of activities are proposed here, a) Interventions to develop water resources in a region for safeguarding agriculture and other livelihood activities b) Interventions in the form of climate smart farming technologies having Hill specificity.

Most of these interventions are planned at the level of individual participant families. Technical handholding and skill building of participants will help to improve the management of their livelihood support resources. The activities will be introduced by family members, who are already involved in agriculture and livestock related operations on day to day basis. The work thus proposes enhanced skills, participation of family workforce for building long term productive assets and improved use of productive labour force without getting displaced for supporting climate smart livelihoods. Thus there is no threat of forced or compulsory labour or any issue of resettlement.

Outcome 2.1: Building resilience through increased water availability and efficient water use in hill region

In the proposed project area, there is 1,648.3 mm of annual rainfall although there is the problem of water scarcity and drying of springs because of water run-off and lesser retention and storage capacity of water. So, for building the resilience of the local community to changing climatic impact, water resource development as well as efficient use of water by the community is proposed.

Figure 7: Schematic presentation of Outcome-activity-output of Component 2 (Outcome 2.1)



Output 2.1.1: Creation of water reserves in regions through rain water tapping interventions

Activity 2.1.1.1: Rejuvenation of Natural Springs

Natural springs are vital sources of water in the hilly areas. Many of the springs, now in use, are drying up or declining in flow due to reduced recharge and excessive groundwater exploitation along with excessive rain-water run-off. To address this issue, a new scientific technology has been introduced by Bhabha Atomic Research Center (BARC)¹¹ in the Dehradun district of Uttarakhand, where water is traced through “Environmental isotopes $^{12}(^{18}\text{O}/^{16}\text{O}, ^2\text{H}/^1\text{H})$ ” which are being widely used for a variety of applications with no fear of **health hazards** along with hydro geochemistry and geomorphology. This will be employed to identify the recharge zones of the drying springs. Isotopic composition of isotopes in water is affected by several factors like temperature, season, latitude, altitude, distance from the coast and amount of precipitation. Orographic precipitation caused by rise of vapor mass over landscape in mountainous region results in variation of isotopic composition owing to difference of altitude at various locations. Therefore, at higher altitudes, where average temperatures are lower,

¹¹<http://www.geosocindia.com/abstracts/2010/july/n2.pdf>

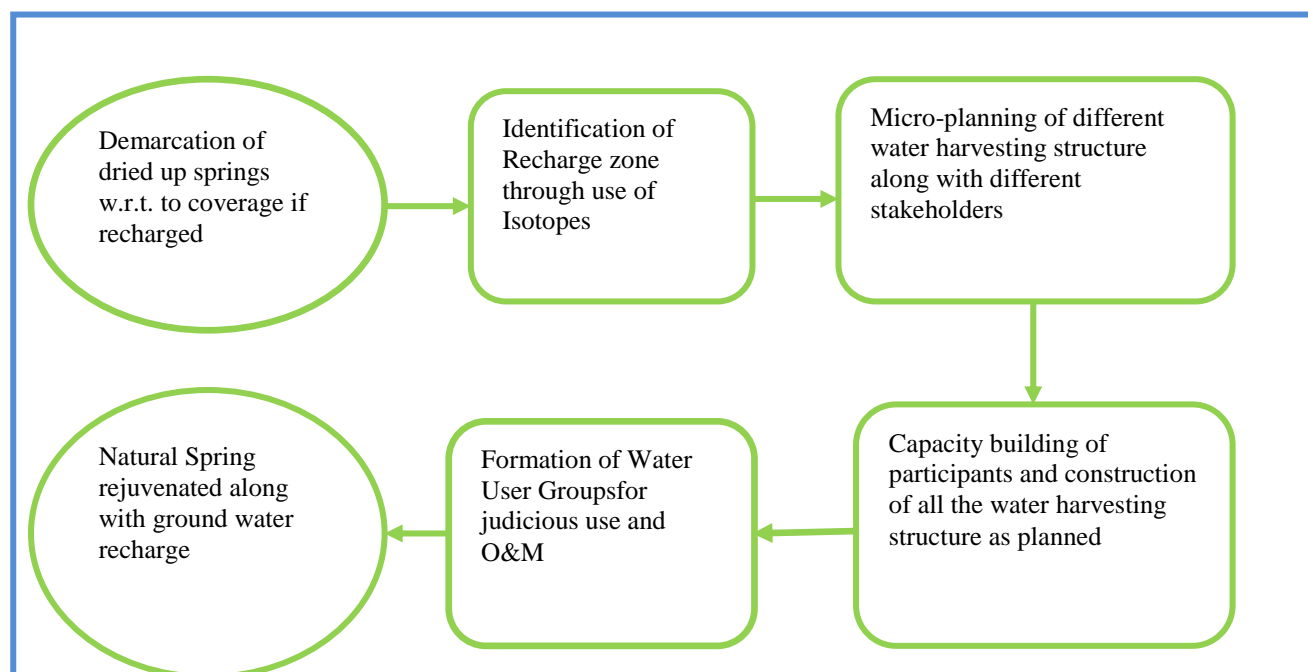
¹² “Environmental isotopes : www.academia.edu/5585470/Hydrological_Studies_Using_Isotopes

precipitation is isotopically depleted compare to the lower altitude. This is commonly known as ‘altitude effect’ and this is used to locate recharge area at project sites and in-and around area¹³. The isotope technique and use of tracers for checking the water recharge and discharge area is suggested as safe, proven and tested technology option to enhance water recharge in an effective manner without any public health issues. The standards for this are prescribed by government recognized institute headed by renowned Scientists.

BARC has set up its laboratory in HESCO-Dehradun campus, and further collaboration in this regard is in progress with HESCO-Dehradun and BARC, who are willing to provide the technical support for rejuvenation of natural springs in the project villages.

A total of **15 springs** will be identified and rejuvenated in the project period. For each Natural Spring rejuvenation activity, 50 hectares will be treated through various rain-water harvesting activities such as creation of staggered trenches, creation of small ponds, and vegetative plantation for soil and water conservation in the recharge zones. For selection of sites and for other operational issues, a Village Committee will be formed which will consist of farmers and members of Village Panchayat and technical expert from Research Institute. It will ensure maximum coverage of the families living in the recharge zone and benefitting from this activity.

Figure 8: Process flow of Rejuvenation of Natural Spring Activity



¹³ <http://www.barc.gov.in/publications/nl/2014/2014030407.pdf>

After finalization of recharge zones and micro-planning of the water-harvesting structure in each village, a Water User Group will be formed which will consist of users of water under the particular activity. Main responsibility of this user group will be operations and management of the water harvesting structure and sharing of benefits amongst the participants.

Figure 9: Photographs of Spring Rejuvenation done by BARC in Uttarakhand a. Drying Spring b. Water recharge through constructing water harvesting structures c. Rejuvenated Spring



All this will enhance water potential in the hilly terrain through better infiltration of rain-water, aquifer recharge and increased availability of water at community sources benefitting around 300 farmers in 10 villages / gram panchayats. The rejuvenation of springs would also help in much needed promotion of economic activities and reduction in drudgery of women in hills.

Activity 2.1.1.2: Roof Top Rain Water Harvesting

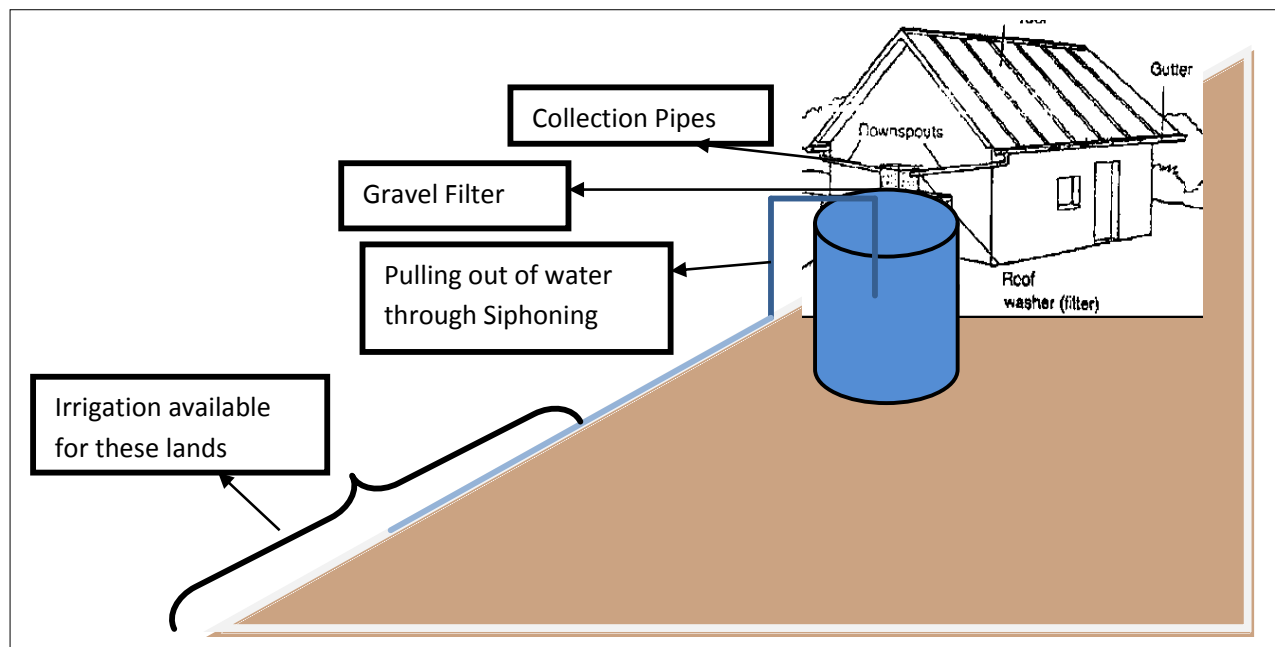
The district is rich with natural perennial rivers and rivulets, but due to uneven geographical conditions the major portion of water drains off through small rivers and rivulets. Only about 9 percent of total land is termed as agricultural irrigated land. The major portion of land is dependent on the rain water only, which has adverse effect on agricultural production. Despite

plenty of resources the inhabitants of the area are dependent upon rain water. In the hill villages women usually cover almost 5-6 kms for collection of drinking water each day.

Champawat district has average rainfall is of 1,600 mm spread over 100 days (approx.) in a year, even though, because of high rain-water run-off for almost 3-4 months there is low to non-availability of water in the area.

For retention of water at an individual household, it is proposed to introduce rain-water harvesting structures, through which a total of **150 families** that have concrete houses and rooftops to collect and channel the rainwater will be targeted. (It is proposed to collect water from an area of 100 sq m with proper slopes and water channels with pipes of 150 m. the water thus collected is proposed to be stored in a storage tank having capacity of 15,000 litres). In the selected villages, farmer's field lies in the lower terrain while the houses are on the higher terrain, (terrace like structure), hence water stored in the tank will be transferred to field through gravitational force.

Figure 10: Pictorial Presentation of Rainwater Harvesting Structure in the selected villages:



The average water that can be collected per household will be around 15,000 litres. This will be used mainly for irrigation and household use. The purpose here is to provide access to water near the household when other sources of water are not available. This is proposed as decentralized intervention for effective rainwater collection, storage and distribution.

Each of these structures includes pipelines for collection of water to the main inlet and an underground water capacity of 15,000 liters. The dimensions of underground tank will be approximately 4m X 2.5m X 1.5m. The structure will be covered with a tin shed. It is proposed to include the individual family's contribution in the form of labour. The storage tank will be filled during the month of July-September (monsoon) and October-November (Post monsoon), which will be used in April to June, when the entire spring and water reservoir in the surrounding area get dried. As this structure is at individual household level, it is up to the family that they want to share it with others or want to use for themselves. Because of availability of water throughout the year, they can actually plan for agriculture activities in all three seasons.

Output 2.1.2: Adoption of efficient water use practices and technologies

Activity 2.1.2.1: Efficient water use practices and technologies will be promoted under the project to reduce water scarcity and to enable judicious use of water.

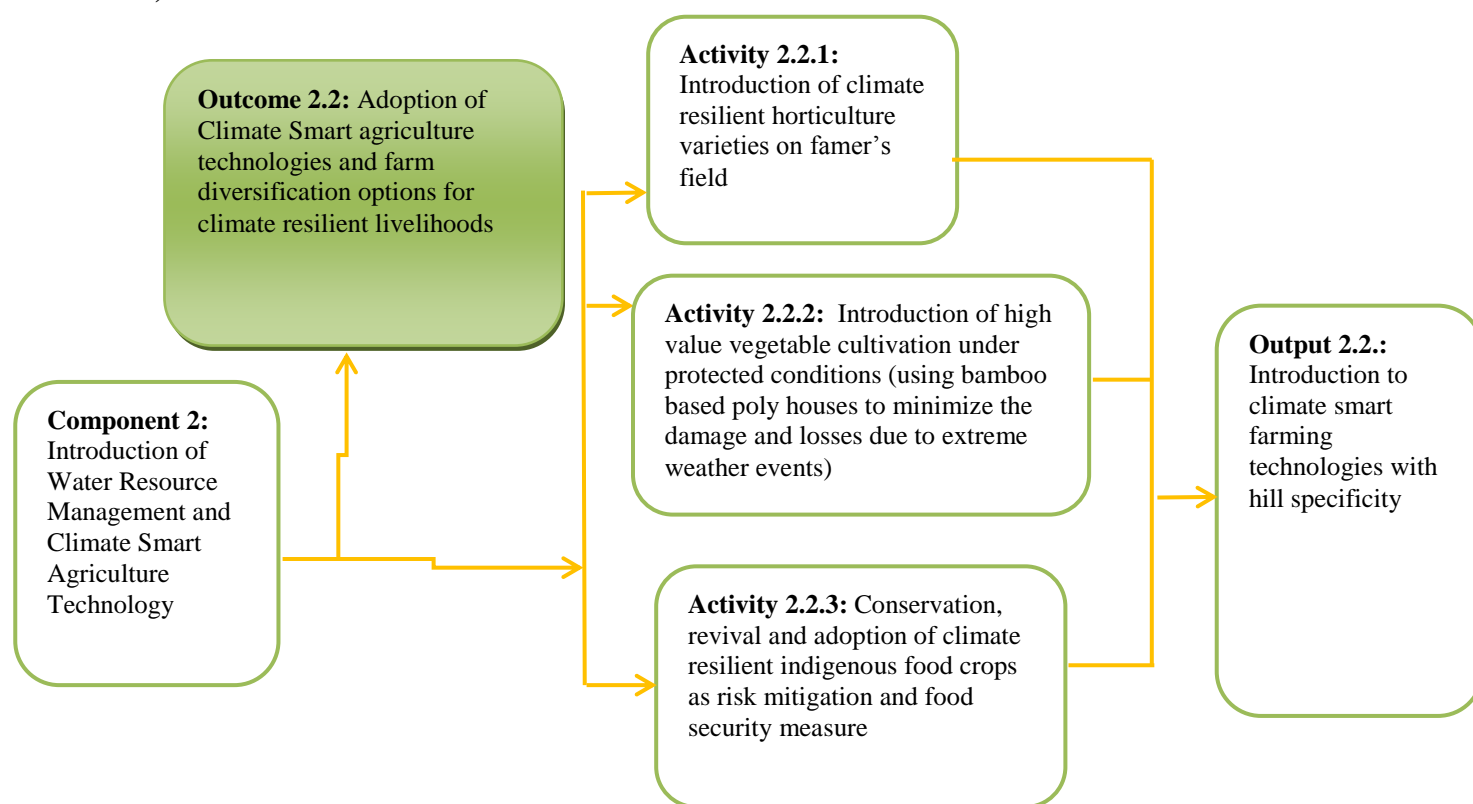
For judicious and efficient use of water for irrigation purposes, drip irrigation facilities will be provided to the participants to avoid the wastage of water during irrigation. It is a quite popular and prevalent technology which enhances production with lesser use of water and labour. Even though, it has lower penetration in hilly areas, as it has a high initial investment cost. Hence, the project will target to include the participants with flat land and lesser availability of water for irrigation as well as families not covered under Spring Rejuvenation activity will be covered on a priority basis under this activity. It is proposed to cover 20,000 sq m in the project period under this activity, depending on the need of the participants. It is also proposed to link with other components like high value vegetables and horticulture plantation.

Various government schemes are providing subsidies for the adoption of drip-irrigation facility; the field team along with strengthened CBOs will strive to establish further linkages with the concerned authorities for families not covered under the project.

Outcome 2.2: Adoption of climate smart agriculture technologies and farm diversification options for climate resilient livelihoods

Here the main purpose is to diversify livelihood and production systems by integrating various subsystems e.g. vegetable crops, fruit tree, indigenous crops, livestock, etc. There are three types of interventions that are proposed here at the level of households with the objective to stabilize their income and ensuring climate resilient livelihoods. These interventions will be introduced in combination at the level of hill families who are mainly dependent on farming and livestock sectors. The activities will ensure better productivity, sustained yield, minimum losses and risks of crop failure despite changing climatic conditions.

Figure 11: Schematic presentation of Outcome-activity-output of Component 2 (Outcome 2.2)



Output 2.2: Introduction to climate smart farming technologies with hill specificity

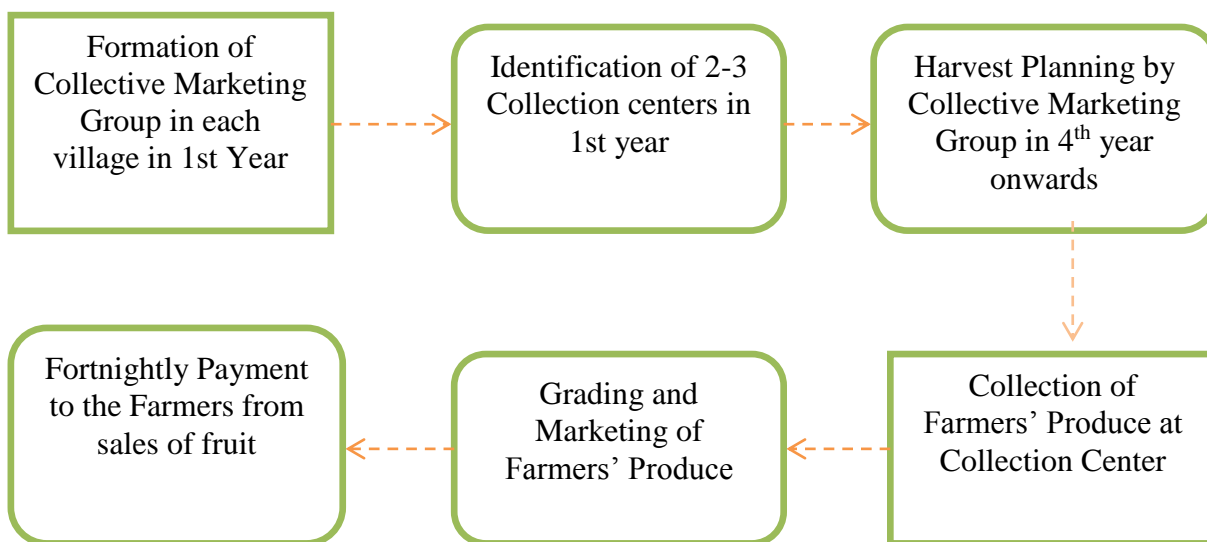
Activity 2.2.1: Introduction of improved horticulture varieties to 600 families

Hill conditions and diversity of bio-geographic zones and altitudinal variations provide favorable conditions for growth of many horticulture crops including temperate and sub-tropical fruits. In Champawat district, almost 16,000 Ha of land is under horticulture crop cultivation from which average yield per hectare is almost 2.5 MT. Out of which 86 percent of the area is under fruit and agri-horti plantation having average yield of 1.44 MT per hectare which is on lower side as compared to the other districts of Uttarakhand. Main horticulture crops cultivated in the area are Plum, Malta, Apple, Peach, and Walnut etc.

Generally farmers opt for mono-cropping rather than tree-based farming, but have the risk of complete loss of harvest in case of any sudden weather events or pest-attacks. In order to lessen the risk, a combination of crops is proposed. It is proposed to acquaint farmers about tree based farming systems which are advantageous over mono cropping in the climate change scenario. High quality grafts of Walnut, Peach and Grafted Pear will be introduced on farmer's fields with required agro techniques and support for management. Each family will receive 50 grafts of

Peach (20), Walnut (15), Malta (10) and Lemon (10) in 0.01ha of plot. Other than that, plant nutrition & after care management of plants, neem cakes, pesticides, plant protection material, and labor will also be provided to the individual families. The support will be extended to 600 families in a phased manner¹⁴ spread over the project period. Farmer and his family will reap the benefits from the plantation beginning from 4th year onwards for the next 15 years.

Figure 12: Flow-chart indicating proposed marketing activities for Farmers' Produce:



In each village, a Collective Marketing Group will be formed, which will be instrumental in collection of farmers' produce at village level and selling it in the nearest market in Lohaghat (20 kms). These groups will mainly consist of youth/women, who have experience of dealing in *mandis* (market). These groups will be actively operational after fruiting of the plants (4th year onwards). These groups will also be responsible for dissemination of market rates to the concerned farmers (provided through agro-advisory services-SMS) and planning of harvesting at village level for collective marketing. Peach and Walnut will be harvested in June-July while Malta will be harvested in December-January. Lemon will be harvested throughout the year.

BAIF has vast experience of promotion informal People's Organizations. It has facilitated one such Farmers' Producer Organization-VAPCOL, comprising of 55 formal and non-formal groups (more than 30,000 farmers). VAPCOL is mainly involved in marketing of value added products of mango and cashew processed by these groups under the brand name of "Vrindavan"¹⁵.

¹⁴ Peach and Walnut will be planted in month of January, while Malta and Lemon will be planted in month of June.

¹⁵<http://vrindavan.co.in/>

Activity 2.2.2: Introduction of high value vegetable cultivation under protected conditions (using bamboo based poly houses to minimize the damage and losses due to extreme weather events) to 200 families

Due to growing uncertainties of climatic forces and extreme weather events, it has become imperative to protect agricultural production when possible. Hence, a low cost bamboo based poly house is introduced to the farmers, so that, produce can be protected from the extreme weather events. Farming of seasonal vegetables under poly house conditions is suggested as one option for the adoption of low volume and high value cropping systems. The poly house technology also offers scope for off season production of vegetables. Crops such as tomato, capsicum and cucumber will be introduced to take advantage of the temperate climate in the hills as compared to plains during summer season. The horticulture interventions will help in optimized use of available land (Uttarakhand has lower productivity 12 MT/ha as compared to India average of 17.25 MT/Ha for vegetable cultivation), making agriculture viable under a changing context and will also helping to achieve the objective of income and risk diversification.



Under the project it is proposed to introduce protected farming (Polyhouse) for high value vegetable crops having better returns to the farmers. Support will be extended to a group of **200 vulnerable families** for cultivating high-value commercial crops under protected conditions. It is proposed to take up tomato and capsicum along with cucumber cultivation under poly house. Support is planned for initial investment in construction of low cost bamboo based poly houses, technical guidance and capacity building for technology adoption by the participating farmers. In the following years, all the cost will be incurred by the farmer himself. The structure will be used for high value vegetable cultivation for a period of at least 10 years, thus giving assured income as compared to cultivation in open condition.



Based on the need and requirement of the individual farmer, crop selection will be done in the month of April. The crop selection generally could be either pure crop of capsicum (200) or pure crop of tomato (200) or mixed crop of tomato (100) + capsicum (100) and cucumber (20)). The produce would be ready for marketing during July –August, when similar produce from the plains areas are not available in the markets and hence fetch better price. As per the market demand and supply the project proposes to plant high value vegetable crop under the protected and controlled conditions. The marketing plan of vegetables will be similar to activity 2.2.1. Group formed under this activity will also provide collective marketing support to the vegetable growers under polyhouse (Refer fig 10).

Activity 2.2.3: Conservation, revival and adoption of climate resilient indigenous food crops as risk mitigation and food security measure

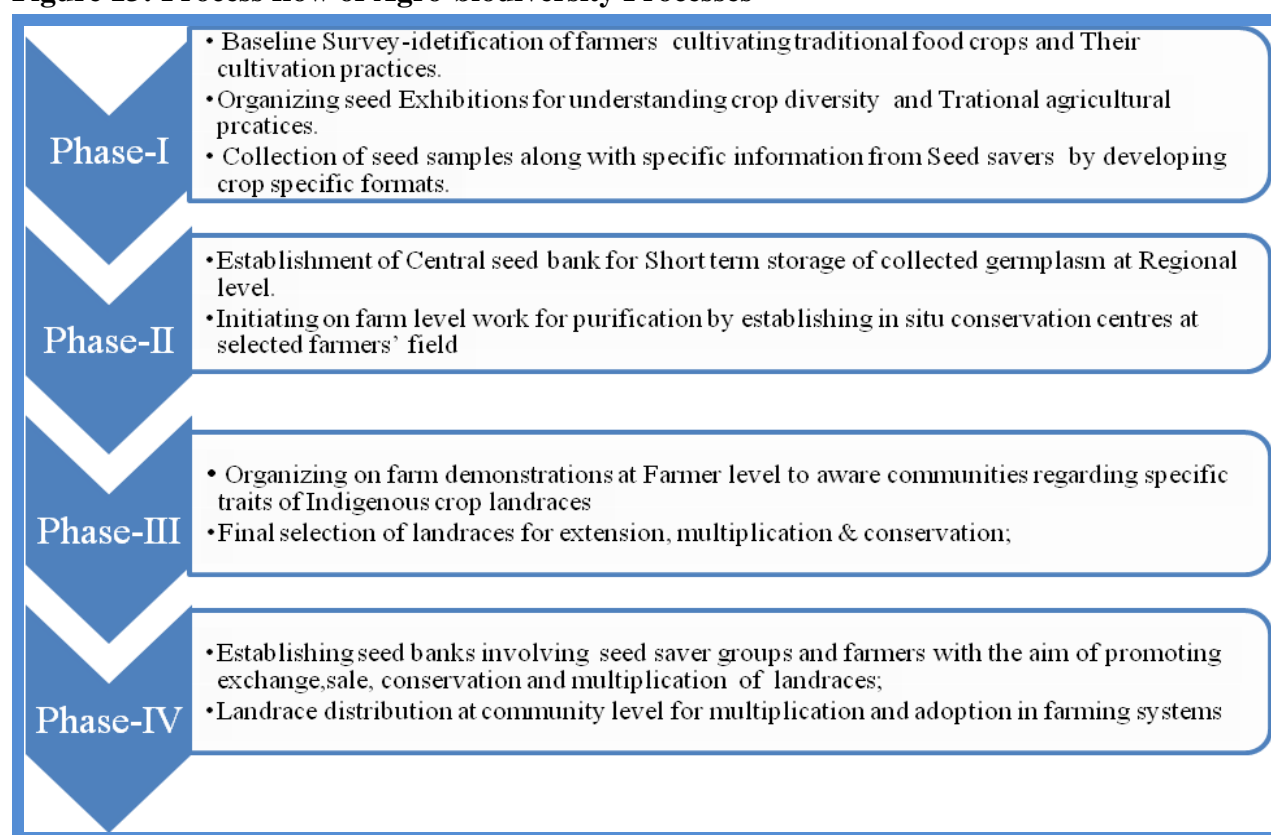
The National Mission of Sustaining the Himalayan Ecology, one of the mission documents of NAPCC, has emphasized conservation of biodiversity in the IHR. The main objective behind promoting agro-biodiversity is to conserve and revive diverse, native and sturdy crop cultivars with relevance to local foods and nutrition security, which can withstand the climate change and related vulnerability arising from that.

Himalaya is amongst one of the mega diversity zones of the world. There are many landraces of pulses & millets available, but some are threatened by extinction. The activity is to be implemented by participatory approach in which sub activities included are collection, fairs, pot cultivation, field cultivation, seed banks, etc. The overall strategy in supporting and promoting conservation of crop genetic resources is based on the following objectives:

- Conservation of crop diversity and knowledge associated with it focusing food security, risk mitigation and livelihood development.
- Characterization and evaluation of crop landraces and trials for productivity enhancement of worthy landraces.
- Establishment of community managed seed banks and promoting village level seed production.

There are a number of native crops which can tolerate stress and have adapted well to unique climatic conditions in fragile hill areas. As suggested by the communities during field level assessments, it is proposed to focus on diverse traditional food crops mainly *Mandua* (finger millets), *ramdana/chua* (amaranthus), *rajma* (common kidney beans), *ogal* (buckwheat), urad (green gram), *moong* (black gram), *naurangi* (mix of pulses), *gahath* (horsegram), *bhat* (soybean), *lobiya* (French beans), *kheera* (cucumber), and other niche crops where hilly terrain adds a comparative advantage.

Figure 13: Process flow of Agro-biodiversity Processes



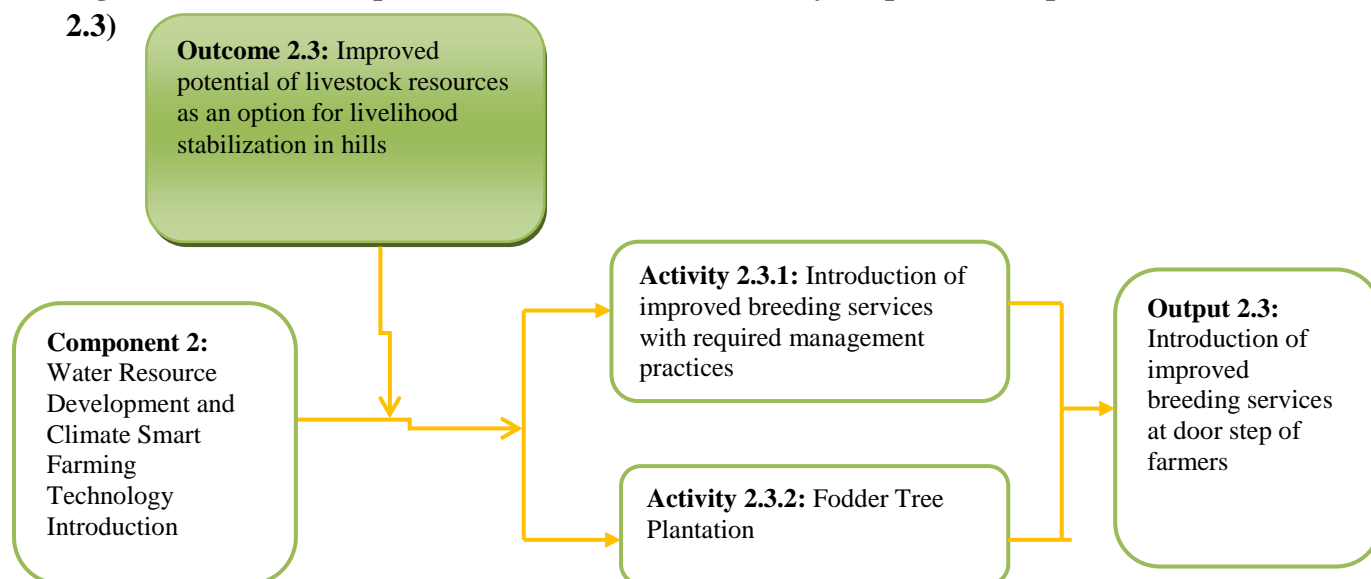
Local maintenance of traditional varieties and their use in crop improvement programmes would ensure that the products are more appropriate to the farming system in which they are used. The threat of genetic erosion will be reduced by conservation of the habitat and ecosystem that produces genetic resources. Economic programs to develop markets for landraces will increase farm income while helping farmers to conserve crop resources. Facilitating information about local varieties and exchange among farmers are having a similar effect, which is why the establishing of local seed-banks and seed-exchange networks are of importance.

Outcome 2.3: Improved potential of livestock resources as an option for livelihood stabilization in hills

Livestock sector in Uttarakhand is extremely livelihood intensive and investment in livestock development is critical to rural prosperity – it is mainly practiced by small, marginal and landless farmers for income support. The per capita bovine population in the state (0.35) is higher than the national average (0.24) whereas per animal daily milk production is lower (3.5 kg) than the national average (3.9 kg). Increasing the cattle population for greater production is not an option due to 36.1 percent fodder deficit and other logistic constraints in the hills. Increasing per animal

productivity is the best available option¹⁶. Hence, it is proposed to introduce improved breeding services at the farmers' door-step along with required livestock management practices. More than 62 percent of land is under reserve forest hence grazing & harvesting of fodder from these areas is restricted to the local people. Hence, under the project, it is proposed to introduce silvi-pasture among the community to get good quality fodder crops from community land through a collective approach.

Figure 14: Schematic presentation of Outcome-activity-output of Component 2 (Outcome 2.3)



Output 2.3: Introduction of improved breeding service with required management practices in Livestock Resources

Activity 2.3.1: Introduction of Improved breeding services with required management practices

The main challenge identified in the hill area is low milk yield per animal due to non-descript nature of cattle as well as fodder deficit in the area, poor infrastructure and veterinary services and limited mobility due to difficult geographical terrain. SAPCC, Uttarakhand has emphasized on increased milk productivity through breed improvement, providing door-step veterinary services and improved infrastructure.

It is proposed to introduce improved breeding services with required health care and management services to the small and marginal farmers at their door-step. Identification of

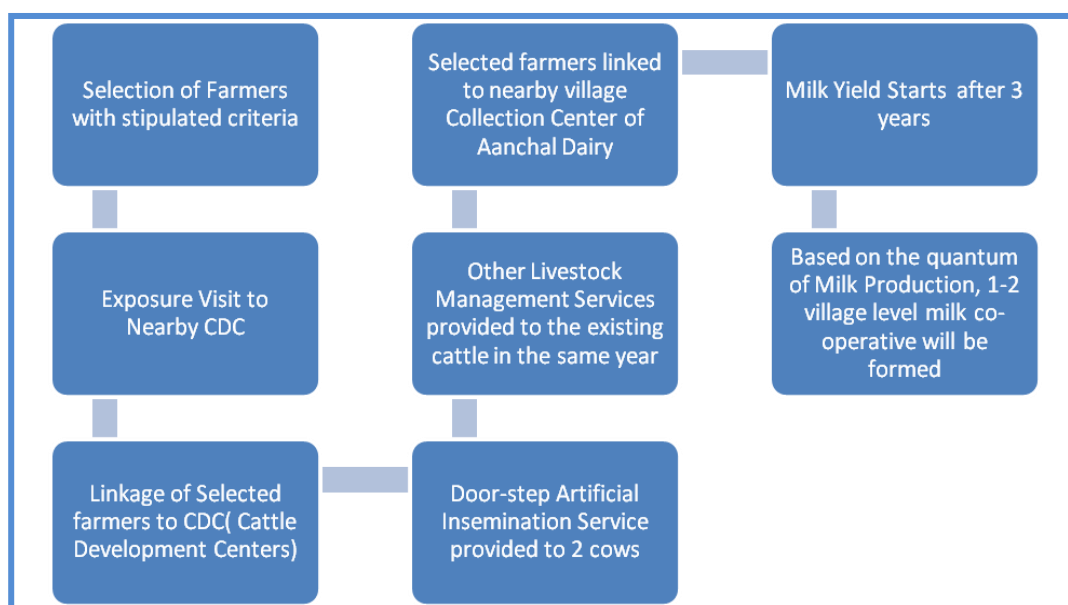
¹⁶State Action Plan for Climate Change-Uttarakhand

farmers will be done on a participatory basis related to their need and existing livestock and management provided by the family. Based on the analysis, those selected families will be linked with BAIF's Cattle Development Center¹⁷ at Lalupani and Khetikhan (almost 5-10 km far from the villages) for any type of services available with the CDC. After enrollment, as per the notification of the farmer, an AI service provider will visit the family and inject the cattle with high quality breed semen at no cost (4 times in 2 years). The existing cattle will be provided with other services as proposed such as deworming and mineral mixture for cattle feed (1 time). As the health of the cattle and family is highly dependent on the hygiene of the household, the existing cattle shed will also be modified under the project.

After AI, it will take at least 3 years to produce milk by the cross-bred animals, so, the benefit from the cross-bred cattle will benefit individual farmer only after 3 years. A total of 800 families will benefit from this intervention in the span of 4 years.

Once the surplus milk is generated, it is proposed to organize these primary group members into a dairy cooperative as a representative organization for the purpose of milk collection and marketing and related backward and forward services. There is already a presence of Uttarakhand Dairy Cooperation Federation (and marketing its products with the brand name Anchal) at the level of the state. It has been in existence since 2002 and has developed quite well. At present it has coverage in all districts of Uttarakhand with 3,807 cooperative milk societies and a membership of about 148,275 producers.

Figure 15: Flow-chart of Livestock interventions



¹⁷http://www.baif.org.in/our_programmes_livestock_development.asp.

There are milk collection points in villages where Anchal Dairy has a presence and then milk is transported to milk processing units. There are 11 milk unions. A Womens' Dairy Cooperative will be formed through the BAIF project and will be registered with this entity and thus the participants will be linked to the main milk chain in the region Champawat Cooperative Milk Producer's Union Ltd. There is a properly spelt out procedure for linking village level societies with milk unions. (For details: www.ucdfaanchal.org. refer annexure: 5)

Activity 2.3.2: Fodder Tree Plantation

The correlation between milk production and quality green fodder been well established for decades. Good quality green fodder is not only essential for milk production but also reduces the cost of milk and maintains the health of dairy animals better than other synthetic / manufactured feeds. The state has a total demand of 252.08 lakhs MT of fodder (197.80 lakh MT of green fodder) against which at present only 125 lakhs MT (82.85 lakh MT of green fodder) of fodder is being produced thus having a net deficit of 127 lakh MT. Remote & geographically difficult terrain and limited road connectivity increases the transportation cost of fodder from the plains. As of now, no hill centric policy measures have been taken towards mitigating this fodder deficit. Besides genetic potential for production of milk, feeding of animals plays dominant role in productivity and economics of dairy animals. In hilly areas where accessibility to market is poor, it is necessary to ensure feed and fodder availability to the nearest point and at least cost.

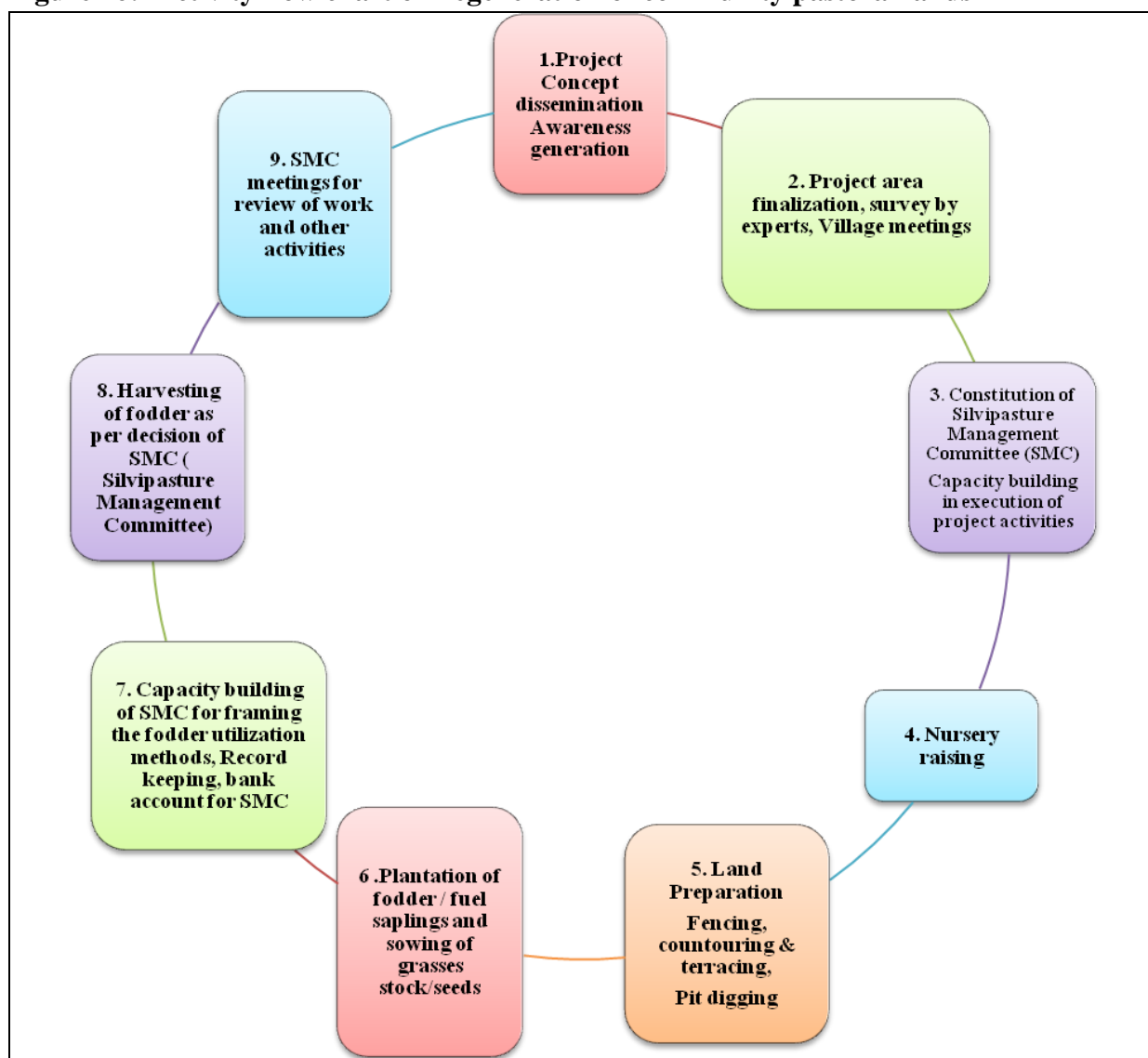
Keeping in view the dependency of people on forests for fodder and fuel, the Govt. of Uttarakhand has allocated 50,000 ha of land to 12,000 villages in form of community land called as "Vanpanchayat" to the villages which is being managed by villagers to meet the fodder and fuel demand of villagers and is almost sufficient to fulfill the fodder requirement of state. Traditional vanpanchayats have been the source of good quality and quantity fodder resource but due to lack of ownership and over grazing these vanpanchayats have become barren, getting eroded and being encroached. The increasing population pressure of human and cattle coupled with reduced area and productivity of vanpanchayats, has seen the problem of fodder and fuel become acute, which is directly affecting the women lives adversely. Champawat district comprises over 90 percent hilly area and has 688 villages and 633 vanpanchayats with an area of 31,233 hectares.

Realizing the importance of vanpanchayats in fodder production for better milk yields the project plans to develop the vanpanchayats into community pasture lands following the principle of silvi-pasture through people's participation. In all 10 villages / gram panchayats, a total of 100 ha will be selected based on shortage of fuel and fodder. For smooth operation of vanpanchayats, Silvi-pasture Management Committees (SMC) will be formed in each village, where participants will be made aware about the program and participants' role in its implementation and management. All the physical work involving labor for development of Vanpanchayats into

community Silvipasture will be done by members of the SMC from the village itself and they will be paid a fix amount against each activity by the SMC.

The physical work will involve stone wall/hedge fencing, land clearing and shaping, contouring and terracing, pit digging for fodder tree, rising of nursery at local level by some of members of SMC, plantation of fodder trees, plantation of grasses and intercultural operations. All the physical activities will be supervised by *chaukidars* (watchman) throughout the day who are appointed and paid by the SMC and will be responsible for checking entry for grazing or cutting of grasses round the year.

Figure 16: Activity flow chart of Regeneration of community pastoral lands



Vanpanchayats will be opened periodically at a particular time during each harvesting season in which villagers will be allowed to enter and carry a head load of fodder. For each time to enter into the vanpanchayats one has to pay some amount in cash which is to be deposited in each SMC's bank account. The time and duration of opening of forest for harvesting purposes is decided by SMC members and all beneficiaries together.

To empower people and to increase management capacity of the participants it was decided that project will not pay directly to members for the physical work being done under the Vanpanchayats. The pasture management committee will raise bill for the work done from the project and project after verifying the activity will forward the asked money to the bank account of that particular committee. Later the committee will withdraw the asked amount from the bank and payment will be made to members on the basis the work they have done. It was also decided by the SMC members that 10 percent of their earnings will be deposited as contribution to raise a sustainable fund to be used after completion of the project.

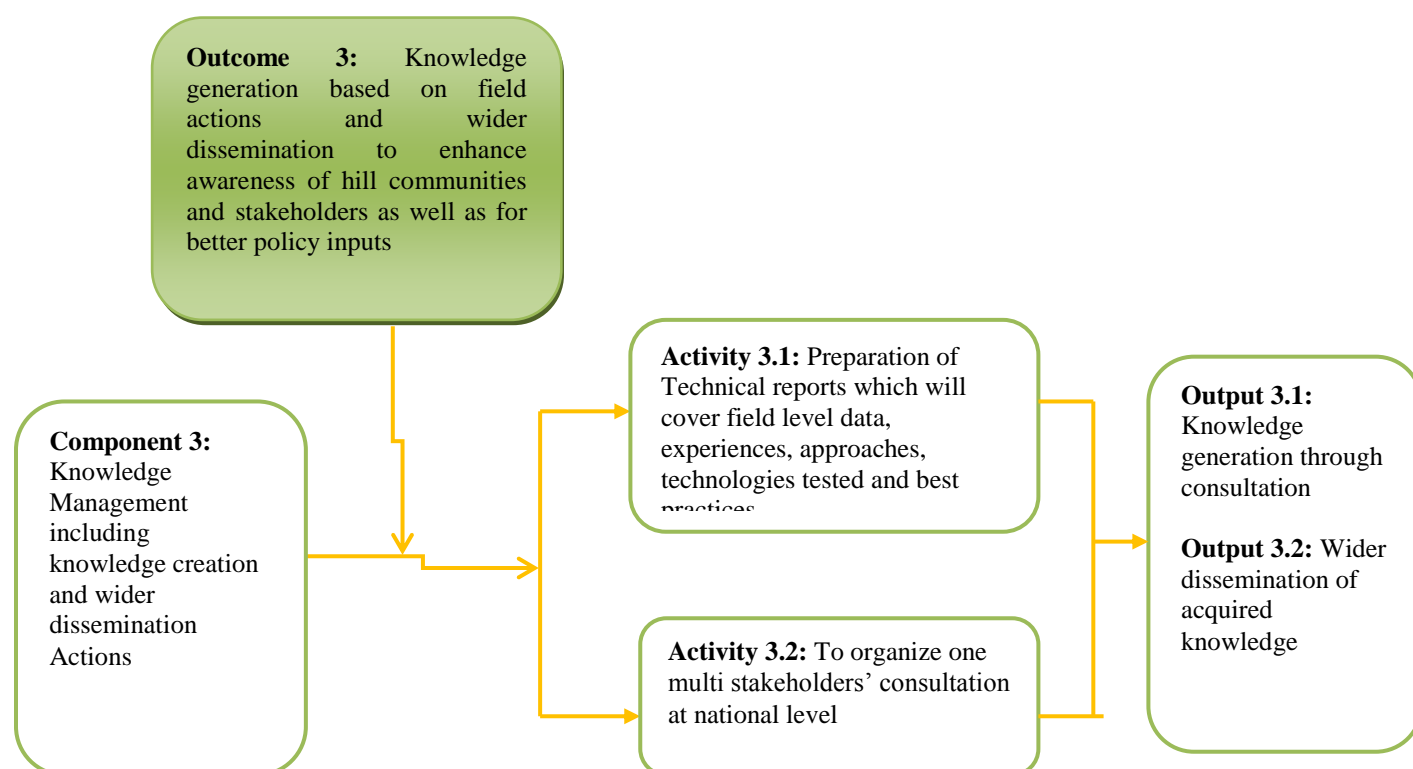
The land for the suggested interventions would be made available voluntarily by the participating families for three types of interventions i.e. Vegetable cultivation under poly house conditions, fruit tree plantation and for fodder promotion of private bunds. For the area /landscape based interventions such as Silvipasture /fodder promotion of community pastoral lands and spring rejuvenation sites, the sites would be identified involving all the community members. Most of these areas are owned and managed by panchayats /village councils as per the Vanpanchayat Act passed by state of Uttarakhand.

Component 3: Knowledge Management including knowledge creation and wider dissemination actions

Access to learning about the outcomes in the targeted villages as well as broader public domain will be ensured through this project. The specific actions would include knowledge management, documentation and dissemination for further replication, facilitated policy inputs and for mainstreaming of climate smart models for the IHR.

Outcome 3: Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and stakeholders as well as for better policy inputs

Figure 17: Schematic presentation of Outcome-activity-output of Component 3



Output 3.1: Knowledge generation through field action component

Activity 3.1.1: Preparation of Technical reports which will cover field level data, experiences, approaches, technologies tested and best practices along with dossiers and documentary

This activity will mainly cover the documentation of the activities under the project. All the processes involved in the implementation of projects right from community involvement through mobilization to benefit accrued from the activities will be covered with all technical specifications. All these will be thoroughly validated by data and case studies of the project area. These documents will be helpful in identifying climate resilient activities and replicating in other climate vulnerable areas.

A total of 4 such documents will be prepared mainly on a) Spring Rejuvenation and its functionality b) Agro-biodiversity in Champawat with Seed Savers Groups c) Farming under Protected climate condition through polyhouse and d) Livestock in hill areas and its management practice to sustain climate change. All these documents will be distributed amongst the block, district and state level officials and others NGO/voluntary organizations working in the area.

Along with that, pamphlets will be published covering individual technology (based on the acceptance among villagers) with the processes involved and the linkages available with GOs and NGOs. This will be distributed in the nearby villages and other panchayats.

For further dissemination of knowledge of technology-based activities at State level and National level, dossiers (1) and small documentary (1) will be prepared based on the best practices evolved under the project for increasing climate resilience amongst hill communities. Other than that, publication of newsletters and articles will also be documented for wider circulation.

Output 3.2: Wider dissemination of acquired knowledge

Activity 3.2.2: To organize one multi stakeholder's consultation at national level

A Multi stakeholder's workshop will be organized at national level to facilitate exchange and cross learning of proven and tested strategies for climate change adaptation under hill context. This together with concept appreciation visits and consultations by various stakeholders will facilitate policy inputs, sharing of best practices and shared understanding on climate adaptation actions in Hill context. This will generate learning at the level of development agencies concerned with the climate change issue as well as will result in better policy inputs and replication opportunities.

The activities proposed above will be achieved through integrated approach through seeking support from different stakeholder and by establishing and linkages with Govt. and non-government organization working in Hill area, for building resilience of the vulnerable communities of North Western Himalayas. Following table is detailed description of suggested technology solution and proposed institutional linkages:

Figure 18: Summarized format of Adaptation Strategies Proposed to Achieve the Desired Outcome through the Project

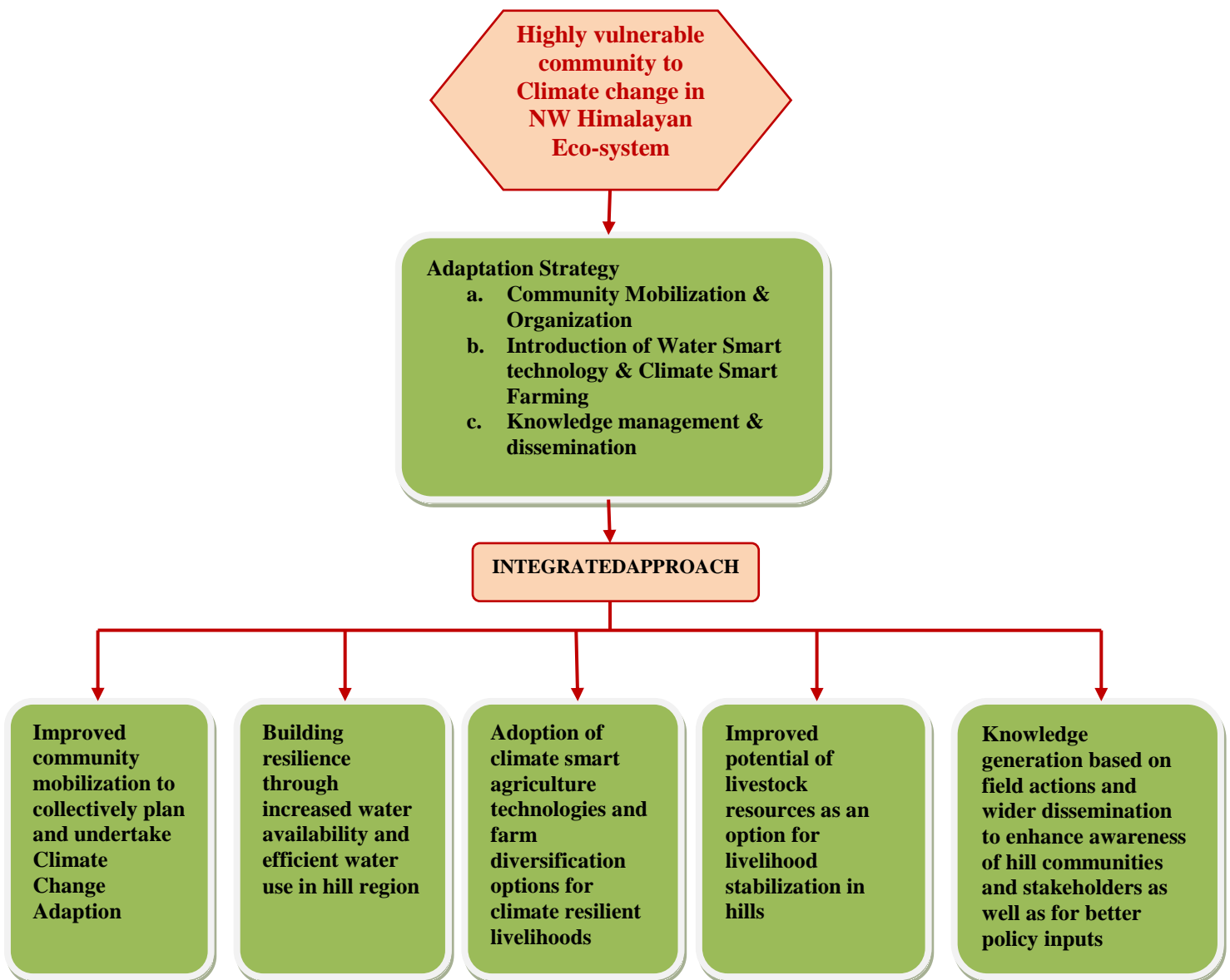


Table 6: Intervention Plan with Technical Partners

Problem Category	Major Issues	Effects	Suggested Technology Solutions	Proposed Institutional Linkages
Growing scarcity of water (surface and sub-surface) for drinking and irrigation purpose due to unseasonal , irregular, less consistent, unpredictable rains in hills	<ul style="list-style-type: none"> ▪ Drying up of springs ▪ Abundance of water in most of the area in rainy season which is followed by long dry season leading to acute scarcity ▪ Non- creation long term water reserves and lack of efforts in diverting water from upper reaches to lower reaches ▪ Erosion of traditional techniques and wisdom related to water conservation 	<ul style="list-style-type: none"> ▪ Agriculture becoming gamble ▪ Possibility of second crop is less ▪ Manual watering for existing plantations ▪ Scarcity of crops and fodder ▪ Adverse effects on animal husbandry 	<ul style="list-style-type: none"> ▪ Recharging of Natural Springs- through site specific mechanical and vegetative measures ▪ Roof top rain water harvesting. ▪ Innovative water use efficiency demonstrations 	<p>CSWTRI – Dehradun</p> <p>IIT –Roorkee</p> <p>HESCO – Dehradun</p>
Growing scarcity of fodder resources in hills	<ul style="list-style-type: none"> ▪ Fodder promotion (both trees and grasses) has not received much attention in spite of livestock as important livelihood. 	<ul style="list-style-type: none"> ▪ Less than optimum production of cattle ▪ Growing hardship of hill women and loss of productive labor 	<ul style="list-style-type: none"> ▪ Fodder promotion on private and community lands ▪ Vegetative propagation and household level nurseries of local fodder 	<p>BAIF –CRS- Scientist</p> <p>Scientists from Livestock Development Board – Uttarakhand</p>

Problem Category	Major Issues	Effects	Suggested Technology Solutions	Proposed Institutional Linkages
	<ul style="list-style-type: none"> ▪ Lack of good quality fodder germplasm ▪ Lack of altitude wise model of year round fodder production (combining trees and grasses) ▪ Lack of knowledge and skills for scientific management and preparation of fodder and feed at household level 	<ul style="list-style-type: none"> ▪ Increase in cost of production due to purchase of fodder from outside 	<ul style="list-style-type: none"> ▪ trees such as, Oak (Quercusleucotr ichophora), Phalyant (Quercusglauca) , Khadik (Celtisaustralis), Bheemal (Greviaoptiva) ▪ Community level nursery to produce quality seedlings of fodder trees & grasses like Napier, Red clover, White clover, Gucchi, Cox foot etc. ▪ Fodder and feed preparation using innovative techniques 	
Absence of optimum development of horticulture as a source of livelihood in spite of favorable conditions	<ul style="list-style-type: none"> ▪ Lack of quality germplasm, seeds and other planting material for temperate horticulture (mainly fruits and vegetables and flowers) ▪ Lack of timely availability of 	<ul style="list-style-type: none"> ▪ Underutilized livelihood potential of horticulture sector 	<ul style="list-style-type: none"> ▪ Promotion of horticulture under protected conditions (low cost bamboo based small poly houses). Main crop to be promoted under the protective cultivation will be vegetables 	VPKAS- Almora CITH – Mukteshwar University of Horticulture and forestry, Solan Pantnagar university – KVK Champawat

Problem Category	Major Issues	Effects	Suggested Technology Solutions	Proposed Institutional Linkages
	planting material ▪ Lack of knowledge about after care and management under open and protected conditions		(Tomato, Capsicum, and Cucumber)	CSK –HP – Palampur NABARD for crop/activity financial viability
Eroding base of agro biodiversity and diverse landraces (mainly, niche crops and sturdy and nutritious millets of hills)	▪ Gradual erosion and loss of local diverse cultivars from Himalayas ▪ Growing threat of food insecurity in the light of climate change phenomena ▪ Growing vulnerability of hill community due to mono cropping/ adoption of improved crops which are sourced ▪ Loosing opportunity on bio prospecting from niche crops and millets.	▪ Growing vulnerability and losing opportunity to develop	▪ Participatory conservation and characterization of indigenous pulses & millets (native varieties) ▪ Establishing community seed banks for conservation and multiplication ▪ Live trials for production enhancement, multiplication and pure seed production	BAIF –Pune scientist and breeders from its research centers and ongoing field programs

B. Describe how the project / programme provide economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

This project proposes to introduce the suggested activities for the benefit of agriculture dependent communities in fragile hill regions of the North Western Himalayas. Out of total 1,337 households, the project activities will be introduced to 800 households (almost 60 percent of HH) under different project activities. Under the different components, targeting of participants will be based on the need and requirement assessed by the community itself. However, based on the socio-economic context of these 10 villages / gram panchayats, the following are the broad categories identified for selection of participants as per their vulnerability to climate change:

- ***Small and marginal farmers staying in remote hill areas having limited sources:*** The communities in the selected cluster suffer from socio-economic marginality, inaccessibility, and lack of livelihood opportunities. The region has a scattered population, fragmented lands, highly terraced farming with small plot size. Majority of the communities are rural and agrarian having average landholding of 2 ha of land on different altitude with limited resources. They are highly dependent on agriculture and natural resources for sustaining their livelihood. Based on the projection of climate change, small and marginal farmers are the most vulnerable people to be affected by climate change and its impact. As all the factors contributing to good agriculture produce is highly dependent on changing climate (as described in Part I), under the project, it is proposed to diversify their risk through creation of several livelihood options such as agro-biodiversity, improved breeding of livestock, agri-horticulture cropping with combination of different crops, high value vegetable cultivation with polyhouse.
- ***Women headed families & women (having responsibilities in absence of men):*** Climate change has resulted in increased work pressure on women due to loss of their productive labor (mainly in agriculture) leading to physical and mental stress. Through diversified cropping patterns introduced under horticulture crop cultivation activities, risks involved in cultivation of single crop (as practiced by most of the women farmers) will be avoided and through forward linkage (market) the prices of the produce will be ensured under the project. The women headed families will be involved under the activities on priority basis. Other than that, women also augment family resources through tasks such as collection of fuel, fodder, drinking water from remote high and sloppy altitudes. Through plantation of different horticulture crops and fodder cultivation proposed under the project, the hardship of the women will be reduced through the project. Through, rain-water harvesting structure

proposed under the project, almost 3000 lit will be stored at household level which will certainly reduce the drudgery of women. In each village, 3 rain-water harvesting structure will be created at community level, which will benefit villagers mainly women. Through, promotion of different type of CBOs under different activities, women will also be part of the decision making process.

▪ ***Schedule Caste Household:***

Awareness about the climate change issue is lacking at community level. The project activities will allow initiating a process of awareness generation and participatory adaptation planning and action involving local CBOs, PRIs and village level bodies of informal nature

In view of this, the project actions are proposed with the aim of facilitating processes of community mobilization and for introduction of mix of climate smart farming technologies (covering important livelihood resources e.g. water, livestock and vegetation and crop resources) in a participatory manner and after understanding hill specificity which is described in Table 7.

Table 7: Detailed Socio-economic and Environmental Benefits in the project area

Type of Benefit	Baseline	Benefits
Social	<ul style="list-style-type: none"> ▪ Currently there is an absence of any collective local action to combat climate change risks. There is a general lack of local level institutional base to address climate change issues ▪ Women in the hills are facing increased burden due to degradation of natural resources due to climate change ▪ There is lack of local resource persons to provide required climate resilient technologies and on field support for transfer of such technologies ▪ Apart from the eroding base of agro biodiversity, the community's knowledge 	<ul style="list-style-type: none"> ▪ The project will facilitate building cohesive groups of villagers to respond positively to climate change. ▪ The activities are planned to address the vulnerabilities of hill families, leading to better adaptation in their own setting without having to migrate to other cities ▪ Hill women will be the focus of most of the field initiatives. The project activities are planned to enable reduction of hardships of hill women ▪ The perceptions as expressed by hill communities during preliminary consultation has formed base for project activities thus care is taken to respect and care local knowledge ▪ The project will revive some of the useful traditions of hill communities with regards to hill crops, water tapping systems etc. which are being lost with changing times

Type of Benefit	Baseline	Benefits
	associated with this is also inadequate	<ul style="list-style-type: none"> ▪ Project processes will lead to empowerment of communities through training and awareness building. Thrust will be laid on building local cadre in the form of community resource persons ▪ Project will support local food security, nutrition and risk mitigation needs of communities by focusing on the conservation of diverse landraces ▪ Project will help improving capacities of local communities and thereby improving their collective response capacity
Economic	<ul style="list-style-type: none"> ▪ Owing to marginality, inaccessibility, remoteness in general there are limited avenues for income generation for communities in Himalayan Mountains ▪ Once rich in natural resources, the base is degraded due to overuse and is threatened by climate change, posing serious threat to the very existence of life in hills ▪ Agriculture, horticulture and livestock potential remains to be exploited fully due to absence of required technologies and processes ▪ Average annual financial returns from horticulture for small and marginal farmers with 0.1 ha of land area are only \$33.33. Farmers are able to take only one crop for 4 months during the year 	<ul style="list-style-type: none"> ▪ The focus of project activities is to ensure sustained income for hill farmers in their own settings under changing climate change context by focusing on regenerative capacities of resources ▪ Adoption of useful technologies will contribute to enhanced yield and income from agriculture, horticulture and livestock and off-farm sectors ▪ The project will create alternate options for livelihoods for hill families by adoption of income diversification options, and marketing services ▪ The steps for disaster preparedness and climate change related planning and coping will reduce the likely damages to resources and this in turn will minimize economic loss due to sudden hazards ▪ The project activities suggest better integration of climate change perspectives into specific livelihoods such as agriculture (annual and perennial crops), livestock, forest and

Type of Benefit	Baseline	Benefits
	<p>due to the unavailability of irrigation water.</p> <ul style="list-style-type: none"> From livestock farmers are able to fetch \$375 per annum from indigenous cows which yields 800-900 liters of milk per annum and the farmers sell it at the rate of \$ 0.42/liter The fruit trees owned by farmers such as apple, pear, and peach are either old or the variety being harvested has no takers in the market; hence farmers do not sell these fruits and let them rot. 	<p>fodder so that these will be more resilient and provide viable household incomes for the communities</p> <ul style="list-style-type: none"> Typical net income per year from the individual activities is as follows: INR 9,250 (\$154) per year: poly-house vegetables; Household net annual income is positive in year 5 (INR 4,000, \$67) and peaks in year 10 (INR 20,000, \$333) Annual net income from milk sales is INR 41,820 (\$697) and periodic heifer sales yield an additional net INR 14,000 (\$233).
Environmental	<ul style="list-style-type: none"> The region is known to be fragile, having unique and rare biodiversity and providing various ecosystem services to people. The region is faced with maximum exposure to climate change phenomena leading to vulnerability of the communities Once rich in the natural resource base the region is under threat due to development activities The faulty development models which do not consider the mountain specificity have resulted in to creating development backlog 	<ul style="list-style-type: none"> The project activities are planned by considering the mountain specificities and thus will be implemented in harmony with its ecosystems The activities are planned in a manner that it will result into creation of long term reserves of important resources such as water, fodder, biomass, food in project villages, this will act as insurance against future threats Most of the activities proposed are based on principle of environmentally sound development and principles of Restore, Reuse and Recycle. The project will result in a robust model of adaptation to climate change in the hills of IHR thereby supporting the co-existence of communities and healthy mountain ecosystems

C. Describe or provide an analysis of the cost-effectiveness of the proposed project /programme.

The proposed interventions through application of innovative techniques and activities are highly cost effective as compared to available alternatives in enabling the community to adapt to the climate change in the project area. The activity-wise details of cost effectiveness is presented in the below given in Table 8.

Table 8: Cost-effectiveness analysis of the proposed project

Activity proposed	Alternatives	Benefits/loss averted
Natural Spring Rejuvenation Cost per site is \$14,167 for project period, with 50 ha per spring. Cost is \$283/ha to improve water supply at each site.	There are limited technologies available to rejuvenate springs successfully. As of now, no other organization has done such specific activity in the past in the Hills area.	Technology and recharge measures proposed will be very useful for rejuvenating springs. It will help in identifying exact recharge zones and due to which, the success rate will be much higher compared to traditional methods. Overall water availability will increase per site at each of the 15 sites proposed, with 50 ha per site, for a total of 750 ha. This will ensure sustained water supply for around 300 villagers. Providing land rehabilitation of 50ha per rejuvenated spring is a cost-effective investment for multiple-use water supply: household use, forestry, agriculture, livestock, etc. Importantly this will also enhance access to community water resource and thereby reducing the drudgery of women.
Rain water harvesting Cost per unit is \$679 This is one time cost at a household level. The life of this rain harvesting system is 10 years.	The alternative is to depend on other water sources which are drying up and are located quite far and down the slope from households, thereby	One of the most tested technologies for collection of water. The system will ensure 15,000 liters of water for irrigation and other usages annually per participant family. The stored water will be used in

Activity proposed	Alternatives	Benefits/loss averted
	<p>adding to the hardship of hill women. Hence, the project is averting the yearly cost of \$ 750 per household for storing 45,000 liters of water at household level.</p>	<p>summer/autumn, period when there is scarcity of water for crops. This will ensure supply of life saving irrigation to seasonal and annual crops as well as will ensure availability of water near household.</p> <p>The main purpose of this intervention is to create a permanent source of water near the household and to minimize the risk of crop failure due to sudden dry spells</p>
<p>Water use efficiency techniques demonstration Cost per sqm is \$ 2.5</p>	<p>Adoption of water saving techniques will help in optimizing the use of scarcer resource and will avert the losses related to water and soil management.</p>	<p>Efficient irrigation will increase the irrigated surface; reduce water losses, as well as labor. The cost of production will be reduced by 20 percent at least. It will provide improve crop resilience and output.</p>
<p>Fruit tree plantation Project Contribution per family is \$168</p>	<p>Traditionally communities in hills used to get income from Apple orchards, with changes in temperature, the area does not get required chilling conditions and apple orchards are turning less productive.</p> <p>In other projects, the cost of grafts is \$167, while in proposed activities, the same cost includes establishment of wadi and after care cost.</p>	<p>This intervention is necessary as the hill climate is suitable for growth of fruit trees. Once these fruit plants are established, communities will get sustained income from fruit trees.</p> <p>The total cost of establishing a fruit plantation in 0.1 Ha of land for a family is \$310, out of which \$168 is contributed from the project, which covers good quality grafts, plant nutrition & after care, neem cakes, pesticides, plant protection material, and labor. Other than after care cost, all the remaining activities will be done in 1st year of the project.</p> <p>Returns from the fruit plantation to the family will begin only after 4 years of the plantation. Farmer and his family will reap the regular crop benefits from the plantation</p>

Activity proposed	Alternatives	Benefits/loss averted
		beginning 4 th year from the year it was planted for at least the next 20 years or longer, depending on the economic life of the particular trees. Household net annual income is positive in year 5 (INR 4,000, \$67) and peaks in year 10 (INR 20,000, \$333) (See Annexure: 6 a)
Promotion of high value vegetable cultivation under bamboo based poly houses Project Contribution per unit is \$ 500	<p>For bamboo based polyhouse in other project ranges from \$600-800.</p> <p>Looking at the nature of extreme climatic events this is necessary intervention. Other measures are not so effective and are prone to climate change risks and thus lead to damage and loss of crops.</p>	<p>It will increase the crop productivity by 60 percent compared to conventional farming on the same unit of land. This will also provide added protection from low incidences of disease & pests.</p> <p>It is proposed to motivate farmers to go for high value vegetables cultivation based investments in the protective polyhouse (Cost: \$ 280) and irrigation tank (Cost: \$212) having life of at least 5 years and 15 years respectively. In the first year, 200 seedlings of high value vegetables (capsicum/tomato or both in addition to 12 seedlings of cucumber) will be given to the participant. The structure will be used for high value vegetable cultivation, thus giving assured income as compared to cultivation in open conditions.</p> <p>The return from the harvest will be insured through collective farming. On an average, the annual net income from the protective cultivation of vegetables will be INR9,250 (\$154) (See Annexure:6b)</p>
Conservation of agro-bio diversity & revival	If this action is not taken	Compare to cost proposed the benefits would be far more valued.

Activity proposed	Alternatives	Benefits/loss averted
<p>of traditional useful agriculture practices Cost is \$6,667 per year</p>	<p>the rich and indigenous resource base will continue to erode gradually. As of now, there is minimal effort taken for this in the hill areas. In another ongoing project in Thane district of Maharashtra costs almost \$10,000 per year</p>	<p>This intervention will help reviving the base of indigenous, nutritious and sturdy food crops that are available in hill conditions. These will prove useful source of food security. Some of these crops are niche crops which are high in demand for their nutritional traits thus may help attracting premium prices in future and thereby benefiting the communities</p>
<p>Improved breeding services (Artificial Insemination using semen of HF/Jersey cow) and scientific management of livestock resources \$ 117/ family during four years</p>	<p>The livestock although forms important source of livelihoods, is not managed scientifically and thus returns from this are suboptimal. In case of family approaching any AI services for 2 cattle, it almost incurs \$16 for 1 time AI service. While in case of proposed activities, it will be door step service costing \$16 for 4 times AI services.</p>	<p>It is proposed to target households having at least 2 cows. The estimated cost of these services comes to \$117 for a family for a period of 4 years. Benefits will start coming from year 4th on-ward from enhanced milk and sale of cross breed cows. With the improved livestock management services the yield of the cattle will increase and will fetch more monetary benefits to the family in the years to come. While the local cows produce 1-2 liters of milk per day, a crossbred cow can produce 8-10 liters of milk in a day from year 4 after Artificial Insemination and if fed correctly. This will result in increased income to the farmers. Annexure6 c): Cost benefit analysis of improved breeding services with required management practices</p>

Quantification of Cost-effectiveness of three important economic activities /interventions leading to income gains:

Tables 9 to 11 show the incremental financial gains from project activities in fruit tree plantations, vegetables in poly houses and improved livestock breeding.

Table 9: Fruit tree plantation per family

S No.	Particulars	Amount in Rs.	Remarks
1	Cost of Establishment of 0.1 Ha of Fruit tree Plantation (Project Support up to 4 year)	10,075 (\$168)	The cost will mainly cover the major cost of cultivation such as good quality grafts, pit digging and after care.
2	Maintenance cost up to 10 th year borne by Family	20,500 (\$342)	This cost will mainly include cost of irrigation done at individual Farmer's end.
3	Total Cost of Cultivation over 10 years.	30,575 (\$510)	Establishment and upkeep
4	Sales revenue over 10 years	90,100 (\$1,502)	From market sales of produce – sold at Lohaghat market 20 kms away from project area
5	Net Benefit from the Fruit Trees over 10 years In the project area the economic life of a walnut tree may be up to 30 years; plum tree 20 years; malta, and lemon trees 20-25 years. Replanting would be needed after yields fall below economic levels. The cost-benefit analysis is presented over 10 years only to tree maturity and as yields stabilize.	Net Present Value (NPV) @15% over 10 years: INR 11,976 (\$200).	Household net annual income is positive in year 5 (INR 4,000, \$67) and peaks in year 10 (INR 20,000 or \$333) See Annex 6a for details

Table 10: Promotion of high value vegetable cultivation under bamboo based poly houses per family

S No.	Particulars	Amount in Rs.	Remarks
1	Cost of Establishment of Bamboo based polyhouse and vegetable cultivation (1 st year of establishment) (Project Support up to 4 year)	30,000 (\$500)	Cost will mainly cover construction of bamboo based polyhouse (life 5 years) and Irrigation Tank (life 10 years)
2	Other costs of cultivation borne by family up to 5 th year	17,250 (\$287)	This cost includes the cost of cultivation up to 5 th year at Farmer's end.
3	Total Cost of Cultivation	47,250 (\$787)	
4	Sales revenue over 10 years	64,500 (\$1,075)	From market sales of produce – sold at Lohaghat Market 20kms from project area.
5	Net Benefit from the Vegetable cultivation under protected farming The economic life of the greenhouse is 5 years and the tank is 10 years. The cost-benefit analysis is over 5 years only.	NPV @15% over 5 years INR 5,790 (\$96.50)	Annual net income of greenhouse vegetables is INR 9,250 (\$154) Refer Annexure:6 b

Table 11: Improved breeding services (Artificial Insemination using semen of HF/Jersey cow) and scientific management of livestock resources per family

S No.	Particulars	Amount in Rs.	Remarks
1	Livestock Management and improved breeding support planned under the project per family	7,000 (\$117)	Families having two cows will be targeted during the project. Cost includes 4 times AI for 2 cows. Vaccination, deworming and modification in Cattle shed for the cattle. All the cost is only for 1 st year.
2	Other costs to be borne per family	498,386 (\$8,306)	This cost includes the cost of cultivation up to 10th year at Farmer's end. 90 percent of the cost included is of fodder, which they generally opt from forest area and free grazing of land.
3	Total Cost (1+2)	503,386 (\$8,390)	
4	Total Income from selling of milk and heifer in 10 years per family	683,000 (\$11,383)	Sales to the Anchal Dairy network
5	Net Benefit from selling of milk and heifers over a period of 10 years per family.	NPV @15% over 10 years INR 13,136 (\$218)	Annual net income from milk sales is INR 41,820 (\$697) and periodic heifer sales yield an additional net INR 14,000 (\$233). Refer Annexure:6c

BAIF has already demonstrated and introduced these interventions in Hill conditions as a part of its effort to set up a context specific development model in hill conditions. This previous experience has proven useful to arrive at realistic base for costs and income. (Refer Annexure: 8)

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

The proposed project activities are in line with many national and sub national goals and policy framework as described below and in Table 12:

- The actions proposed are in line with National Action Plan for Climate Change and various Missions proposed under it

- The interventions proposed aimed at increased adaptation for agriculture dependent hill communities of North Western Himalayan region. It is also spelt out as an important thrust area in the IPCC document and the State Action Plan of Climate Change in Uttarakhand, 2012
- The actions proposed are part and parcel of India's commitment under Kyoto Protocol. The proposed activities are also in line with objectives mentioned under India's Biological Diversity Act 2002, which aims at conservation of biodiversity
- The proposed project actions will fulfill the objectives of number of sub national acts and policies such as Disaster Management Act, Environment policy and Vanpanchayats Act of state of Uttarakhand
- Most of the outcomes defined will also help fulfilling India's commitment to the UN's Millennium Development Goals
- It is also in line with the major poverty reduction schemes of the Government of India.

Table 12: Detailed National Programme and Its Alignment with the Components Proposed

	Missions	Components of the Policy	Alignment with component
1	NAPCC		
a	National Mission for Sustaining Himalayan Ecosystem¹⁸	Strengthening Institutional Capacity Identification of desirable adaptation and development policies (Water Security, rejuvenation of Springs, Infrastructure Development enhancing ecological sustainability etc.)	Capacity building of the hill community Enhancing knowledge base through creation of field based evidence as well as dissemination of knowledge, Maintaining the agro-biodiversity of hill areas through promotion of Agro-biodiversity centers Water security through springs rejuvenation in hills
b	National Water Mission	Conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management	Introduction of Rain water Harvesting Structures and drip irrigation for conservation and minimization of wastage of water in the hill areas Management of usages of water through CBOs at village level
c	National Mission for	Use of bio technology Dry land (rain-fed)	Climate smart agri practices and innovations including

¹⁸India's 2nd National Communication_UNFCCC.pdf

	Missions	Components of the Policy	Alignment with component
	Sustainable Agriculture	agriculture Risk management Access to information	introduction of combination of horticulture crop for diversification, soil and water conservation
d	National Mission on Strategic Knowledge on Climate Change	Network of institutions Promotion of climate science research Data sharing policy: from various arms of government Building human and institutional capacity: filling knowledge gaps in modeling and technology	Several institutes are identified for sharing and transfer of technology Human and Institutional Capacity is being built through training and capacity building of the most vulnerable group.
2	National Horticulture Mission	To provide holistic growth of horticulture sector through regionally differentiated strategies	Combination of horticulture crops is introduced having hill specificity to diverse the risk
3	National Policy on Agriculture	Attain output growth rate in excess of 4 percent per annum based on efficient use of resources	Soil conservation, organic agriculture, conserving agro-biodiversity and promoting climate resilient horticulture varieties
4	National Policy on Livestock	Improving productivity of the livestock sector in a sustainable manner while protecting the environment, preserving animal bio-diversity, ensuring bio-security and farmers' livelihood.	Promotion of livestock management practices, fodder plantation, screening and documentation of fodder trees.
5	National Disaster Management Policy	Timely dissemination of disaster related information Preparing for Disaster Management Planning for Mitigation of Disaster	Weather based early warning systems are linked to community preparedness and risk assessment. Providing a decision support tool for advance planning of major livelihood support sectors including agriculture is consistent with the NDMP
6	National Forest	Acknowledges the	Promotion of fodder trees and

	Missions	Components of the Policy	Alignment with component
	Policy	importance and primacy of local communities, sustainable management with environmental stability	grasses in private lands as well as community wastelands.
7	National Environmental Policy	Emphasized on integration of environment in economic and social development sectors	Forest regeneration, conservation of native species and agro-biodiversity, water resources conservation and management. Planning climate smart interventions with mountain specificity
8	12th Five Year Plan of India	The working group report mentions many issues emerging in this region, including climate change. It also highlights a need to plan required programs and schemes	There is separate chapter on Development needs of Himalayan Region. The project is consistent with the priorities identified in the policy.

E. Describe how the project / programme meet relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and comply with the Environmental and Social Policy of the Adaptation Fund.

The project components will be strictly implemented in accordance with various standards set out by various Ministries of Government of India and various Departments at the State level such as Department of Agriculture, Horticulture, Environment & Forest, Animal Husbandry, Fisheries, Renewable energy etc. For inputs and materials such as seeds, planting materials standards established by national research and technical institutes as well as by national level organizations like Indian Council of Agriculture Research (ICAR) will be adhered to. The details of the applicable standards *vis-a-vis* broad activities are indicated in Table 13 below:

Table 13: List of Relevant National Technical Standards and Compliance

Activity	Applicable standards	Application to Project	Monitoring
Introduction of climate resilient horticulture varieties on farmer's field Introduction of high	Operational Guidelines: <ul style="list-style-type: none"> Department of Agriculture & Cooperation 	By Project Management Unit in consultation with NABARD Regional	Technical report of the Activity Package of Practices

Activity	Applicable standards	Application to Project	Monitoring
value vegetable cultivation under protected conditions(bamboo based polyhouse)	<ul style="list-style-type: none"> Ministry of Agriculture Government of India 2014; Mission For Integrated Development of Horticulture; Soil Health Management(SHM 	Office, District Agriculture Department Officers, Technical Institution identified	designed Field Visit & Photos
Roof Top Rain Water Harvesting along with underground water storage facility	<ul style="list-style-type: none"> Standards as described by Bureau of Indian Standards, Guidelines For RWH in Hilly Areas by Hill Area Development Engineering Sectional Committee –(Public.resource.org.in) 	Roof top rain water harvesting (at the level of Individual household, natural spring rejuvenation, drip/sprinkler demonstration	Technical report Field Visit and Photos
Increase in the productive capacity of livestock through improved breeding & scientific management of cattle.	<ul style="list-style-type: none"> National Livestock Policy, 2013;Government of India ,Ministry of Agriculture ,Department of Animal husbandry, Dairying & Fisheries 	Livestock management, fodder plantation, screening & documentation of fodder trees, poultry, cold water fisheries	Field visit, Photos, progress report, document on screening of fodder.
The use of isotopes for assessing water recharge and discharge zones and use of tracers for tracking of water flow	<ul style="list-style-type: none"> Standards developed by isotope hydrology division of BARC would be applicable. This Technique is widely applied for investigating and solving problems related to water 	Developing water resource in hills by rejuvenation of natural springs	Technical Report Reports and analysis involving BARC and HESCO 's team of scientist

Activity	Applicable standards	Application to Project	Monitoring
	resource management in Hills of Uttarakhand.		

The project is not expected to violate and social and environmental regulations as applicable at National and Sub-national level as well as Environmental & Social Policy of Adaptation Fund.

F. Describe if there is duplication of project / programme with other funding sources, if any.

This project will not duplicate efforts ongoing through other development agencies in a region and sub-region. There are no other efforts on climate change adaption in the selected 10 project villages / gram panchayats. This project would be the first one to explicitly focus on improving the resilience of communities and preservation of ecosystems as an adaptation strategy.

This project will complement on-going government programs as indicated in Table 14 below. These programs are aimed at improving rural agriculture productivity; manage drought and landslides, improved irrigation and watershed management and conservation of biodiversity. During the project implementation, necessary efforts would be made to build partnerships with the concerned departments and institutions.

Table 14: List of on-going Projects in the Proposed Area

On-going /Proposed Project	Objectives	Complementarities	Geographical coverage	Concerned Agency
Technology Interventions in Mountain Eco system (TIME)	To introduce suitable technologies having hill specificities	Technology interventions suited to mountain ecosystem are proposed. The project is yet to commence implementation	In three states of North Western Himalayas	Department of Science and Technology (DST), Govt of India
Area based programs through National Rural	To introduce actions for soil water conservation in a landscape with the objective	The scheme has major area based treatment approach which can be used for treatment of	All over India	On-going with support of department of rural development

On-going /Proposed Project	Objectives	Complementarities	Geographical coverage	Concerned Agency
Employment Guarantee Scheme – Ministry of Rural Development on natural resource management	of creating local employment	wastelands.		under NREGS scheme
Programme on climate change on-going through various ICAR institutes such as, farmer's awareness, capacity building actions and ICT enabled information sharing	To increase the interaction between the farmers and the Agro-meteorological Service providers like India Meteorological Department (MD), State Agriculture University (SAU), Indian Council of Agriculture Research (ICAR)	Greater awareness of the farmers about the importance of climate and its impact on the agricultural crops and its management	All India	Ministry of Earth Science, ICAR & IMD
HICAP : Himalayan Climate Change Adaptation Programme The program has started in	It is collaboration among three organizations – CICERO, ICIMOD, and UNEP GRID-Arendal it is aimed at contributing to enhanced	It is important think tank on climate change in Himalayas and project can get benefited from knowledge products	Himalayan region	On-going with support of SWISS Agency for Development Corporation, ICIMOD-Nepal

On-going /Proposed Project	Objectives	Complementarities	Geographical coverage	Concerned Agency
September 2011 – August 2016	resilience of mountain communities, particularly women, through improved understanding of vulnerabilities, opportunities, and potentials for adaptation.			
IHCAP Indian Himalayas Climate Adaptation Programme	The program is aimed at climate change adaption actions by building partnerships in Himalayan region	It is one important effort to take action against emerging issue of climate change	Indian Himalayan Region focussed in Kullu district of Himachal Pradesh	Climate Change and Development (CCD), through the Embassy of Switzerland in India, under the Global Programme of Climate Change supported by Swiss Agency for Development and Cooperation (SDC) in collaboration with the Department of Science & Technology (DST), Government of India

Two important bilateral and multi-lateral programs are launched in the Indian Himalayan Region to address the climate change issue. The two major projects are 1.Indian Himalayas Climate

Adaptation Programme (IHCAP) and 2. Himalayan Climate Change Adaptation Programme (HICAP).

The IHCAP is under the Global Programme Climate Change (GPCC) of the Swiss Development Corporation. In India, the program is being implemented in coordination with the department of Science and Technology, GoI. It mainly promotes collaboration between Swiss and Indian scientists on glaciology in order to better monitor glacier retreat. The thrust is on scientific dimension of climate change dynamics and scenarios on snow, glaciers and water flows and promoting scientific collaboration in the field of glaciology, climatology, and hydrology, between Indian and Swiss scientists

The efforts are also taken for building the resilience of vulnerable communities in the Himalayas and for building knowledge and capacities of research institutions, communities, and decision-makers. Most of the current work under this project is however ongoing in Kullu district of the State of Himachal Pradesh (HP). The official partners are Government of Himachal Pradesh; scientific cooperation: Department of Science and Technology, Government of India (GoI); Swiss Universities (Geneva, Zurich, and Berne). Policy: Ministry of Environment and Forest, GoI. Under the project, efforts would be made to develop collaborations with technical team members and scientists that are working under this program. BAIF is formal partner of DST, which is anchoring this project in India. Efforts would be made to draw relevant learning based on the work already initiated under this project.

Himalayan Climate Change Adaptation Programme (HICAP) is a pioneering collaboration among three organizations – CICERO, ICIMOD, and GRID-Arendal – aimed at contributing to enhanced resilience of mountain communities, particularly women, through improved understanding of vulnerabilities, opportunities, and potentials for adaptation. HICAP mostly works for generation of knowledge of climate change impacts on natural resources, ecosystem services.

HICAP mainly aims to achieve following objectives :

- To increase understanding of uncertainties influencing climate change scenarios and water availability and demand projections for parts of major river basins, and to encourage use of the knowledge thus created
- To enhance capacities to assess, monitor, communicate, prepare for, and undertake actions to respond to challenges and opportunities from impacts of climate change and other drivers of change;
- To make concrete and actionable proposals on strategies and policies (with particular reference to women and the poor) for uptake by stakeholders, including policy makers.

Its current geographical base is in five sub-basins of major Himalayan river systems: two sub-basins of the Brahmaputra and one each of the Indus, Ganges, and Salween-Mekong. BAIF has initiated dialogue already with the ICIMOD official to explore scope of collaboration for climate change actions in North Western Himalayas.

Both these programs will prove useful and complementary for actions proposed by BAIF under AFB project. The collaboration would be useful to capture and disseminate policy lessons based on field evidences generated from BAIF's projects. Such collaboration would be mutually beneficial as these programs do not have field action activities which BAIF's project has. Further, these programs do not have much of the programmatic presence in the district of Champawat and in the proposed project cluster.

Similarly, under the project, efforts would be made to achieve convergence with the program of MGNREGA, where panchayats can identify type of work the village wants to undertake in order to generate employment and create assets at the level of village. The landscape based work at community lands and soil and water conservation type works will be included in the yearly job shelf by mobilising villagers. The required sensitisation, capacity building of villagers, job card holders, village level functionaries and line departments would be done. The internalisation of some of the permissible works under NREGA will also ensure long term up-scaling and replication of proven and tested works.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

One of the outcomes of this project will be to create field-based evidence of climate resilient strategies and approaches in mountain ecosystems, and further create a database for its wider dissemination and possible replication in other parts of the IHR. There is a need for this type of effort as there is dearth of data covering field evidence of required climate change adaptation strategies and program approaches in the IHR. A knowledge management system will be set up to capture field evidence, best practices covering climate smart agriculture technologies in the hills. Efforts would be made to prepare a variety of knowledge products. The training, capacity building efforts through the project will also help generate data on required training modules to transfer technologies at the level of communities and for seeking their informed participation. Following are the modes through which will be helpful in capturing the learning and dissemination of lessons learned:

- a) **Technical Reports:** All the best practices having significant impact will be document in the form of Technical report, summarizing all the technical processes followed in implementation of the activity, its cost economics and impact on the hill communities. This document will also summarize the similar programs and projects having presence in

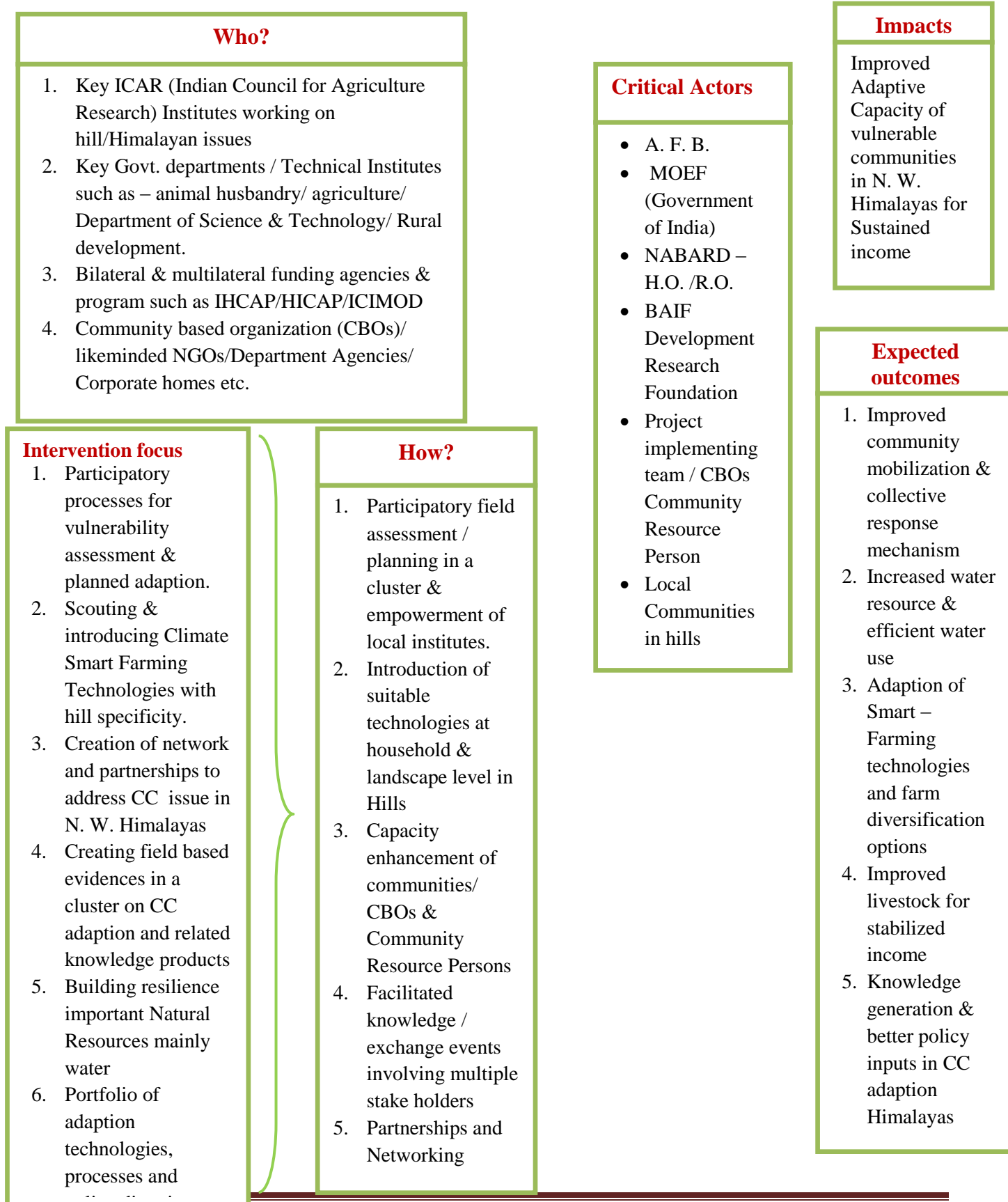
other hill villages and linkages. These documents will be helpful in identifying climate resilient activities having hill specificity and replicating in other hill villages. These documents will be distributed amongst the block, district and state level officials and others NGO/voluntary organization working in the area for further knowledge dissemination process.

- b) Pamphlet/Dossiers:** Most of the time it is observed that, farmers are not able to access various schemes due to lack of information and know-how of the technology. This 1 page pamphlet will be a short note on the available climate resilient technology and related schemes of Govt./NGOs/Voluntary Organization in the area. This note will also describe the linkages details and ways to approach the schemes. This will also be helpful in disseminating the best practices amongst the farmers.

For further dissemination of knowledge of technology based activities at State level and National level, 2 page fact sheet will be documented describing the approach, objective, outcome and future strategies involved in up scaling the best practices in other climate change affected areas. This will be mainly helpful in disseminating the lessons learned about the different climate resilient technology to policy makers and other stake holders.

- c) Audio/visual Documentary:** Audio/visual Documentary will be able to actually capture the impact of all the climate resilient activities practiced in the hill areas and final outcome/result of the project.
- d) Workshop at National Level:** A multi stakeholder national consultation will be held to allow further exchange of best practices and better policy inputs. These efforts are expected to result in captured and disseminated learning insights, approaches, and technologies for the IHR. During the course of project implementation, efforts would be taken to facilitate cross learning and exchange of best practices involving several stakeholders as described. The region has several research institutions of repute engaged in technology development in agriculture, forestry, natural resource management and allied disciplines. A large number of non-government organizations are working at the grassroots level and making a change in the lives of rural communities. Development initiatives rank highly among the priorities of the Department of Biotechnology and the Department of Science and Technology, premier agencies of Government of India for promoting scientific development initiatives. BAIF already has a programmatic base in this region (See Annexure 8), whose field level experience along with technical input from Government and Non-government Organization as well as research knowledge base of Research institutes in the area will be utilized for wider dissemination of climate change approaches and strategies.

Figure 19: Project related Networking and Partnerships



H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The proposed adaptation plan is result of understanding generated, insights gained during series of multi stakeholder consultative meetings which were held in the past in the hill region by the executing entity as a part of its efforts through Thematic Centre for Development in Fragile Hill Areas (North Western Himalayas).

Climate change issue and consequent adverse impact on livelihoods in North Western Himalayas could be discussed with number of stakeholders including hill communities, the villagers of proposed project cluster, Scientist and domain experts from various research institutes and technical agencies similar mandate of science and technology extension in the hill region, professionals of likeminded NGOs and representatives of development agencies.

The consultative meetings proved useful to understand the climate change context as perceived by communities, to understand the full impacts and growing vulnerabilities of communities and their livelihood resources to identify potential ways and methods for adaptation, to assess preferences and priorities of communities towards diverse adaptation measures and technologies and to arrive at a broad understanding of required field actions/ interventions having mountain specificity

Details of consultative meetings held so far:

- A daylong village level meeting could be held in the month of September 2013 to understand the nature of climate change and resulting effects along with existing coping strategies as adopted by the group of villagers from the 8 villages of Champawat District. These project villages were part of BAIF's program through its Centre for Fragile Hill Areas. This was attended by 55 persons, comprising all marginal farmers from 8 villages, of which 15 were women. Participatory assessment of Climate Change issue and impact could be done using CRiSTAL tool. (Community based Risk Screening Tool- Adaptation and Livelihood) tool. This is a decision support tool for assessing and enhancing project impacts on local adaptive capacity to climate variability and climate change. This tool is developed jointly by the International Institute for Sustainable Development (IISD), the International Union for Conservation of Nature (IUCN), the Stockholm Environment Institute in Boston (SEI-US) and the Swiss Foundation for Development and International Cooperation (Inter cooperation). During these interactions, communities shared their own perceptions of climate change indicators and how these changes are affecting land, water, and agriculture and livestock resources in hills.

Following participatory tools of CRiSTAL were used to facilitate participatory discussion and brain storming

- a. Historical time line
 - b. Hazard mapping
 - c. Hazard prioritization
 - d. Seasonal calendar
 - e. Crop calendar
 - f. Vulnerability matrix
 - g. Impact matrix
 - h. Adaptation matrix
-
- On 5th April, 2014 one more discussion meeting could be held involving group of 30 villagers at village Nariyal Gaon and by involving villagers from other 9 project villages from selected AFB project cluster covering mixed population from various sections.

 - **11-12th Nov- 2011** at Forest Research Institute – Dehradun, BAIF could organise the two days consultation jointly with Department of Biotechnology and Department of Science and Technology, (DST) Government of India. The Theme of this consultation was, ” **Crafting Strategies for Development in Hill Areas of North Western Himalayas**”. **The main objective of this consultation was to** evolve a suitable strategy framework based on sound principles of ecology and economics for the sustainable livelihood development through better managed natural resources in the Central and Western Himalayan hill regions. Climate change threat was also discussed in depth. There were 40-45 invitees from 4 Himalayan States including eminent scientists, development workers, professionals, thematic specialists, Academicians, technocrats and representatives of Department of Sciences and Technology and Department of Biotechnology, Government of India and likeminded agencies having programmatic presence in Himalayas. At the end of two days discussion, clarity was jointly evolved on suitable program approach in the context of hills, along with required technological framework to be able to address number of issues in hill areas. This meeting also created base for future synergetic efforts involving multiple stakeholders like Uttaranchal Bamboo & Fiber Development Board, Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Uttarakhand University of Horticulture and Forestry, NRC –Orchid –Sikkim, G.B.Pant University of Agriculture & Technology, Dept. Of Geography, HNB Garhwal University, ,Uttarakhand Regional Economic Development Programme,DBT-New Delhi, SDTT –Mumbai , NABARD, Dr Yashwant Singh Parmar University of Horticulture and Forestry,College Of Veterinary And Animal Sciences ,Indian Institute of Technology-Roorkee ,UREDA etc. (Proceedings are available at: http://www.baif.org.in/pdf/Hill_Workshop_Proceedings.pdf)

- **16-18 July 2013**, at Scientist Hostel, FRI- Dehradun. BAIF could jointly organize a meeting to discuss broad scope for launching of the DST program ,’’ Technology Interventions in Mountain Ecosystem (TIME). DST has recently launched TIME program as a multi institutional, multi-location network program in three Himalayan states in Central and Western Himalayas. The main objective was to identify the critical areas / issues requiring development interventions in hills (Including climate change) and to evolve a suitable program to help addressing fundamental livelihood issues of the mountain communities by generation of new economic activities in the fragile hills.

Table 16: Summarized Tabular Form of Consultation Processes Done and its Outcome

Consultation	Type of stakeholders	Objective	Outcome of discussion
Multi stakeholder meetings On 11-12 th Nov-2011 at Forest Research Institute – Dehradun ,Uttarakhand BAIF along with Department of Biotechnology ,DST and Himmothan society network could organise a two days brain storming workshop ,’’ Crafting Potential Strategies and measures for North Western Himalayan region.	37 invitees including eminent scientists, development workers, professionals, thematic specialists, Academicians, technocrats and representatives of Department of Sciences and Technology and Department of Biotechnology, Government of India and likeminded agencies like partners of Himmothan Society etc. The list of participants is enclosed at Annexure 7.	To evolve a suitable strategy framework based on sound principles of ecology and economics for sustainable livelihood development and for management of natural resource in Central and Western Himalayan hill regions Climate change threat was also discussed in detailed	At the end of two days discussion, clarity was jointly evolved on suitable program approaches in the context of hills, along with Required technological framework to plan development interventions in hill areas. This has also facilitated ensuring future synergetic efforts by main participating organizations to achieve development goal with hill specificity
Multi stakeholder meetings – held on 16-18July 2013, at Scientist Hostel, FRI- Dehradun.	Eminent scientists, development workers, professionals, thematic specialists, Academicians, technocrats and	To Identify critical areas requiring interventions in hills (Including climate change) and to evolve a suitable	The workshop resulted in to launching a TIME program by DST as an interface between number of premier NGOs,

Consultation	Type of stakeholders	Objective	Outcome of discussion
BAIF was part of Core group, formed by DST –Department of science and technology –GoI, which met to discuss scope and design of TIME-LEARN program which is launched by DST as a multi institutional, multi-location network program in three Himalayan states in Central and Western Himalayas.	representatives of government and likeminded agencies from three main states of North Western Himalaya	program to help addressing fundamental livelihood issues of the mountain communities by generation of new economic activities in the fragile hills.	research and scientific organizations working in hills and Himalaya's communities.
<p>Field assessment of climate change effects and related vulnerability in Uttarakhand involving villagers</p> <p>This was held on August 2012 (CRiSTAL tool)</p> <p>An assessment was conducted on in Khetikhan village of district Champawat</p>	55 Small and marginal farmers from 8 villages including female members (16 nos.)	<p>To understand</p> <ul style="list-style-type: none"> ▪ How climate-related hazards affect project area and local livelihoods ▪ How people cope with the impacts of these hazards ▪ Which livelihood resources are most affected by climate hazards and which ones are most important for coping ▪ How project activities affect access to or availability of these 	An assessment helped to understand and discuss adaptation and mitigation strategies as suggested by communities for climate change phenomenon in a region

Consultation	Type of stakeholders	Objective	Outcome of discussion
		critical livelihood resources <ul style="list-style-type: none"> What adjustments can be made to a project to increase access to or availability of these critical livelihood resources 	
<p>A village level assessment of climate change and vulnerability issue involving farmers.</p> <p>Organised on 5th April, 2014 at village NariyalGaon, district Champawat</p>	28 Small and marginal farmers including female members who are vulnerable from 10 proposed project villages participated.	<p>Communities expressed helplessness as they did not know ways to accurately predict these climatic changes and its occurrence.</p> <p>Villagers indicated need for specific interventions through adaptation project. Some suggested measures includes-</p> <p>Management of Water for irrigation as well as for drinking</p> <p>Tapping of rainwater and efficiently utilize the ground water Ex:- Spring rejuvenation, diversion based irrigation , roof top rainwater harvesting, innovative water storage ,de - silting of common water tanks ,rain water recharge etc.</p> <p>Increasing productivity from land per capita land or per capita water even under changing context</p> <p>Technical handholding and on field support for newly introduced crop was also expressed as a need</p> <p>Measures to check an incidence of pests and diseases in crop and livestock resources</p> <p>Improvement guidance in Livestock rearing</p>	

Consultation	Type of stakeholders	Objective	Outcome of discussion
		<p>Need soil conservation measures in the area to protect productive soil which is washed off during intense rains</p> <p>Need to conserve forest, with reforestation on Vanpanchayats (Community managed pastoral lands). Pine needle trees causing fire in the forest therefore need is expressed to manage this properly to reduce fire. Need to ensure biodiversity in forests ,which has vanished over the years</p> <p>Need for timely information about rainfall and temperature to plan climate friendly agriculture activities in advance (Developing an Early Warning System for extreme events)</p>	

Summary of main points discussed during village level consultative meetings and during field level assessments of vulnerabilities using CRiSTAL tool:

- a) During these interactions, communities shared their own perceptions of climate change indicators and how these changes are affecting land, soil, and water agriculture and livestock resources.
- b) Communities mentioned that the uncertainty in climate events is growing since last few years thus making the dependent community more and more vulnerable. Villagers talked about their perception of increase in maximum temperature in last few years
- c) Main hazards identified by community in terms of its impact on livelihoods in sequence are
 - Less/reduced snowfall
 - Drought (Not getting rainfall when it is actually needed thereby leading to total loss in agriculture)
 - Rainfall variability and Unseasonal rainfall

Table 17: Vulnerability Assessment Results

Hazards	Description	Current coping strategies as adopted by the communities
Reduced snowfall	<ul style="list-style-type: none"> ▪ Snowfall has reduced significantly in the last 3-4 years. ▪ Earlier, thickness of the snow used to be between 1-2 feet, but now it has reduced down to only 2 inches. ▪ This has significantly affected the growth of temperate fruits especially apple. ▪ Yield obtained from wheat used to be good, but, now since the snowfall has reduced, the quality of wheat has also decreased. ▪ Because of sufficient amount of snowfall, the insects or pests also used to die earlier, but now they are growing even more. ▪ 1994 : Major snowfall (2 feet) 	<ul style="list-style-type: none"> ▪ Instead of apple, fruits like Malta, Peach etc. that require low chilling hours are grown now. ▪ Since horticulture was mainly affected, people have now started growing vegetables.
Drought	<ul style="list-style-type: none"> ▪ Because of delayed monsoon this year, crop produce has been affected the most. ▪ Due to scarcity of water, people had to bring drinking water from a distance of 300-400m. ▪ Many domestic animals also died this year due to scarcity of water. ▪ 1977-1978 : Major drought 	<ul style="list-style-type: none"> ▪ Changes in cropping pattern ▪ Also people have now started digging wells. ▪ Dry fodder was purchased this year because of lack of green fodder.
Unseasonal rainfall	<ul style="list-style-type: none"> ▪ Till last year, onset of rainfall was latest by 28th June, but this year it did not rain at all between March-July. ▪ Earlier in July-Aug, sometimes it used to rain continuously for 7 nights (also known as Satrati/Satchadi), but now it doesn't happen. ▪ If it rains by 28th of June, then only the rains are beneficial for the crops otherwise they are not. 	<ul style="list-style-type: none"> ▪ Changed cropping pattern. Nowadays, Kharif (monsoon) crops are cultivated on a large scale as compared to Rabi (winter) crops. ▪ Some of the villagers have recently started fishing in the nearby water bodies. The species present in these water bodies are mainly Common

Hazards	Description	Current coping strategies as adopted by the communities
	<ul style="list-style-type: none"> Number of monsoon days has decreased i.e. onset of monsoon is delayed and it gets over early by 2nd of September. Previously when it used to rain, the soil used to remain moist; but now the soil has become hard. 	carps, Trout, Silver carps, Rohu, etc.

- The other adverse impacts mentioned were an increase in maximum temperatures, and a decrease in minimum temperatures both during winter and summer.
- Unseasonal, irregular, less consistent and unpredictable rains compared to earlier period. A late monsoon leads to drought-like situations and results in failure of the main crop sown in March.
- Villagers also mentioned changes such as, an increase in mosquitoes, and early flowering in rhododendron trees. New pests have appeared on capsicum..

Sectorial implications of climate change as shared by the community:

- Agriculture & horticulture sectors have been affected the most.** This has also resulted in changing cropping patterns in this region. Cultivation of hill food crops such as local millets, buckwheat, soybean and barley are on the decline. Crops that need freezing temperatures, such as apple, are also on the decline. The lack of chilling temperatures is leading to a decrease in fruit setting. Crops that were not originally grown in this belt are now increasingly cultivated e.g. :- Tomatoes, capsicum, flowers, etc. This has resulted in the hill community increasingly depending upon plains markets for the supply of basic food produce.
- Water** is other important resource whose availability is influenced adversely in the hills. Water in the hills was never anticipated as a problem earlier but this year many villagers had to purchase water. Hill community are now digging wells as they have to struggle hard to fill water from natural springs in hilly terrains. Community seems to be not aware of different modern and proven techniques of improving water harvesting, storage and use of water in the hills.
- Livestock:** Livestock resources are affected due to shortage of nutritive fodder even in the monsoon. Due to this shortage, cattle have been released to forest this year. Interactions with villagers helped BAIF realize how the sudden climatic events in hills have accelerated the process of degradation of natural resource base, damage to biodiversity resources and growing marginalization of the hill communities. While discussing the required adaptationion

strategies, it was noticed that people were clueless, confused and ill-equipped with required knowledge and skills.

Listed intervention areas in consultation with the local villagers:

- i. Community mobilization to revive and regenerate vegetation cover on degraded community pasture lands (Vanpanchayats) and fodder promotion would lead to ecological restoration of common property resources, sustained ecosystem services and ensuring long term access and availability of green fodder for livestock.
- ii. Demonstrating and standardizing other livelihood options having potential in hills such as livestock rearing, horticulture and high value vegetable cultivation will help developing risk and income diversification options
- iii. Scouting and demonstrating technique of promotion of cultivation of vegetables under controlled or protected conditions to ensure production despite sudden climatic events and weather variations, which are common in hills
- iv. **Technical support for newly introduced crops:** People are not very aware of how to adapt to newer cropping patterns resulting from the upward shift of the agro climatic belt due to increased temperature. They expressed a need for technical support for crops which are new to the region
- v. Soil and water conservation measures and site specific measures for ground water recharge will help rejuvenation of springs, which are an important natural and perennial source of water in the hills
- vi. Community based agro biodiversity conservation and revival of niche crops from the hills will improve risk mitigation, seed sovereignty and food security in the region. Villagers narrated stories of the usefulness of two traditional methods i.e. **Baranaj** (Plantation of 12 different varieties/ types of food crops to be able to get assured yield of at least 5 crops in case of climate uncertainty); and **Aicha-Paicha**, participatory exchange of local seeds to be able to reduce dependency of farmers on seed companies.
- vii. Introduction of climate smart technologies in important sectors will help reduce the hardship of hill women.

I. Summary of main points discussed during interactions with scientists, academicians, technocrats and government officials of relevant line departments:

The scientists and government officials will play the role of enablers. Scientists have an important role to devise newer technologies, climate smart agriculture interventions and carry out innovative research to develop various techniques, products and services. Government officials play an important role in framing the required response by farmers to be able to mitigate or adapt with issue of climate change. They work as ears and eyes of planners and policy makers

and help in extension of newer schemes that are introduced through various government line departments.

During interaction scientists talked about the emerging issue of climate change and also spoke about the types of technologies, action research and trials that have been planned by technical and scientific institutes. They also mentioned the need for taking technologies from ‘lab to land’ and the role of NGOs like BAIF which can facilitate such extension of proven and tested technologies.

Government officials on the other hand spoke about many programs and schemes through their line departments under various missions and panchayat level programs like MGNREGS which the project can collaborate with for improved resilience of the hill communities.

Listed interventions in consultation with the local villagers

- Community mobilization to revive and regenerate vegetation cover on degraded community pasture lands (Vanpanchayats) and fodder promotion would lead to ecological restoration of common property resources, sustained ecosystem services and ensuring long term access and availability of green fodder for livestock.
- Demonstrating and standardizing other livelihood options having potential in the hills such as livestock rearing, horticulture and high value vegetable cultivation will help developing risk and income diversification options
- Scouting and demonstrating techniques of promotion of cultivation of vegetables under controlled or protected conditions to ensure production despite sudden climatic events and weather variations, which are common in hills
- Soil and water conservation measures and site specific measures for ground water recharge will help rejuvenation of springs, which is important natural and perennial source of water in hills
- Community based agro biodiversity conservation and revival of niche crops from hills will improve risk mitigation, seed sovereignty and food security in the region
- Introduction of climate smart technologies in important sectors will help reduce the hardship of hill women
- Innovative actions for promotion of producer owned agri businesses/ marketing efforts, and improved market access

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The issue of climate change and related consequences on livelihoods of hill communities is recently emerging as a major threat to development. There are limited efforts so far to adapt to these changes. The overall gearing up of the Indian response to face such problems has been

slow; there is a general lack of field-based evidence on the context specific adaptation measures that are needed. The proposed project is an unusually timely one, which can use previous experience to directly support the adaptation of the livelihoods and take steps to better manage natural resources in the North Western Himalayas.

Component 1: Community Mobilization and Organization

Baseline without Adaptation fund:

People residing in the project villages have very limited information about adaptation measures and the communities are feeling vulnerable due to growing uncertainty of weather events. Normally projects are taken-up without adequate stakeholder consultations especially during the planning stage. Stakeholders, especially the vulnerable communities who are the direct beneficiaries of any project, are not taken on board while designing various components as well as at implementation. Hence mobilization of the stakeholders, constitution of village level institutions formation of SHGs, farmers clubs, water users association, etc. are not given the required focus. In the project villages, farm families are highly exposed to climate change related livelihood insecurity with no definite idea how to resolve this issue in future. Village level vulnerability assessment was not done by any Governmental agencies in the area prior to designing past projects. For example, weather based advisory services are not available in the area that hill communities can rely upon. The nearest weather station of the Indian Meteorology Department is located at Mukteshwar is at the distance of 250 km from the project site. In the absence of appropriate training and capacity building, the community is unable to adopt feasible climate change adaptation measures. Further, there are hardly any agencies in the field for undertaking the required capacity building of the communities covering multiple livelihood sectors that have a bearing on climate change adaptation.

With Adaptation Fund Support:

Through awareness generation meetings and vulnerability assessment of the villages, a participatory assessment of climate risks and related vulnerabilities will be prepared. Based on the analysis, Annual Adaptation Plan will be prepared in consultation with the villagers (through PRA) on different aspects of climate change and related adaptive strategy. This would enable positive effects on physical and natural and human resources, mapping of threats, planning response strategies, etc.

The local level institutions will be strengthened through mobilization and capacity building, and will have a central role in operation of different activities like information dissemination, further training of different activities, marketing linkages and other linkages at different levels.

Component 2: Introduction of Water Resource Development and Climate Smart Farming Technology

Baseline without Adaptation fund:

Growing scarcity of water (surface and sub-surface) for drinking and irrigation due to erratic, unseasonal, and unpredictable rains in the hills in recent years, including the drying up of natural springs, is the major threat to the hill communities of climate change. Drinking water sources are becoming scarcer, thus adding to drudgery of women in finding and carrying water. Similarly, agriculture in the IHR and project area is mostly rain-fed and is characterized by small-scale and low productivity, and is highly vulnerable to climate change. The potential of horticulture, including protected cultivation, as livelihood options remains largely untapped. The lack of proven local solutions to address low incomes and vulnerability has led to migration of productive labor to other areas for work, resulting in an even greater local threat to food security and family wellbeing. Animal husbandry which is second largest sector supporting livelihoods is turning unproductive and less remunerative due to the scarcity of fodder leading to increased cost of production. Dependence on agriculture alone will not be sufficient in ensuring resilience to climate change.

With Adaptation Fund Support:

Creation of water reserves to address water stress due to climate change is envisaged by undertaking site-specific measures. Rainwater harvesting techniques (individual & community), natural spring rejuvenation and demonstration of drip irrigation are the main activities proposed as important activity under this component.

Adoption of climate smart, context specific and feasible activities, as proposed, will contribute to enhanced yield and income from the farming and livestock sectors. These interventions will create alternate livelihood options for the hill farmers, stabilize their income even under the changing context and thereby enable them to cope with the adverse impact of climate change. Introduction of niche fruit crops having high value will be promoted with required technical support. The changed climate is conducive for growth of diverse, high value fruits such as, walnut, peach and grafted pear. Promotion of farming under protected conditions (low cost bamboo based poly houses) would also help in growing high value and off-season vegetables. Long-term conservation of hill agro biodiversity has also been identified as an important investment leading to risk mitigation and ensuring food security.

It is proposed to focus on fodder trees, which are native to hill areas. With appropriate training and capacity building, the ability of the community to adopt feasible interventions will greatly be improved. These interventions will result in direct and positive impacts at family level in the project area.

Component 3: Knowledge Management including knowledge creation and wider dissemination actions

Baseline without Adaptation fund:

A suitable mechanism to capture processes and factors leading to the success or failure has been sadly missing in most of the government sponsored flagship rural projects. Therefore it has been difficult to replicate and upscale many of the pilot projects implemented in the country. Documentation of projects during as well as after implementation is a neglected area limiting the scope for dissemination of information and constraining future up scaling of identified and successful activities.

With Adaptation Fund Support:

The project will take required steps to disseminate the learning/outcomes from the project through technical reports, fact sheets, pamphlets and documentary to the different stakeholders. Through a national level workshop mass awareness generation among different stakeholders will be done. The technical report will document the process flow and the outcome with all the necessary data from the field as well as 1 case study will be printed based on the impact of the activities. This will help in policy advocacy and wider adoption of the best practices under the project. The documentary film will be based on the outcome of the project which will be shared in the national workshop or any other workshop in the future, so that; similar results can be attained using the same approach.

J. Describe how the sustainability of the project outcomes has been taken into account when designing the project / programme.

Due consideration has been given to sustainability of all project interventions. Three type of sustainability efforts are planned- 1) Economic sustainability of important project activities for livestock through scientific management and improved breeding, vegetable cultivation under bamboo based poly house structures and fruit tree plantations; 2) Ecological sustainability is ensured by keeping focus on regeneration of natural resources such as ground water, degraded pastoral lands; and 3) Institutional sustainability is ensured by emphasizing building capacities of local groups and ensuring collective actions through them, including after project completion.

All the components proposed under the project are based on community participation and engagement, which will ensure the involvement of all the participants in the process from planning, implementation through to evaluation. Early stage involvement of the participants in the project will help in formulation of strategy and execution. In the process of formulation and execution, the participation of women, youth and landless poor families will be ensured in order to have inclusive implementation and benefit sharing at different stages.

Component 1 of the project will mobilize and strengthen the Community Based Organizations and through vulnerability assessment of all the villages, the Annual Adaptation Plan will be prepared based on the needs and priorities of the most vulnerable participants.

As a part of project interventions processes have been planned to form and strengthen diverse user groups and commodity interest groups of vegetable growers, women SHGs for milk collection, water user's associations, poly house farmers etc. for the activities proposed. These groups will be strengthened to handle the marketing of post-production handling and marketing of agri produce including vegetables (tomatoes, capsicum) and surplus milk. One resource person from each village will be identified and trained for various technologies proposed under the project. The local resource person will represent community interests and will be the interface between the community and local technical experts as well as the Govt. linkages. The project will help to improve the capacity of this local community in order to develop and support future adaptation actions.

The main outcome of the project will be increased adaptive capacity of the communities through informed institutional arrangements and context specific planning of adaptive strategies to build the resilience of the community.

Output 1.1

This output will strengthen the adaptive capacity of the local community in order to identify and plan climate change adaptation. Under this output, a **Climate Adaptation Group** will be identified in each village, which will be instrumental for the smooth functioning of each activity. The Annual Adaptation plan will provide a number of capacity building opportunities for local communities. The awareness generation meetings and linkages with technical partners of the project will involve the community and will increase their understanding of climate change and its impact on life and livelihood and future challenges. It will help the community to plan their own adaptive strategy based on the informed choices available. These annual adaptation plans formulated at village level will be in form of a sample proposal that they can forward to other funding agency so as to sustain the activity proposed or they can make other arrangements to suit their requirements after the project is complete. Climate Adaptation Group will be responsible for such linkages along with Panchayats of the village.

Output 1.2

Climate Adaptation and other such groups will be formed and strengthened under this output leading to increased participation in development decisions and productive activities. The main aim of this output is to ensure mainstreaming of the adaptation plan in overall development of the local community through institution building processes, which will be operationalized by a well-guided operational framework of each institution so as to involve community participation to sustain the project. The project outputs and outcomes will create significant assets that will

benefit the entire community; hence for operation and maintenance of these structures capacity building of the local group will be done to run and sustain the activities involved. The maintenance of the assets created under the different components will also be monitored by these groups. Mainly youth & women will be involved to collect operation and maintenance fees from users for running costs and maintenance costs. Guidance will be given by the village level community adaptation groups, so as to bring cohesiveness and transparency among different groups. This output is mainly responsible for capacity building and institution creation to make sure the project is sustainable.

Training and exposure visits will be provided to orient users to different technologies. Other than that, one resource person for each activity will be trained for each technology-based activity under the project. The selected person will also part of Climate Adaptation Group, which is the central team for co-ordination of this project village level. Trained resource persons will also act as facilitators for this activity in the locality of the activity. The person will also be linked with different extension field officer of different Govt. Departments for imparting training.

Component 2 of the project is climate smart agriculture through which the communities will be enabled to try new technologies including climate resilient crops and practices and improved livestock so as to adapt to climate change and generate new avenues of future livelihoods.

Output 2.1.1

Physical and natural assets built through this output will be managed by the Community User Group formulated in output 1.2, and external support will be given by technical expert from the executing entity as well as government departments. The ownership and maintenance of the structures will rest on Village Committee and Water User Group of the structure. They will be responsible for maintenance and operation of the activity. The village committee will decide upon the operational issues related to activity. There will be a mandatory agreement between the user group and Panchayat for the management and maintenance of the assets to be created particularly on the creation of operation and maintenance funds. The user group established during the construction phase will be responsible for management and operation of the structure.

Output 2.2

Income diversification through adoption of technology based activities will be sustainable because of good established marketing linkages that will provide better returns from the produce. This initiative will be supported under the project, through extensive harvesting planning, collective collection centers and direct linkages with the markets. All these will be executed by the Collective Marketing Group established in each village for different produce proposed under the project. Other than that, seed banks will be sustainably managed by local user groups. It is

expected that these ventures would create local employment and income especially to women in addition to creating food availability and security.

Output 2.3 Livestock is a secondary source of income in the community, and this output is mainly based on increasing diversification of livestock in order to increase production to minimize the risk of vulnerable communities. The local communities will be provided breed improvement services, and animal health care services in the villages. Other than this, cultivation of fodder trees in vanpanchayats will increase the green fodder stock in the village, which will be beneficial to enhance the digestion process of livestock and decrease GHG emission level caused by livestock. For making this activity sustainable, these farmers will be linked with network of collection centre of Anchal Dairy in the nearby villages. This linkage will provide long term surety of returns from their milk produce along with other privileges (patronage bonus, loan facility, input support facility) from the Dairy.

Throughout the project efforts will be made to involve local, district level and national government officials and departments in a network of supporting agencies. These members will be involved in consultations, field visits, scouting of technologies and programs, etc. Further, concept appreciation visits to field sites by policy makers and government officials, as well as direct project stakeholders, also will be planned. The best practices and case studies will be disseminated through local and national media to create required acceptability. Together these efforts are expected to help in attracting mainstream funding (including state budget support) in the longer run.

Component 3 of the project is all about knowledge generation from field evidence and dissemination of these field based best practices to larger audience for policy inputs and replication through various Government as well as Non-governmental organization. This will be platform to communicate the facts and figures along with the successful interventions to the Government machineries, who will further replicate it in other climate vulnerable areas. This part is very important for replicating to the model to similar field locations in future which will impact the whole problematic area rather than few pockets of the area.

Output 3.1

Through this output based on the field based output and practices, some fact-sheets and dossiers will be published which will be summarized format for the whole activity. Based on the best practices and impact on the area of this project, future directions will be laid down. These documents will be representative sample for the whole area which will be further replicated. If replicated, these areas will definitely act as knowledge hub for the future projects with well-laid institutions and resourceful manpower at village level only.

Output 3.2

Workshop will provide a platform for showcasing the impact of this project to Govt/Non-Govt. organization working for Climate Change related issues. This will be a cross-learning forum for every participating organization which will help further enriching the knowledge base.

Scope for further replication of project activities along with potential sources of funding for up scaling of proven interventions:

Looking at the proposed project intervention, the possible stakeholders would be various line Departments like Agriculture, Horticulture, Animal Husbandry Environment, Department of Science and Technology etc. The interventions/ activities under the project would be mainstreamed through existing schemes of line departments, Funds available under programmes like Rashtriya Krishi Vikas Yojana (RKVY), National Horticulture Mission (NHM), and National Mission on Micro Irrigation (NMMI) etc. would be channelized for the purpose.

Officials of State / Central Government will be involved in concept appreciation visits to field sites to sensitize officials about the field level issues and adopted approach and to influence the national policy, planning and resource allocation decisions by educating and exposing the senior government officials and policy makers to the field actions and best practices in hills. The best practices and case studies on climate smart interventions would be disseminated through local and national media to create required acceptability by mainstream funding agencies. This will facilitate further replication of proven and successful interventions for the benefit of hill communities in rest of the Northern Western Himalayas. A brain storming and sharing workshop is proposed under the knowledge management component of the project. Such workshop will provide required platform for discussion and for showcasing best practices and proven adaptation interventions to Govt. /Non-Govt. organization working for Climate Change related issues.

Table 18: Component wise possible up scaling and replication role of different stakeholders

Project intervention	Existing government fund for up scaling and replication (mainstream fund)
Building resilience through increased water availability and efficient water use	NREGS, Soil and Water Conservation Department, Dept. of Science & Technology, Agriculture Department ,Private Corporate houses
Climate smart agriculture technologies, Agri, horticulture development and crop diversification	Agriculture department, agri. research institutions, ICAR institutions
Forestry, fodder development	Animal Husbandry, Forest and Environment, Krishi Vigyan Kendra (KVK)

Livestock development	Animal Husbandry, Rural Development Dept.
Forward linkage development for value addition , processing, marketing etc.	Private and Government Dairies, Producer Companies etc.
Technology extension	Krishi Vigyan Kendra , Agriculture Department, Local Panchayat.

BAIF has been recognized for its development programmes by the Planning Commission, Ministry of Rural Development and Ministry of Tribal Affairs, Government of India, which enables BAIF Programme Approach to be taken up as a part of Government-sponsored main stream development programmes. BAIF is also recognized as an Institute of National Importance by the Indian Council of Agricultural Research and a formal MoU has also been made to plan concrete steps jointly.

The proposed project activities will be implemented as a part of BAIF-UK's thematic center called Center for Development in Niche Areas of Hills (covering the North Western Himalayan region). The center works towards incubating and piloting innovative project ideas. As a strategy, planned efforts are taken to sensitize government officials, policy makers, and like minded development organizations on proven and tested development approaches. This results into concept appreciation and internalization of work under existing and new policies and programs through national, sub national and regional government agencies. The implementing agency already have a working partnership with many local and state level government line departments such as Animal Husbandry Department, State Livelihood Mission program office , MGNREGS offices, Horticulture Research Station , Agriculture Extension, T & V, Soil And Water Conservation Department, Department of Science and Technology etc. BAIF has been recognized as an eligible agency for submission of proposals / action plans under MGNREGS program in district Champawat.

It will be possible to leverage scaling up of the successful initiatives under the project with the help of Government Departments as discussed above.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

This essentially is screening of risks for individual sub-projects that are identified during project along with it's possible Categorization (A or B or C)

Table 19: Checklist of Environment and Social Impacts and Risks Identified

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
Compliance with the Law	<p>There are no activities which are against legal framework in this project.</p> <p>The project complies with Environment (Protection) Act, 1986 and Forest Conservation Act, 1980.</p>	None
Access and Equity	<p>Project is envisaged to ensure equal access to all willing households in 10 project villages which are solely dependent of agriculture sector for livelihoods.</p> <p>Since climate change is posing more threat to some sections of population, The project envisages providing access to three types of vulnerable/disadvantaged populations i.e.: Small and Marginal Farmers, Women headed households and Scheduled Caste households and this aspect is proposed to be monitored regularly. Project team will undertake an assessment of the Access and Equity in respect of marginalized and vulnerable groups during the implementation stage through a consultative exercise with the communities to find physical, social and economic barriers. All the selection will be scrutinized by Village level committee to ensure whether the project will create additional barriers or deny access to the vulnerable groups-women and Schedule Caste families.</p> <p>The project participant selection processes are planned in such a way that principles of access and equity are observed. Before selecting the required number of participant families, project orientation meetings will be conducted involving men, women and youth from the project villages as well as members of local self-government. These orientation meetings will help the community to understand the objectives and approach</p>	Low

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>of the project and facilitate developing rapport with the community members.</p> <p>At the village level, project planning, implementation and monitoring will be done with the participation of all village level groups. Care will be taken to ensure that there is proper representation from different age groups, caste, class, religion and ethnicity of the villages. The major purpose of this process is (i) to provide a platform to participate in planning project interventions, implementing and monitoring; (ii) to provide space for women and marginalized communities to participate in decision making; and to (iii) create ownership of all project activities implemented in the village.</p> <p>The following criteria will be shared with the villagers to identify project participants:</p> <ul style="list-style-type: none"> - Families with sole dependence on agriculture / primary sector which are climate sensitive as only source of income and livelihoods - Families staying in remote hill areas, where alternative livelihood options are limited - Farmers with basic minimum resources to meet their livelihood requirements - Women headed families where productive men have migrated to cities and thus females are taking care of farming and thus bear direct burden of degradation of natural resources due to falling effects of climate change /variability <p>Poor households (Including Scheduled caste households) to be jointly identified by villagers using participatory processes (considering poverty and</p>	

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>marginalization perspectives of the villagers). The project envisages provision of fair and equitable access to the project beneficiaries in terms of alternate climate resilient livelihood options</p> <p>To ensure access to fodder resources and equitable distribution, Silvi-pasture Management Committees (SMC) will be formed in each village, where participants will be made aware about the program and participants' role in its implementation and management.</p> <p>For implementation of natural spring, a Village Committee will be formed which will consist of farmers and members of Village Panchayat and technical expert from Research Institute. It will ensure maximum coverage of the families living in the recharge zone and benefitting from this activity. After finalization of recharge zones and micro-planning of the water-harvesting structure in each village, a Water User Group will be formed which will consist of users of water under the particular activity.</p>	
Marginalized and Vulnerable Groups	<p>The project is basically aimed at providing alternate climate resilient livelihood options and income to marginalized communities living in the project area and as such will not have any adverse impact on other marginalized and vulnerable groups.</p> <p>The project will focus on small and marginal vulnerable groups whose risks have been identified and accordingly project measures have been identified</p> <p>(A) Small and Marginal Farmers having lands less than 2 Ha: Sixty percent of the population is directly dependent on agriculture and related activities, they are the most vulnerable group. Within these also the small and marginal</p>	Medium to Low

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>farmers /households having land holding of less than 2 Ha of land are more vulnerable. This is because resources that are there at their disposal are very limited. They have no other livelihood generation options and income from agriculture is very meager due to overall nature of rain fed, low productive and less diversified farming. Due to irregular rainfall and sudden climatic events, the agriculture is turning as a gamble for these section of population</p> <p>Agriculture & horticulture crops have been affected the most as these are highly climate sensitive and there are huge losses owing to sudden climatic events and higher incidence of pest and diseases.</p> <p>It was noticed that this section of farmers are ill-equipped to deal with the climate change issue as they are not organized, have less access to new technologies and farming practices etc.</p> <p>B. Women headed Households: Nearly 40% of the project households have women headed households. The region also has seen increased feminization of agricultural work and labour as productive men out migrates for better income opportunities. Climate change has resulted in increased work pressure on women and loss of their productive labour. Women also expressed concerns over absence of any climate change technology options due to remoteness and due to less exposure to modern technologies and limited access to women</p> <p>C. Schedule Caste/Schedule Tribe Households In the proposed cluster nearly 18% of the population belongs to Schedule Caste (SCs). It is seen that this section of population have comparatively less lands (average 0.7 Ha).</p> <p>Agriculture and labour constitutes main livelihood sources for this section of population. Growing risks of climate change has further threatened the produce from agriculture. Low production and productivity from agriculture has</p>	

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>resulted in increased manual labour as livelihood coping mechanism</p> <p>As a part of this project intervention, it is proposed to achieve farm diversification, reduce vulnerability, and promote environmentally sound and sustainable livelihoods for food security and risk mitigation, to ensure better adaptation with changing climatic conditions without compromising on production and productivity levels. The activities will help in creating a long term asset base in villages, plus an enhanced natural resource base and also will help in creating livelihoods and income for vulnerable groups'. The project is planned to have a positive social impact on the vulnerable communities in the project area.</p> <p>Non inclusion/partial inclusion of marginalized and vulnerable groups in the programme, Non representation of these communities during consultation and selection for project interventions etc. are the likely risks identified.</p>	
Human Rights	<p>The project does not affect the life and liberty of any individual or group. Neither does the project discriminate against any particular community or group or persons on grounds of gender, caste, ethnicity, ability or birth. The project upholds the fulfilment of the human rights of the villages and the target groups that it seeks to work with.</p> <p>The project does not violate any of the basic human rights that are available to all human beings.</p> <p>The entire process is planned as participatory and voluntary in nature. Efforts are planned to build the capacities of local villagers and sensitize them appropriately. This is expected to result in to informed participation of community members in to program implementation</p>	None
Gender Equity and Women's Empowerment	<p>Nearly 40% of the project households have women headed. In all there are 3158 women members in project villages out of total population of 6364</p>	Low

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>(49.62%). The highest population is in Goshani village (937 nos.) and lowest was in Bangaon (93%). The literacy rate among female is 64% against average literacy rate of 74%. The sex ratio in the project villages on an average is 985. A total of 556 households (HH) are women headed. Maximum number of women headed HH is in Goshani village (189) and lowest is in Digdai (27). The demographic details of the project villages is presented in Table 3.</p> <p>Inadequate representation of women in various committees, disproportionate selection of women beneficiaries and insufficient measures for empowerment through skill and capacity development etc., are the possible risks identified.</p> <p>Project is planned to ensure participation by women fully and equitably, receiving comparable socio-economic benefits and those they do not suffer adverse effects. Towards this end, women will be involved in decision making process through adequate representation of women in various committees.</p> <p>Major drudgeries identified based on the consultations with community were related access to drinking water, fodder availability and low income levels. The interventions proposed under the project are designed to address these issues through following measures included in the project document.</p> <ul style="list-style-type: none"> • Drudgery of women reduced due to improved access to water, fodder and alternative sources of income. • The rejuvenation of springs would also help in much needed promotion of economic activities and reduction in drudgery of women 	

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>in hills. The water resources created out of rejuvenation would be used for multiple-use water supply: household use, forestry, agriculture, livestock, etc.</p> <ul style="list-style-type: none"> • Through, rain-water harvesting structure proposed under the project, will certainly reduce the drudgery of women. In each village, 3 rain-water harvesting structure will be created at community level, which will benefit villagers mainly women. 	
Core Labor Rights	<p>The labour rights in the context of the project include: determination of work and adherence to minimum and time payment of wages; hours of work and their timing based on season; rest and worksite facilities; participation in planning; child labour; and grievance & redressal system.</p> <p>The project will work within the framework of the labour laws that are applicable to any site that employs casual labour. Freedom of association and the effective recognition of the right to collective bargaining will be respected. The wages will be determined on task allotted and the wage rate will be calculated on the basis of prevailing minimum wage rate for the task. The record of work done for each labour engaged will be maintained and the wages will be paid. The hours of work and the timing of the working hours will be determined in consultation with the labour and the prevailing practices in the area. Resting place with shade, facility for drinking water, pre-determined resting period, presence of and access to first aid box will be available at all working sites in the project.</p> <p>Positive discrimination in favour of women will be used to provide fair and equal opportunity to women</p>	None

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>who seek employment as labour and gain from the wages earned by her. All forms of negative discrimination in respect of employment and occupation will be eliminated</p> <p>Project will not engage child labour in any of its activities and all forms of forced or compulsory labour will be eliminated. The prohibition of child labour will be part of the agreement with the project beneficiaries and will be a non-negotiable provision of the agreement.</p> <p>Name, designation and number of the concerned official of EE to whom the labour and employment related grievances can be addressed will be displayed in the project area.</p>	
Indigenous People	There are no indigenous communities in these project cluster villages	None
Involuntary Resettlement	<p>Project activities causing involuntary settlement could be a risk.</p> <p>The project activities will be undertaken at the level of hill households, using their available natural resource base. The main project objective is to provide opportunities for sustained livelihoods in their own settings to hill communities without them getting displaced.</p> <p>The project activities like adoption of climate smart agriculture technologies through introduction of improved horticulture varieties, high value vegetable cultivation under poly-house, introduction of improved breeding services etc., are to be implemented at individual household level for improving their coping capacity through diversification of climate sensitive livelihood. As such</p>	Low

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>these activities will improve the economic condition of targeted household and thereby arresting the need for relocation on economical or livelihood reasons.</p> <p>The criteria for selection of sites for individual interventions will include the fact that in case there is any possibility or likelihood of involuntary resettlement due to project activities that particular site will not be selected. This factor will be included in one of the factors for ESI screening safeguards.</p>	
Protection of Natural Habitats	<p>The project will work on adoption of climate smart agriculture technologies through introduction of improved horticulture varieties (600 families), high value vegetable cultivation under poly-house, introduction of improved breeding services etc. These activities will be carried out in the farmers' fields without any disturbance to the existing wildlife habitats and flora and fauna. The impact on habitats and species as a result of project related activities will be low and localised and will not affect the ecology of the region. On the other hand there is emphasis on the conservation of natural habitat through regeneration of community pastoral lands (Vanpanchayats) which are in the state of degradation. Project has a component to restore such habitats by adopting both mechanical and biological measures, which will set in process of natural regeneration leading to eventual restoration of various ecosystem services</p>	None
Conservation of Biological Diversity	<p>Conservation, revival and adoption of climate resilient indigenous food crops as risk mitigation and food security measure is one of the sub-components of the project. The main objective behind promoting agrobiodiversity is to conserve and revive diverse, native and sturdy crop cultivars with relevance to local foods and nutrition security, which can withstand the climate change and related vulnerability arising from that.</p> <p>The activity is to be implemented by participatory approach in which sub activities include collection, fairs, pot cultivation, field cultivation, seed banks, etc.</p>	None

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>The project therefore is in fact promoting biodiversity. The project will not be introducing any exotic or invasive species of crops/animals in the project area.</p> <p>In case of livestock intervention, care will be taken to see that activities lead to scientific management, fodder and feed development and improved feeding, use of de-worming and vaccination. The project will ensure not to use vaccines like Diaclofanac which are banned as per government order in 2006.</p>	
Climate Change	<p>The project is will enhance the adaptive capacity of agriculture dependent hill communities in typical clusters that are representative of the North West Himalayas. One of the outcomes planned is to create field-based evidence of climate resilient program strategy in mountain ecosystems and ensure its wider dissemination. In this way the project will provide a springboard for replication in other parts of the mountains, thereby impacting a far larger area in the future.</p> <p>None of the project activities will lead to significant increase in greenhouse gas emission or other drivers of climate change.</p>	None
Pollution Prevention and Resource Efficiency	<p>The project has many interventions which will infact lead to resource efficiency demonstrations. There are activities like spring rejuvenation, water resource development and demonstration of water use efficiency, fodder plantation, horticulture promotion, cultivation of improved high value vegetables in small poly houses etc. which will help augmenting the existing base of natural resources while also allowing using the resource efficiently.</p> <p>Similarly, there is likely to be no issue of pollution .As far as agriculture is concerned; hill farming to a large extent is chemical free farming.</p> <p>Many activities suggested in the project will prevent pollution and improve optimum use and efficiency of natural resources especially of resources like lands, soil, vegetation, livestock and water in hills.</p>	None
Public Health	No risks are identified through any of the project activities as far	Low

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>as public health is concerned. In case of use of Isotope technique for spring rejuvenation, the scientific technology developed by Bhabha Atomic Research Center (BARC) viz. 'Environmental isotopes $^{19}(^{18}\text{O}/^{16}\text{O}, ^2\text{H}/^1\text{H})$' will be used for identifying the recharge zone of drying springs and spring rejuvenation in the project area. Although application of the technology has no health hazards, suitable precautions prescribed by BARC will be taken while applying the technology. Services of qualified and experienced Scientists from BARC laboratory in HESCO-Dehradun campus will be utilised for administering the technology.</p> <p>It is however proposed to discuss and make the community aware about this innovative technique by way of series of meetings, interactive sessions involving experts, public disclosure, grievance mechanisms etc.</p> <p>The project activities are expected to result in to improved base, access and availability of water, fodder, agriculture and fuel wood resources in and around the houses of 10 villages/ gram panchayats. This is thus expected to reduce the hard ship of hill women who otherwise have to bear direct burden of degrading base of natural resources due to climate change</p>	
Physical and Cultural Heritage	<p>No adverse impact on cultural heritage related issues is identified.</p> <p>The project interventions have been identified in consultation with the local villagers. There is no plan for any alteration to physical and cultural heritage in this project. On the contrary the project mentions need to revive traditional wisdom and useful climate smart agriculture traditions of local communities</p>	None
Land and Soil Conservation	<p>The project will have a positive impact on the general landscape of the area as it will not only green the project area through planting of fruit/fodder trees but will also enable in enhancement of bio-diversity</p> <p>The topography of the project area is undulating and in the absence of vegetative cover the rate of soil erosion is high. Most of the project interventions such as planting of horticulture and fodder trees, revival</p>	None

¹⁹ “Environmental isotopes : www.academia.edu/5585470/Hydrological_Studies_Using_Isotopes

Check-List of Environmental and Social Principles	Assessment Required for Compliance	Potential Impacts And Risks And Any Further Management Required For Compliance
	<p>and conservation of indigenous crops etc., are aimed at improving crop coverage in the area, which in turn is expected to protect the land from further soil erosion.</p> <p>In the catchment area of springs which are proposed to be regenerated, various treatments such as staggered trenches, creation of small ponds, and vegetative plantation will be undertaken thereby reducing the rate of soil erosion.</p> <p>The project proposes improved breeding and management services for livestock through artificial insemination so as to encourage stall feeding thereby reducing proportion of local roaming cattle which might exacerbate problem of soil erosion.</p>	

The interventions planned under the project are mostly at individual household level and the actual location and characteristics of the interventions to be implemented will be finalized during the implementation stage hence actual E&S risks although appears to be low / nil are not known at this stage. Some of these interventions will require close monitoring and proper observation of environment and social principles as given by Adaptation Borad . Hence, a detailed environmental and social screening and then management mechanism is proposed during the implementation stage. In view of this, the project is categorized as **“Category B”**. Methodology for Environment and Social Impact Assessment and Environment and Social Management Plan have been developed and the same is enclosed as Appendix I.

The following grievance redressal mechanism would be created as part of implementation mechanism.

Grievance Mechanism

- All the project villages will have display board stating the name of the project and names of NIE and Executing Agency. The names of contact persons and their mobile numbers will also be displayed on these boards.
- The village committee and gram panchayat which finalizes the interventions will pro-actively disclose the grievance mechanism that exists in the project. To maintain

consistency across villages a pamphlet related to the project comprising of the grievance mechanism will be printed and distributed in the village committee meeting. A copy of the pamphlet will be kept in the office of the Gram Panchayat so that it can be accessed during the course of project implementation.

- All grievances received either orally or in written form will be recorded in the Complaint Register maintained in the cluster office. Each such complaint will be identified by a complaint number and will be followed up and the resolution of the grievance will also be recorded. A consolidated statement of complaints received and resolved will be reported in the State Steering Committee.
- Information related to grievance mechanism will be provided in the language that is easily understood by the members of the village community.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The Project will be executed by BAIF Research & Development Foundation (BAIF), Pune, having an established presence in 16 states across India through its sister organizations since 1977. It is committed to provide sustainable livelihood to the rural poor through management of natural resources and promotion of livestock development, watershed development and agri-horti-forestry as major income generating activities. The BAIF team includes a Thematic Specialist having expertise and subject matter specialisation in areas such as agriculture, livestock, natural resource management, social science including strengthening of community based groups, team of finance and administration. BAIF will be directly responsible for execution of project activities in the state of Uttarakhand along with its associate agency in Uttar Pradesh (BIRD UP) and site-specific team in Uttarakhand.

Main stakeholders involved in the implementation of the project are as follows:

Role of NABARD as NIE:

- NABARD would be involved in periodic monitoring (on-site and off-site). Periodicity and structure of monitoring is given below:
- On-site detailed monitoring would be done on a six monthly basis jointly by NABARD Regional Office (Dehradun, Uttarakhand) and Head Office, Mumbai. The frequency of monitoring would be increased if considered necessary
- District Development Manager i.e. NABARD officer stationed at the district, would be a part of the monitoring committee for implementation of the project at local level
- NABARD would be part of steering committee which would meet every six months. The committee would deliberate and review the progress of implementation
- Quarterly report submission formats would be designed for submission by the executing entity for desk appraisal of progress. This will be structured as a part of the off-site monitoring
- Surveillance system and would be designed to generate warning signals, if any
- Progress reporting would be done to AFB on periodic basis (half yearly or more frequently as per requirement of AFB)
- NABARD would create a platform for sharing and dissemination of knowledge at the regional and national level.

BAIF Research & Development Foundation, Pune

Project Director will be responsible for the financial management regarding this project as per the BAIF financial guidelines. BAIF, Pune being the executing entity will be the single point of contact of NABARD for all the communications.

Roles and responsibilities of BAIF:

- Project executing entity directly responsible for smooth and effective execution of proposed project activities in North Western Himalayas
- Setting up project management systems along with BIRD- UP and Team at Uttarakhand including appointment of staff, finance, HR, M&E, Project implementation, defining strategies for defined project components
- Facilitating involvement of stakeholders, building working relationships and partnerships with likeminded institutes and development actors
- Knowledge management and data generation (planning strategies and suitable activities and events)
- Facilitating convergence and co-financing to enhance the impact
- Capacity building of project staff and other stakeholders for effective project execution
- Progress Reporting to NABARD – physical, financial and impact parameters.

BAIF, UP & Uttarakhand Team

The project will be executed by BAIF's team in Uttarakhand. It has good network of field level offices and regional centers across Uttarakhand. A full-fledged team is based at District of Champawat to execute and oversee work through its Center for Hill Areas. At the level of the community, a good rapport has been built with SHGs and farmer's groups, as the agency is regularly in touch with cattle owners in providing ongoing improved breeding services. The overall strategy of the project is people-centered, process-oriented and stakeholder based. The following is the process to be followed in project planning and implementation

Implementation plan for field actions

- The proposed field actions are to be introduced in 10 selected villages / gram panchayats covering vulnerable households, community managed landscapes / common property resources. The social engineering processes are planned to be introduced at the level of primary groups such as Self Help Groups, Livestock Keeper Families, Seed savers groups, Farmer's collectives, gram sabhas, Water User's Associations etc
- The approach of the proposed program is to facilitate site specific understanding on changing climate and its sectoral effects and then introduce climate smart agriculture measures by blending science and technology inputs for the benefit of agriculture dependent hill communities which mostly includes hill women
- Women and agriculture dependent communities having sole dependence on climate sensitive livelihoods have been identified as primary stakeholders of this project.
- The project activities will aim at facilitating introduction of mix of climate smart technologies (covering important livelihood resources mainly, land, water, livestock and

vegetation and crop resources) at household and landscape level in mountain conditions with technical back stopping from relevant scientific and technical institutes.

- Most of the land-based project interventions like drip irrigation, climate resilient horticulture, protected cultivation, agro-biodiversity & revival for traditional agriculture practices, fodder plantation etc., will be implemented in the land owned by the individual beneficiaries. Ownership of the beneficiaries will be verified by means of checking the title/land tax receipt before implementation so as to ensure land ownership by the farmer. As such there is no land ownership issue for the proposed family based project interventions. In case of community / area based interventions such as spring rejuvenation and community managed pastoral lands too, there will not be any conflicting situation as these lands are owned and managed by Village Panchayats and the project activities are also planned to provide access and benefits to all the villagers.
- Linkage development with local scientific and research institutes such as agriculture universities, institutes working on Himalayan ecosystem, Technology providers for scouting of suitable climate smart agriculture technologies to be introduced in selected villages. As a first step, an attempt is made to list and document the available technologies with many of the institutes operational in Hills. Under the project, efforts would be made to introduce relevant technologies with required adaptations at the level of farmers from 10 villages / gram panchyats .
- The executing agency have programmatic base in this region. BIRD-UK has been working in Uttarakhand since year 1994. As a development agency involved in rural development efforts, BIRD–UK and Uttarakhand team already have working relationships with local and state level government departments.
- Further linkages are also being sought with on-going Climate Adaptation programs in North Western Himalayas such as HICAP, IHCAP on-going with support of SWISS Agency for Development Corporation, ICIMOD-Nepal, newly launched program of Department of Science and Technology, Government of India DST –TIME (Technology Initiatives in Mountain Ecosystems), MGNREGS scheme, NABARD etc.

Figure 20: Project Implementation Structure

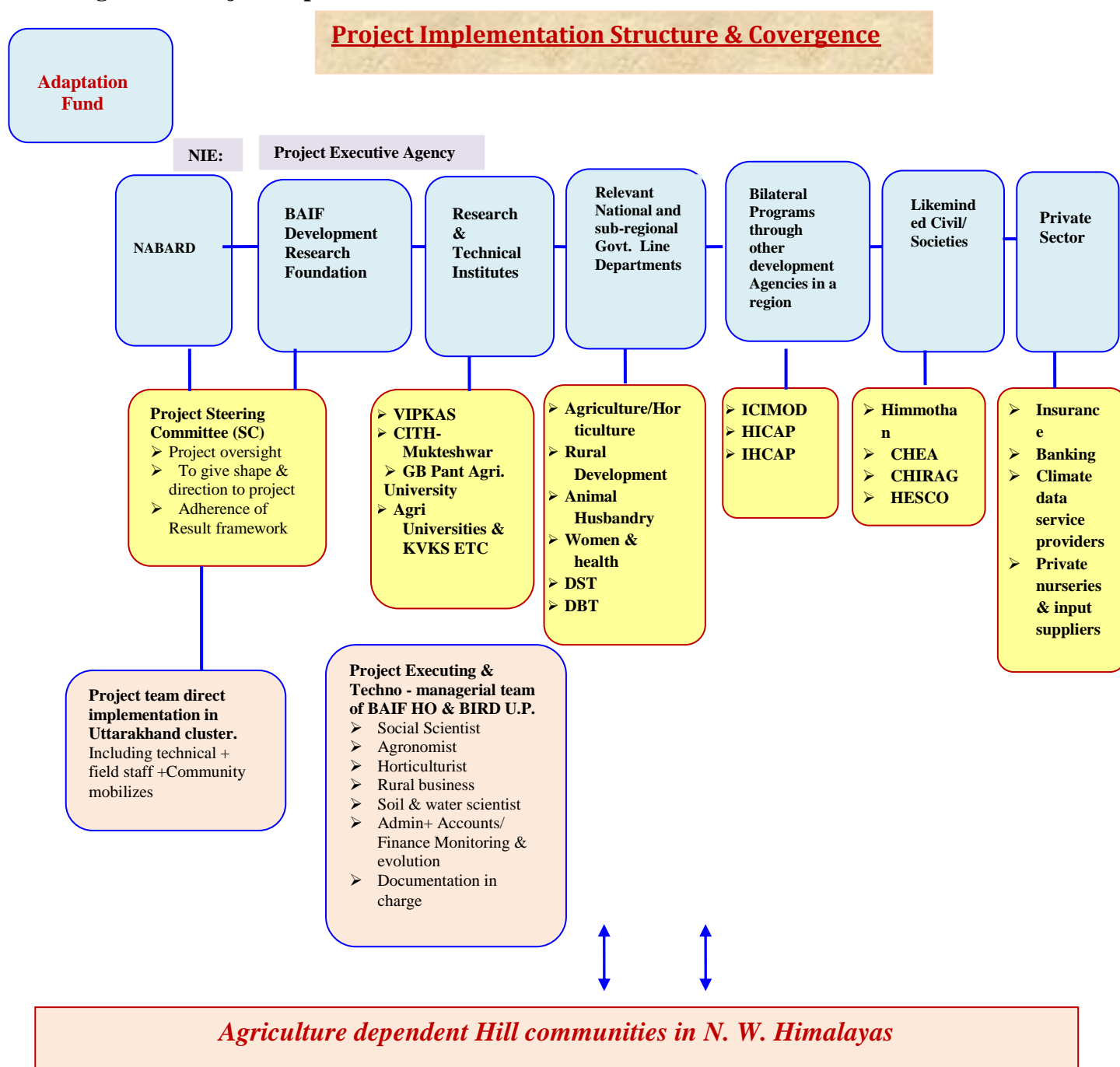


Figure 21: Implementation Arrangement of the Project

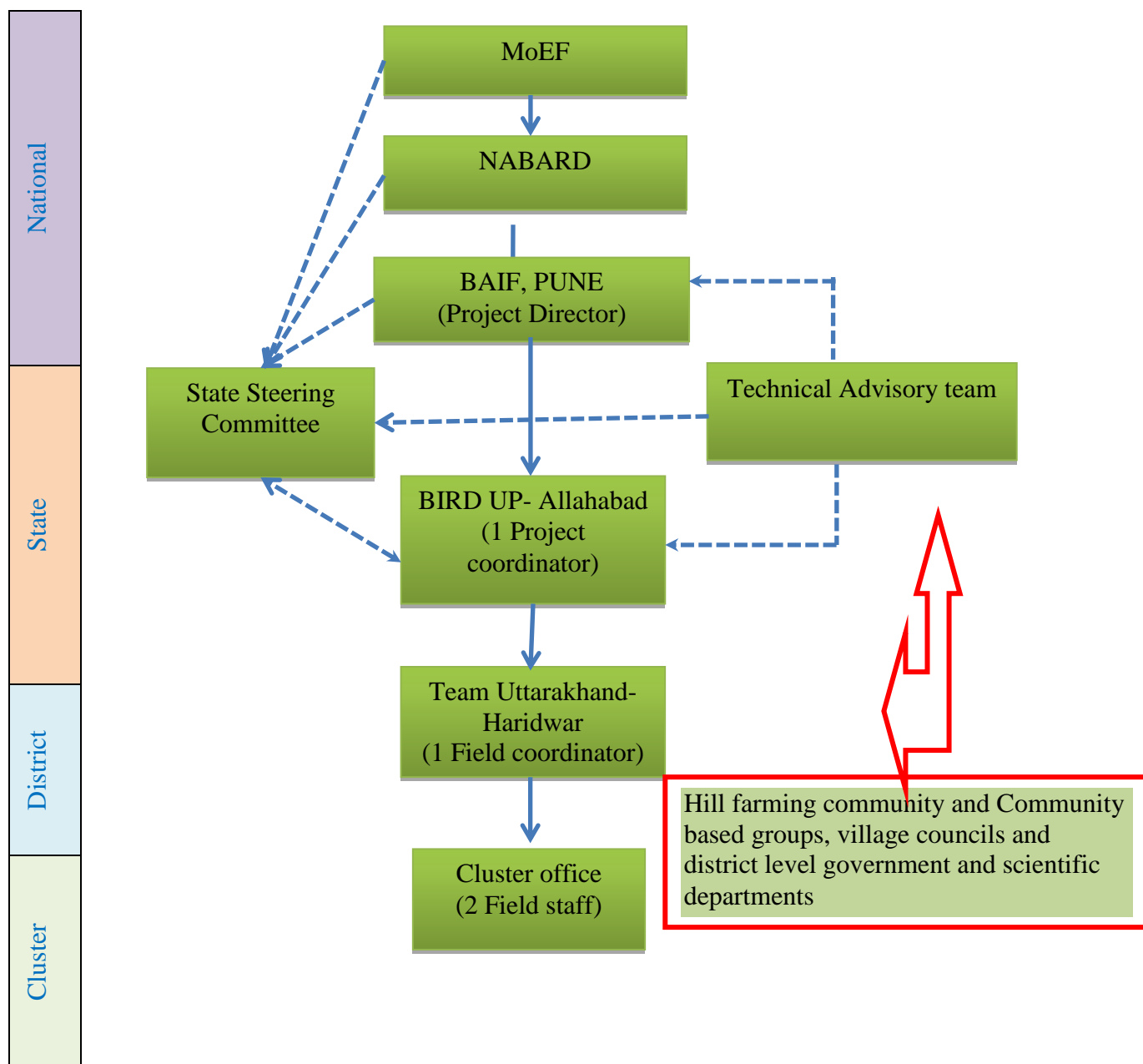


Table 20: Responsibility Matrix of Project Implementation Arrangements

Institutional Arrangement	Composition/Membership	Roles and Responsibility
State Steering Committee	<p>This will be comprised of</p> <ul style="list-style-type: none"> ▪ Project Director of BAIF and Project co-ordinator from BIRD-UP ▪ Members from NABARD RO and HO ▪ Representative of nodal department in the State dealing with climate change and Station Action Plan for Climate Change (SAPCC) ▪ Representatives from Technical Advisory Group <p>BAIF Project Director is Convener of the State Steering Committee, which will be called on half-yearly basis.</p>	<ul style="list-style-type: none"> ▪ Oversight of the project-financial and technical implementation ▪ Ensuring full implementation of project actions and speedy progress ▪ Monitor the progress of the project against the agreed time lines ▪ Facilitating linkages and partnerships with resource agencies, government and other development agencies having similar mandate
Technical Advisory Group	<p>Experts with qualification and Experience in:</p> <ul style="list-style-type: none"> ▪ Climate Change and development of Adaptation Strategies in Himalayan Region ▪ Agriculture Experts ▪ Geo Hydrology ▪ Rural Marketing <p>These experts will be drawn from Govt. Departments, Universities, and Technical Intuitions.</p>	<ul style="list-style-type: none"> ▪ Make recommendation to the Project Team on technical matters to incorporate the same in the implementation plan ▪ Provide science and technology inputs to main program components. ▪ Ensuring technical standards and quality of inputs ▪ Assess relevance and impact of the climate adaptation strategies
Project Team	<p>BAIF, Pune: Comprising of Project Director and other technical team</p>	<ul style="list-style-type: none"> ▪ Responsible for overseeing execution of project activities ▪ Fund administration of the project ▪ Procurement of goods and services

Institutional Arrangement	Composition/Membership	Roles and Responsibility
		<ul style="list-style-type: none"> Monitoring and Evaluation Communication with NABARD Knowledge Management Coordination with Government Departments for ensuring convergence
	Project Team comprising of Project Coordinator, Field Coordinator, and Field Team Members	<ul style="list-style-type: none"> Adherence to various project management systems and standards as per the AF requirements Preparation of work plans and execution. Progress Reporting to NABARD through Project Director – Physical, Financial and impact parameters Rapport with project stakeholders, Government Agencies, at project level.

Table 21: Component/activity wise roles and responsibilities

Components/Activities	Responsible parties	Roles and Responsibilities
Component 1: Community Mobilization and Organization	Project Team	Building rapport with the community, formation of groups, Training, Capacity Building The SHGs of women and farmer's collectives/user groups /commodity interest groups would be the primary groups at village level through which the efforts for introduction of appropriate climate smart interventions would be piloted in select villages
Component 2: Introduction of Water Resource Development	Project Team under the guidance of Thematic specialists of BAIF and	Scouting and introduction of climate smart technologies

Components/Activities	Responsible parties	Roles and Responsibilities
and Climate Smart Farming Technology	local research and scientific institutions e.g. VIPKAS – Almora, GB Pant Institute Of Himalayan Environment and Development, Garhwal; Dr. Y.S. Parmar University Of Horticulture & Forestry- Solan; Central Soil and Water Conservation Research and Training Institute (CSWTRI), National Remote Sensing Centre (NRSC) etc. are some of the Institutes	
Component 3: Knowledge Management including knowledge creation and wider dissemination actions		Data Management and Documentation, Workshops, Sharing and Cross-learning Workshop, Publication & dissemination
Procurement	BAIF -BIRD-UP and project team	AF/NABARD procurement guidelines will be complied with
Finance & audit	BAIF - BIRD-UP and Project team External Auditor for annual audit	BAIF accounting guideline will be followed and AF/NABARD guidelines will also be complied with
M & E	BIRD-UP and BAIF through its central project monitoring and vigilance team members	A team will be formed comprising technical experts and financial experts to visit the site quarterly
Working partnerships with Scientific and Research Institutes	BIRD-UP and BAIF Project Leader and steering committee members	working partnerships will be developed as per the need identified in the work plan
Reporting	Project Leader and BIRD-UP	Quarterly and annual basis
Mid-term Review	External Consultant	After 2 years of work completion

Components/Activities	Responsible parties	Roles and Responsibilities
Project Completion Report	BAIF with field team	Last phase of the project
Final evaluation	External Consultant	After submission of PCR

B. Describe the measures for financial and project / programme risk management.

The program interventions are identified after a series of local and regional level consultations including multiple stakeholders. This project seeks to demonstrate an integrated approach that addresses the vulnerability of agriculture dependent hill communities which is expressed by many as need of hour

The project envisages scouting and introducing combination of Climate Smart Agriculture Technologies after understanding the type of vulnerabilities. Number of scientific and research institutions are already present in this part of Himalayan region, who are actively involved in conducting research and developing solutions to emerging challenges in hills. These technologies will be packaged properly and then transferred at the level of hill farmers. The Hill context and specificities are taken in to account while devising the technology solutions thus the environmental and social risks are minimum.

Both NABARD and BAIF have rich experience of working in development sector for many years. There are many projects jointly implemented by NABARD and BAIF in India. Thus these institutes would be able to take care of any unforeseen project risks. Following risks are listed and mitigation measures are indicated:

Table 22: List of Risk Identified and Mitigation Strategy

Risk Class/Category	Level	Mitigation
Operational/Administrative: Coordination of activities with other agencies; large timeliness of technical inputs and their proper scheduling number of on-going projects/programme Issues related to planned intervention in desired	Low	<ul style="list-style-type: none"> ▪ BAIF, BIRD-UP along with the Uttarakhand team have programmatic base and development related work experience in this region since past many years. ▪ The agency has earmarked and dedicated team. The required man power can also be drawn from other offices to ensure that project is executed smoothly ▪ It has experienced staff with competitive compensation structures and also having long association with BAIF ▪ Further the project has strong capacity building

Risk Class/Category	Level	Mitigation
outcome due to unavailability of timely inputs		<p>and local cadre building activities</p> <ul style="list-style-type: none"> ▪ NABARD will be actively involved in project monitoring, and coordination. Both the parties have previous experience of working together. Thus not much operational risks are anticipated ▪ Advance planning will be done to take care of non- availability of timely and quality inputs for proposed project activities. The situation will be closely monitored and required adjustments will be made
Financial: Cost escalation leading to increased costs for goods and services	Low	<ul style="list-style-type: none"> ▪ The current schedule of rates and wage rates has been used in estimating the budget and as such it is expected to take care of the implementation as per the phasing proposed
Environmental: Natural Hazards (flood, drought, storm surges, and storms) may hamper project implementation.	Moderate	<ul style="list-style-type: none"> ▪ The programme is seeking to reduce the effect of natural hazards. However, certain activities may be at risk particularly in the early phases of implementation and piloting
Participation of stakeholders and required cooperation from government, private and technical institutes.	Low	<ul style="list-style-type: none"> ▪ The project activities are highly relevant to the stakeholders. With proper community mobilization and formation/strengthening of groups, participation could be ensured. The project has strong component of software activities in the form of capacity building and knowledge creation at the level of local communities ▪ BAIF has previous many years of experience of working at grass root level. It also has team members having required expertise who can be involved in the program implementation
Technical Risk ineffectiveness of recharge measures	Moderate	<ul style="list-style-type: none"> ▪ Use of Modern technologies (use of isotopes) pin pointing area specific water recharge measures. This is tested and proven technology in hills. This is introduced with the help of scientific organization called BARC. This is now ready for replication and thus risks associated with this will be minimum

Risk Class/Category	Level	Mitigation
Delay in aquifer recharge leading to partial achievement of project results	Low	<ul style="list-style-type: none"> As a strategy, intervention having long-term impact will be done in earlier part of the projects
Project benefits captured by Elite group	Low	<ul style="list-style-type: none"> Since inception care will be taken to make the project participatory and inclusive.

NABARD's role in financial and project risk management is given below:

- NABARD, as part of structured / periodic monitoring, would take-up the scrutiny of books of accounts as well as scrutiny of audit and accounting systems of the project funds at Executing Entity level. Release of funds would be based on the scrutiny of accounts and utilization of funds, progress of implementation and action plan submitted by BAIF
- Risk parameters identified would be specifically monitored during the field visits as well through reporting mechanism by NABARD. Monitoring objectives will also include identification of project bottlenecks and risks as early as possible to address them
- NABARD will be fully involved in identification of E&S risks during implementation phase as well as monitoring of mitigation actions initiated by EE. Details of E&S risk assessment / management is given in Appendix 1.
- NABARD has a Regional Office at the state capital, Dehradun and also has posted an officer, called the District Development Manager (DDM) in the project district. NABARD has already earmarked two officers at the Regional Office level, designated as the nodal officers and trained them for implementation of CC adaptation projects. NABARD officials/teams at district and state level would be involved in project guidance, steering, monitoring, auditing, co-ordination with State, District officials for resolving any bottlenecks in project implementation
- Officers from NABARD Head Office will also visit the project at intervals for addressing risks, if any.

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

This tables gives details on mitigation measures for identified risks .

Table 23: List of Environment and Social Risk Management in Alignment with AF Guidelines

Risk Class/Category	Level	Mitigation
Project does not comply with social and environmental law and	None	The project activities are planned keeping in view various social and environmental law and commitments of India and Uttarakhand state.

Risk Class/Category	Level	Mitigation
commitments of country and sub regions.		
Project neglects the principles such as access and equity	Low	<p>The project activities are aimed at vulnerable and agriculture dependent households from the selected region. All the participating families thus have equal chance of gaining from proposed adaptation activities.</p> <p>The project will undertake an assessment of the Access and Equity in respect of marginalized and vulnerable groups during the implementation stage. The project envisages provision of fair and equitable access to the project beneficiaries in terms of alternate climate resilient livelihood options including provision of clean water and renewable energy options.</p>
Project neglects marginalized and vulnerable groups / deny gains	Medium to Low	<p>The project will focus on three types of vulnerable groups whose risks have been identified and accordingly project measures have been identified. Small and Marginal Farmers having lands less than 2 Ha, Women headed Households and Schedule Caste/Schedule Tribe Households are the three types of groups.</p> <p>As a part of this project intervention, it is proposed to achieve farm diversification, reduce vulnerability, and promote environmentally sound and sustainable livelihoods for food security and risk mitigation, to ensure better adaptation with changing climatic conditions without compromising on production and productivity levels. The activities will help in creating a long term asset base in villages, plus an enhanced natural resource base and also will help in creating livelihoods and income for vulnerable groups .The project is planned to have a positive social impact on the vulnerable communities in the project area.</p> <p>Selection process of beneficiaries for various interventions shall take care to include proportionate representation of members from these vulnerable groups.</p>

Risk Class/Category	Level	Mitigation
Project does not protect natural habitats / alters landscapes and natural heritages	None	The project interventions have been identified in consultation with the local villagers. There is no plan for any alteration to physical and cultural heritage in this project. On the contrary project mentions conserving and protecting natural habitats like vanpanchayats / community pastoral lands
Project poses threat to existing biodiversity in agriculture	None	<ul style="list-style-type: none"> ▪ The project does not affect biodiversity in any adverse way. In fact there is important component of conservation and revival of diverse, native and sturdy agro-biodiversity resources in hill areas in a participatory manner. Efforts are also planned for maintaining seed bank of native diverse cultivars at village level ▪ The project also supports integration of climate smart options for disease and pest control in agriculture ▪ Conservation and promotion of native fodder species in situ using degrading community pastoral lands /natural habitats
Project does not guarantee gender equity / gender empowerment	Low	<p>The project is proposed for agriculture dependent community. In hills, women bear the responsibility of agriculture and livestock activities. They are thus the main beneficiaries of this project. Some of the interventions like formation/strengthening of SHGs, training and capacity building of SHGs etc. are exclusively aimed at empowering the hill women both socially and economically.</p> <p>Inadequate representation of women in various committees, disproportionate selection of women beneficiaries and insufficient measures for empowerment through skill and capacity development etc., are the possible risks identified.</p> <p>Project is planned to ensure participation by women fully and equitably, receiving comparable socio-economic benefits and those they do not suffer adverse effects. Towards this end, women will be involved in decision making process through adequate representation of women in various committees.</p>

Risk Class/Category	Level	Mitigation
Project violates human rights	None	The project does not violate any human right. Wherever, labor oriented activities are taken up, it will be ensured to provide minimum wage as guaranteed by Centre/State governments.
Project neglects indigenous people and leads to displacement	None	The project area doesn't have indigenous population.
Involuntary Settlement	Low	Majority of the activities planned under the project are proposed in individual lands and very small soil & water conservation measures of agriculture productivity enhancement measures. In case of structure in common areas such as spring rejuvenation it is proposed that specific care would be taken for selection of sites which would not result in physical as well as livelihood resettlement. The criteria for selection of sites for individual interventions will include the fact that in case there is any possibility or likelihood of involuntary resettlement due to project activities that particular site will not be selected. This factor will be included in one of the factors for ESI screening safeguards.
Project activities are not environmentally sound/ not climate smart	None	The project activities proposed revolve around available natural resources such as land, water, vegetation and livestock and hence are environmental friendly. The interventions are planned to achieve resource efficiency and optimum use of available resources and as such would reverse further degradation of natural resources. Further, most of the activities are to be introduced in a decentralised manner at the level of individual households. All the proposed activities are climate smart in nature and will help communities to adopt climate resilient livelihoods. During execution of the proposed interventions, adherence to applicable standards will be ensured by the Project Team and same will be monitored by NIE through structured monitoring.

D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

Overall responsibility for monitoring and evaluation will rest with BAIF Development Research Foundation. The senior members of BAIF will provide technical assistance and supervise, monitor and evaluate project by laying M & E systems.

The project will start with a **Project Inception Workshop** in first 1-2 months of the project start with all the stakeholders, technical advisors and State Steering Committee in order to build ownership of the project. It will be crucial in finalizing future prospect of the project listed as below:

- a. Details about roles and responsibilities of different stakeholders will be defined in the implementation of the project;
- b. Finalization of annual work plan along with indicators, means of verification, risk management activities and monitoring and reporting frameworks and schedules of different activities;
- c. Environmental and Social Risk Management and grievance redressal mechanism.

For timely and efficient flow of the information and review of the project, different M&E documentation will be established. The system will encompass a clear data collection and compilation plans for monitoring qualitative as well as quantitative result indicators using appropriate methods and tools. Data will be collected periodically at specific interval and analyzed to track the progress. Work plans with clear targets, time line and budgets will be prepared and executed to accomplish the results.

A three-tier system will be followed to review the progress and reflect critically to ensure effective and effectiveness of the programme interventions. At the village level participatory monitoring will be done by community and implementing staff. At the district level, project coordinator will conduct monitoring meetings with implementing staff and community representatives and at the state level the Project Director, will monitor and review the work progress.

Following are the details of different type of M&E documents as mentioned in Result Framework:

- **Quarterly report:** Quarterly monitoring reports will be prepared based on the analysis and will incorporate the challenges and internal and external difficulties encountered during implementation of activities and in monitoring process on quarterly basis along with District Development Manager from NABARD, district office. It will highlight critical areas of concerns and strategies to overcome the challenges. First 2-3 quarters will be of very important, as this will be for entry point activities as well as linkages with other line-departments will be set up in that period.

- **Annual Report:** Annual Report is an extensive key report which is prepared to monitor progress made since project start and in particular for the previous reporting period. This will be assessed by Project Director and would be submitted to NABARD. Mainly, progress made towards project objective and project outcome against base line data will be assessed. Assessment of Risk and adaptive strategies and learning in the year, will also one of the highlights of the Annual report. The Annual report will also highlight the good practice notes, factsheets and technical documents to capture the technology related details and outcomes.
- **Periodic Field Survey Report & Internal Monitoring Report:** At the district level, Uttarakhand team will be doing periodic field survey on regular basis, which will highlight the periodic progress of the project as per the indicators and target set in the RF. Other than that, a monthly monitoring meeting will be conducted with implementing staff and with community representatives at quarterly interval to analyze the actual field implementation and impact. At all levels monitoring will ensure that the activities planned are completed and the results are achieved, the reports for the same will be shared with different stakeholders. The responsibility for the same lies with Project Coordinator.
- **Mid-term Assessment Report:** The project will undergo an independent Mid-Term Review by external consultant at the mid-point of project implementation. The Mid-Term Review will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation, and provide an independent review of executing agency's role. The Mid-term Review will highlight issues requiring decisions and actions and present initial lessons learned about project design, implementation and management to the Steering Committee. Findings of this review will be incorporated as recommendations for enhanced implementation during the second half of the project implementation.
- **Terminal Evaluation Report:** Three months prior to completion of the project, an independent Terminal Evaluation by external consultant will be undertaken. The final evaluation will look at impacts and sustainability of results, delivery of the project's result and capacity building of the community. It will also include an independent review of project implementation arrangements and their efficacy.

Role of NABARD for Monitoring and Evaluation of Project:

- On-site detailed monitoring would be done on six monthly basis jointly by NABARD Regional Office (Uttarakhand) and Head Office. The frequency of monitoring would be increased if considered necessary.
- District Development Manager i.e. NABARD officer stationed at the district would be a part of the monitoring committee for implementation of the project at local level.
- Supervision of monitoring and evaluation functions of Executing Entity through reporting mechanism (field visit / monitoring reports by EE).

- Monitoring of Environmental and Social Risk parameters as identified under risk assessment and compliance with AF's E&S Policy.
- Review of the monitoring reports submitted by Executing Entity and provision of feedback.
- NABARD would be part of steering committee which would be meeting every six months. The committee would deliberate and review the progress of implementation.
- Quarterly report submission formats would be designed for submission by executing entities for desk appraisal of progress. This will be structured as a part of the off-site monitoring surveillance system and would be designed to generate warning signals, if any.
- Periodic progress reporting would be done to AFB as per the requirement

A budget of US\$ 7800 has been earmarked for undertaking the above monitoring and evaluation functions.

Budgetary requirement of Monitoring and Evaluation Plan is described as below:

Table 24: Monitoring and Evaluation Plan

Activity	Responsible person	Budget (US\$)	Time frame
Inception workshops	Project Director	1666.67	Within 2 months of project starting and yearly thereafter. Submission of Inception Report
Progress Report (Periodic Field Survey /quarterly / annual)	Project Co-ordinator	0	
Annual Impact Assessment Report	Project Director	833.33	Annual
Mid-term Evaluation	External consultant	1666.67	Mid term
Final evaluation	External consultant	3333.33	months before end of project
Audits	External auditor	300.00	Every Year
Total		7800.00	

E. Include a results framework for the project proposal, including milestones, targets and indicators.

Table 155: Results Framework of Proposed project

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
Component 1: Community Mobilization and Organization					
Outcome 1: Improved community mobilization to collectively plan and undertake Climate Change Adaptation	<ul style="list-style-type: none"> % of farmers using climate risk information to adjust their livelihood behavior 	<ul style="list-style-type: none"> No information regarding Climate Change and related adaptation is shared with villagers 	<ul style="list-style-type: none"> At least 60% of people of which 50% are women, are aware about climate change and adaptive measures 	<ul style="list-style-type: none"> Training Completion reports Quarterly Report 	Assumption: Women are free to participate in meetings Risks: Traditional values and governing structures restrict the participation of women
Output 1.1: Local level awareness generation and mobilization of the community for Climate related hazards.	<ul style="list-style-type: none"> No. of participants attending the meeting (M:F) No. of villagers aware about climate change, its impact No. of annual Adaptation Plan prepared 	<ul style="list-style-type: none"> Very few meetings held Limited participation of villagers No Adaptation Plan for 10 villages/ gram panchayats 	<ul style="list-style-type: none"> At least 80% of the targeted families adopting Climate Resilient Annual Adaptation Plan for 10 Villages / gram panchayats 	<ul style="list-style-type: none"> Minute book of the meeting Internal Monitoring report Annual Adaptation Report 	Assumption: Existing CBOs willing to participate All stakeholders will participate in preparation of Annual Adaptation plan

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
	<ul style="list-style-type: none"> No. of women heading families adopting climate resilient strategy as per Annual Adaptation Plan 				
Output 1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability	<ul style="list-style-type: none"> No. of new CBOs formed (at least 1 for women) 	<ul style="list-style-type: none"> No new CBOs formed during last 1 year 	<ul style="list-style-type: none"> At least 5 CBOs formed in each village (at least one is of hill women) 	<ul style="list-style-type: none"> Internal Monitoring report Gender disaggregated data 	Assumption: Villagers are willing to form new groups
<ul style="list-style-type: none"> Component 2: Introduction of Water Resource Development and Climate Smart Farming Technology 					
Outcome 2.1: Building resilience through increased water availability and efficient water use in hill region	<ul style="list-style-type: none"> No. of days of water availability Saving of number of hours of hill women for water collection 	<ul style="list-style-type: none"> Only 8-9 months water availability 	<ul style="list-style-type: none"> 10-11 months water availability in targeted project sites 30% of the population of 10 villages 	<ul style="list-style-type: none"> Periodic Field Survey Report Internal Monitoring report Gender disaggregated data 	
Output 2.1.1: Creation of	<ul style="list-style-type: none"> No. of natural springs 	<ul style="list-style-type: none"> Dried up 	<ul style="list-style-type: none"> 15 springs 	<ul style="list-style-type: none"> Internal 	

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
water reserves in regions through rain water tapping interventions	rejuvenated <ul style="list-style-type: none"> No. of Rain-water harvesting structures created Number of women having access to water post project (as compared to baseline) 	Natural Springs <ul style="list-style-type: none"> No Rain water harvesting facility 	rejuvenated <ul style="list-style-type: none"> 300 families benefitted 150 Rain water Harvesting Structures created 	Monitoring report <ul style="list-style-type: none"> Annual Report Gender disaggregated data 	
Output 2.1.2: Adoption of efficient water use practices and technologies	<ul style="list-style-type: none"> No. of families adopting water efficient technologies and practices No. of families adopted the skill of water saving Saving of number of hours of hill women for water collection 	<ul style="list-style-type: none"> Limited awareness but no resources for accessing Water Smart Technology 	<ul style="list-style-type: none"> 20,000 sqm areas will be covered by water use efficiency techniques. 	<ul style="list-style-type: none"> Internal Monitoring report Annual Report Gender disaggregated data 	
Outcome 2.2: Adoption of Climate Smart agriculture technologies and farm diversification options for	<ul style="list-style-type: none"> No. of families adopting climate friendly livelihood options (Number of women headed households) 	<ul style="list-style-type: none"> People are clueless about Climate friendly livelihoods and required technologies 	<ul style="list-style-type: none"> 800 families adopted climate smart farm practices 	<ul style="list-style-type: none"> Field Reports Internal Monitoring Reports Participant Register Gender 	

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
climate resilient livelihoods				disaggregated data	
Output 2.2 Introduction to climate smart farming technologies with hill specificity	No. of families (out of these at least 50% are women participants) gaining from following interventions <ul style="list-style-type: none"> acquired knowledge and skills on climate smart farming technologies for hills adopted high value vegetable cultivation under protected conditions adopted high value and climate resilient fruit trees as an option to diversify production system participated in conservation, multiplication and revival of sturdy, nutritious and 	<ul style="list-style-type: none"> No training efforts have been made on this issue Limited awareness on suggested climate smart technologies 	<ul style="list-style-type: none"> No. Of Training: 20 No. Of Exposure Visits: 10 No. Of Low-cost poly house: 200 Fruit Trees Plantation: 600 families Agro-biodiversity conservation focusing Niche hill crops: Establishment of 1 seed bank (2 crops conserved and multiplied) 	<ul style="list-style-type: none"> Periodic Field Survey Report Internal Monitoring report Gender disaggregated data 	

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
	indigenous food crops and local biodiversity				
Outcome 2.3: Improved potential of livestock resources as an option for livelihood stabilization in hills	<ul style="list-style-type: none"> Quantity of milk per participant family Income from livestock per family 	<ul style="list-style-type: none"> The full potential of livestock is not exploited in the region resulting in low productivity 	<ul style="list-style-type: none"> Increasing income through improved breeding and management of cattle for 800 families 	<ul style="list-style-type: none"> Periodic Field Survey Report Internal Monitoring report Annual Report 	Assumption: Communities will be actively participating in adoption of project activities Material and logistics related issues Risks: Non-cooperation from other Stakeholders Occurrence of Sudden Natural Calamity
Output 2.3.1: Introduction of improved breeding service at door step of farmers with required management	<ul style="list-style-type: none"> No of families made aware and acquired required skills for cattle resource management No. of families adopted the improved breeds of cattle and management practices 	<ul style="list-style-type: none"> Low productivity in cattle Less awareness about livestock management practices Limited access 	<ul style="list-style-type: none"> No. of Training: 10 No. of Exposure visits organized: 5 Improved Breeding Services: 800 families adopted Artificial Insemination 	<ul style="list-style-type: none"> Periodic Field Survey Report Internal Monitoring report Annual Report 	

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
practices including fodder and feed management	<ul style="list-style-type: none"> No. of families linked with better cattle management services including insurance No. of families having access to fodder trees and grasses 	to livestock related services Scarcity of green fodder	Introduction of improved livestock management practices: 800 families <ul style="list-style-type: none"> Area Covered under fodder development: 100 Ha Livestock Insurance advisory: 1600 cattle 	Gender disaggregated data	
Component 3: Knowledge Management including knowledge creation and wider dissemination actions					
Outcome 3: Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and	<ul style="list-style-type: none"> No. of adaptation techniques for vulnerable areas identified. No. of publications covering vulnerability status prepared. No. of knowledge Notes on adaptation measures prepared No. of Stakeholder 	<ul style="list-style-type: none"> Limited data on Climate Change Strategies, approaches and climate smart technologies in Hill Context Lack of awareness at policy levels 	<ul style="list-style-type: none"> Pamphlets/fact sheets/dossiers/best practice notes: 10 Baseline/Vulnerability Report: 1 Process Documentation/Audio visual reports: 3 	<ul style="list-style-type: none"> No. and type of Publications Workshop Reports Annual Report 	Assumption: There is a demand for knowledge how to adapt to climate change in the hill region specifically for the poor rural dwellers in the area. State is willing to

Strategy	Indicator	Baseline	Target at End Project	Source of Verification	Assumption and Risk
stakeholders as well as for better policy inputs	Workshops organized for cross learning and sharing on best practices	leading to low allocation in State Budget for Climate change and adaptation			implement State Action Plan for Climate Change.
Output 3.1: Knowledge generation through field action component	<ul style="list-style-type: none"> No. of Technical Report published No. of Pamphlets published and distributed in the nearby villages 	<ul style="list-style-type: none"> Village is not having any technical report at village level 	<ul style="list-style-type: none"> At least 5 technical report published 1 audio visual Documentary filmed 		Risk: Uptake of the knowledge is highly constrained by lack of awareness and resources at state level.
Output 3.3: Wider dissemination of acquired knowledge	<ul style="list-style-type: none"> No. of Stakeholders approached 	<ul style="list-style-type: none"> Lack of awareness at policy levels leading to low allocation in State Budget for Climate change and adaptation 	<ul style="list-style-type: none"> Workshop-national: 1 & proceedings 		(Mitigation Measure: Need to have close interaction of policy makers)

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Table 166: Program Alignment with AF Result Framework

Project Objective	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Budget (US\$)
Objective: To improve adaptive capacity of vulnerable communities in North Western Himalayan hill region by introducing combination of Climate Smart Farming Technologies covering crop, livestock and water resources and by undertaking community strengthening processes and capacity building actions	No. of community groups formed, (including hill women strengthened and involved in climate risk screening and vulnerability assessment based action planning	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks 2.2. Number of people with reduced risk to extreme weather events	68,133
	Number of families including hill women reached by way of introduction of combination of climate smart technologies , diversification options for stabilized income and risk mitigation	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure (increased) access to livelihood assets 6.2. Percentage of targeted population with sustained climate-resilient livelihoods	731,575

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	
Outcome 1: Improved community mobilization to collectively plan and undertake Climate Change Adaptation	No. of people trained in 10 villages / gram panchayats about approaches to climate change adaptation planning and implementation	Output 2.2: Targeted population groups covered by adequate risk reduction systems	2.2.1. Percentage of population covered by adequate risk reduction systems	16,667
			2.2.2. No. of people affected by climate variability	
Outcome 2.1: Building resilience through increased water availability and efficient water use in hill region	No. of days of water availability, Saving of number of hours of hill women for water collection	Output 4: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)	731,575
Outcome 2.2: Adoption of Climate Smart agriculture technologies and farm diversification options for climate resilient livelihoods	No. of families adopting climate smart farming technologies	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1. No. and type of adaptation assets (physical as well as in terms of knowledge) created in support of individual or community livelihood strategies	
			6.1.2. Type of income sources for households generated under climate change scenario	

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	
Outcome 3: Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and stakeholders as well as for better policy inputs	No. of adaptation techniques for vulnerable areas identified. No. of Publications covering vulnerability status prepared. No. of knowledge notes on adaptation measures prepared No. of Stakeholder Workshops organized for cross learning and sharing on best practices Number of events organized for better policy inputs	Output 7: Improved integration of climate-resilience strategies into country development plans	7.1 Number, type, and sector of policies introduced or adjusted to address climate change risks 7.2 No. or targeted development strategies with incorporated climate change priorities enforced	16,667

Table 27: Alignment with Adaptation Fund Core Impact Indicators:

Impact	Indicator
Increased adaptive capacity of communities to respond to the impacts of climate change	<p><u>“Number of beneficiaries (direct and indirect) “</u></p> <p>Direct Beneficiaries :</p> <ul style="list-style-type: none"> ▪ At least 600 hill women reached and provided direct benefits by way of capacity building efforts, drudgery reduction measures, introduction of climate smart technologies (covering farming system) and social engineering processes ▪ At least 100 youths from North Western Himalayan region reached and covered under capacity building and skill building efforts to enhance the scope of self-employment ▪ Almost double the number of hill women and youth would be covered indirectly through awareness generation, sensitization and capacity building and spillover effects of Climate Smart Technologies
	<p><u>“Assets Produced, Developed, Improved, or Strengthened”</u></p> <p>Targeted Asset/changes in assets /assets produced</p> <p>1) Health and Social Infrastructure <i>developed (Scale 1 to 5)</i></p> <ul style="list-style-type: none"> ▪ Formation / strengthening of CBOs at least 4 in project villages there by creating platform and mechanism for collective /organized actions ▪ Adaptation Planning in at least 10 project villages there by preparing capacity to face any climate risks with minimum damage ▪ Roof Top Rain water Harvesting systems to be demonstrated at the level of least 150 households there by storage of at least 22.5 lakhs of liters of water ▪ Drip and Sprinkler–water use efficiency demonstrations in area covering at least 2000sq.ft. there by improving water use efficiency up to 30% ▪ Low cost bamboo based poly-houses standardized and demonstrated at the level of at least 200 households. there by allowing additional 900 kgs of high value vegetables in the region even under difficult climate (Total 180MT/Yr) ▪ Fruit trees planted as family assets at least 30,000- there by allowing production of at least 30MT of fruits ▪ Community Seed Bank set up at 1 place for conservation of native crop diversity and future access to villagers ▪ Fodder Plantation promoted on at least 100 ha of degraded lands there by

	creating fodder reserve and improved fodder availability and access for at least 800 households
<i>Increased ecosystem resilience in response to climate change-induced stresses</i>	<p>“ Natural Assets protected or rehabilitated “</p> <ul style="list-style-type: none"> Facilitated rejuvenation and natural recharge of ground water covering at least 15 sites of natural springs in the region. There by 750 Ha of lands rehabilitated Existing native crop diversity in hills revived with community processes and in situ and ex situ conservation measures Vanpanchayats lands rehabilitated and eco restoration measures demonstrated there by allowing forest and grass land regeneration and sustenance of ecosystem services from such landscapes

Adaptation Fund Core Impact Indicator : “Number of Beneficiaries”				
Date of Report	31 st December 2014			
Project Title	Climate Smart Actions And Strategies in North Western Himalayan Region for Sustainable Livelihoods of Agriculture-dependent Hill Communities			
Country	INDIA			
Implementing Agency	NABARD			
Project Duration	4 YEARS			
	Baseline (absolute number)	Target at project approval (absolute number)	Adjusted target first year of implementation (absolute number)	Actual at completion [1] (absolute number)
Direct beneficiaries supported by the project	0	1600		
<i>Female direct beneficiaries</i>	0	600		
<i>Youth direct beneficiaries</i>	0	100		
Indirect beneficiaries supported by the project		3200		
<i>Female indirect beneficiaries</i>	0	3000		
<i>Youth indirect beneficiaries</i>	0	300		

Adaptation Fund Core Impact Indicator : “Assets Produced, Developed, Improved, or Strengthened”	
Date of Report	03 February 2015

Project Title	Climate Smart Actions And Strategies in North Western Himalayan Region for Sustainable Livelihoods of Agriculture-dependent Hill Communities			
Country	INDIA			
Implementing Agency	NABARD			
Project Duration	4 YEARS			
	Baseline <i>(absolute number)</i>	Target at project approval <i>(absolute number)</i>	Adjusted target first year of implementation <i>(absolute number)</i>	Actual at completion <i>(absolute number)</i>
Sector (identify)	Rural Development, Food Security, Water Management, Agriculture			
Targeted Asset 1) Health and Social Infrastructure developed (Scale 1 to 5) <ul style="list-style-type: none"> Formation / strengthening of CBOs Adaptation Planning 2) Physical assets produced (absolute No) <ul style="list-style-type: none"> Roof Top Rain water Harvesting Drip and Sprinkler Low cost poly-houses Fruit trees Fodder Plantation (produced/improved/strengthened)	0 0 0 0 0	4 10 150 no. 20000 sq. m. 200 no. 30000 no. 100 ha		
Changes in Asset (Quantitative or qualitative depending on the asset) <ul style="list-style-type: none"> Roof Top Rain water Harvesting Drip and Sprinkler 	0 0	22.5 lakh liters of rain water will be stored and used for drinking and other usages Water use efficiency		

<ul style="list-style-type: none"> Low cost poly-houses Fruit trees Fodder Plantation 	0	improved by 30%		
	0	Yearly at least 900 kgs of high value vegetables will be harvested by individual Family (total-180 MT/yr.)		
	0	30 Mt of fruits (Peach, Walnut, Malta and Lemon) will be harvested		
	0	Fodder requirement for 800 households met		

5. Adaptation Fund Core Impact Indicator : “Natural Assets Protected or Rehabilitated”

Date of Report	31 st December 2014			
Project Title	Climate Smart Actions And Strategies in North Western Himalayan Region for Sustainable Livelihoods of Agriculture-dependent Hill Communities			
Country	INDIA			
Implementing Agency	NABARD			
Project Duration	4 YEARS			
	Baseline (<i>absolute number</i>)	Target at project approval (<i>absolute number</i>)	Adjusted target first year of implementation (<i>absolute number</i>)	Actual at completion[1] (<i>absolute number</i>)
Type of natural assets or eco systems				
1. Natural Spring Rejuvenation (no.)	0	15		
	0	1 village		

Change in State 1. Natural Spring Rejuvenation (no.) 2. Agro-biodiversity (scale 1 to 5)		750 Ha of Land is recharged- Scale-4 Agro-biodiversity Conservation village-4		
Numbers of assets rehabilitated/ restored/ protected	0	2 (water and biological assets)		

(E) Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs

Table 28: Detailed Budget Table

	TOTAL ESTIMATED PROJECT COST FOR FOUR YEARS IN US(\$)				
	PROJECT COMPONENTS	UNIT	RATE IN US \$	QUANTITY	Amount in US \$
I	COMPONENT 1: COMMUNITY MOBILIZATION AND ORGANIZATION				
A	Output 1.1: Local level awareness generation and mobilization of the community for Climate related hazards.				
i	Awareness Generation Meetings in all 10 villages/ gram panchayats	No.	100	10	1000
ii	Baseline Survey and Vulnerability assessment of all 10 villages and preparation of Annual Adaptation Plan	No.	666.67	20	13333
iii	Facilitation from Subject Matter Specialist	Days	100	288	28,800
B	Output 1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability				
i	Mobilization and Formation of CBOs	No.	100	100	10,000
ii	Training on suggested technologies for participants and staff	No.	250	30	7,500
iii	Exposure visits on suggested technologies for participants and staff	Family	500	15	7,500
	Total (Component I)				68,133
II	COMPONENT 2. Water Resource Development and Climate Smart Farming Technology Introduction				
A	Output 2.1.1 Creation of water reserves in regions through rain water tapping interventions				
i	Natural Spring Rejuvenation	No.	14,167	15	212,500
ii	Roof Top Rain water Harvesting System	No	679.17	150	101,875
B	Output 2.1.2 Adoption of efficient water use practices and technologies				
i	Efficient use of Water through Drip Irrigation	sqm	2.5	20000	50000
C.	Output 2.2: Introduction to climate smart farming technologies with hill specificity				
i.	Introduction of climate resilient horticulture	Family	166.67	600	100,000
ii	Farming under protected cultivation with irrigation facility	Family	500.00	200	100,000
iii	Conservation of agro-bio diversity & revival of traditional useful agriculture practices	Villages	6,666.67	1	6,667
D	Output 2.3 Introduction of improved breeding and management service at door step of farmers				
i	Livestock Management Practices	Family	117.33	800	93867
ii	Fodder Plantation (Trees)	Ha	667.67	100	66667
	Total (Component II)				731,575
III	COMPONENT 3: KNOWLEDGE MANAGEMENT INCLUDING KNOWLEDGE CREATION AND WIDER DISSEMINATION				
A	Output 3.1: Knowledge generation through consultation				
i	Preparation of Technical reports which will cover field level data, experiences, approaches, technologies tested and best practices along with dossiers and documentary	No.	333	20	6,667
B.	Output 3.2: Wider dissemination of acquired knowledge				
i	To organize one multi stakeholder's consultation at national level	No.	10,000	1	10,000
	Total (Component Iii)				16,667
1	Total Project Cost (I+Ii+Iii)				816,375

	TOTAL ESTIMATED PROJECT COST FOR FOUR YEARS IN US(\$)				
	PROJECT COMPONENTS	UNIT	RATE IN US \$	QUANTITY	Amount in US \$
2	Project/Programme Execution Cost				77,595
3	Total Project/Programme Cost(1+2)				893,970
4	Project/Programme Cycle Management Fee Charged by the Implementing Entity (8.5% Of 3)				75,600
5	Amount of Financing Requested (3+4)				969,570

Table 29: Budget Note

	TOTAL ESTIMATED PROJECT COST FOR FOUR YEARS IN US(\$)	
	PROJECT COMPONENTS	EXPLANATION
I	COMPONENT 1: COMMUNITY MOBILIZATION AND ORGANIZATION	
A	Output 1.1: Local level awareness generation and mobilization of the community for Climate related hazards.	
i	Awareness Generation Meetings in all 10 villages	Orientation meeting with the villagers in all 10 villages @ US \$100.
ii	Baseline Survey and Vulnerability assessment of all 10 villages and preparation of Annual Adaptation Plan	10 Annual Adaptation Plan will be prepared based on the vulnerability assessment done in all 10 villages @ US \$ 667 (unit 20: 10 Vulnerability Assessment and 10 modification in Annual Adaptation plan alternate year)
ii i	Facilitation from Subject Matter Specialist	Various activity given above are needed expert inputs from various institutions like VPKAS, BARC, GBPUAT and other experts in BAIF head office and associate organizations. Cost will cover travel, lodging, boarding, food and honorarium for experts. The cost proposed is US\$ 100 per day for 288 man-days.
B	Output 1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability	
i	Mobilization and Formation of CBOs	A total of 100 CBOs will be mobilized and formed @ US \$ 100
ii	Training on suggested technologies for participants and staff	3 major components will be covered in all 10 villages. 30 training will be organized in each village @ US \$ 250.
ii i	Exposure visits on suggested technologies for participants and staff	15 Exposure visits to different places with a group of 20 farmers will be organized @ US \$ 500.
II	COMPONENT 2. WATER RESOURCE DEVELOPMENT AND CLIMATE SMART FARMING TECHNOLOGY INTRODUCTION	
A	Output 2.1.1 Creation of water reserves in regions through rain water tapping interventions	
i	Natural Spring	Treatment for recharge with water conservation measures

TOTAL ESTIMATED PROJECT COST FOR FOUR YEARS IN US(\$)		
	PROJECT COMPONENTS	EXPLANATION
	Rejuvenation	(digging pond, trench and plantation etc.) – US \$267 per hectare. For one spring it is needed to treat about 50 hectare land. Total cost for rejuvenation of one spring is US \$14,166.67. The cost includes cost towards vegetative and physical measures in recharge zone of spring and cost towards accessing technology from BARC and HESCO.
ii	Roof Top Rain water Harvesting System	The unit cost per structure is US \$ 679.17. The break up cost includes US \$83 for preparation of roof top, US \$63 for installation of collection pipes, US \$25 for gravel filter and US \$508 for construction of underground water storage tank (capacity approx. 15000 L).
B	Output 2.1.2Adoption of efficient water use practices and technologies	
i	Efficient use of Water through Drip Irrigation	The unit comprises of Chaffin/ sprinkler, pipe (32mm & 16mm), screen filter, Joiner, compression valve etc. These units will be installed on 2 hectare cultivable land and the cost comes to approx. US \$2.5 per sq. m.
C	Output 2.2: Introduction to climate smart farming technologies with hill specificity	
i.	Introduction of climate resilient horticulture	It is proposed to provide 50 saplings of fruit trees per family. Total cost works out to US \$166.67. Break up is Grafts (US \$40); pit digging (US \$33), manure & plant protection (US \$43), and Plant nutrition & maintenance (US \$50).
ii	Farming under protected cultivation with irrigation facility	Bamboo based poly houses are planned to reduce initial cost. The life expectancy of this structure is five years. During the project period a local cadre will be trained for manufacturing of these poly houses. An irrigation tank with the capacity of 4500- 5000 lit is also considered with the unit. For this intervention US \$500 is proposed per unit.
ii i	Conservation of agro-bio diversity & revival of traditional useful agriculture practices	The activity is to be implemented by participatory approach in which sub activities included are collection, fairs, Pot cultivation, Field cultivation, seed banks etc. The amount proposed for these activities is approx. US\$ 1666.67 per year. The budget proposed US \$666.67 for four years.
D	Output 2.3 Introduction of improved breeding and management service at door step of farmers	
i	Livestock Management Practices	Expenditure will occur on Artificial insemination (US \$7), quarterly deworming & mineral mixture (US \$28) and modification in cattle shed (US \$83). This will helpful to strengthen livestock rearing as a sustainable source of income for rural hill people. Total cost per family is US \$ 117.33
ii	Fodder Plantation	In one hectare US \$223 will be expend on purchase of saplings of

TOTAL ESTIMATED PROJECT COST FOR FOUR YEARS IN US(\$)		
	PROJECT COMPONENTS	EXPLANATION
	(Trees)	trees & grass and US \$444 for manure, water conservation, watering and fencing etc. during the project period. Total cost per ha is US\$ 666.67.
II	COMPONENT 3: KNOWLEDGE MANAGEMENT INCLUDING KNOWLEDGE	
I	CREATION AND WIDER DISSEMINATION	
A	Output 3.1: Knowledge generation through consultation	
i	Preparation of Technical reports which will cover field level data, experiences, approaches, technologies tested and best practices along with dossiers and documentary	For collection of data during the project period for various use of documentation. Cost includes Survey format/ Photocopies/ Paper etc. For dissemination of knowledge to stake holders it is planned to publish various type documents. Cost will include documentation expert charges, travel, boarding, lodging and publication.
B	Output 3.2:Wider dissemination of acquired knowledge	
.		
i	To organize one multi stakeholder's consultation at national level	For dissemination of knowledge build during the project period a workshop of various stakeholders will be organized. Cost includes Travel, Expert charges, Lodging, boarding, publication of proceedings etc.

Table 30: Details of Execution Cost

SI No.	Budget Head	year 1	year 2	year 3	year 4	Total
1	Programme coordinator @ \$300/month	3600	3600	3600	3600	14400
2	Field coordinator 1 @ \$366.67/month	4400	4400	4400	4400	17600
3	Field Team Member 2 @ \$433.33/ month	5200	5200	5200	5200	20800
4	Review meetings @ \$500/ Year	500	500	500	500	2000
5	Travel (local and for facilitation) @ \$41.67/ month	500	500	500	500	2000
6	Organizational over heads, AMC, Printing, Stationary, Rent, Communication etc. @ \$ 233.33/ month (10% increment annually)	2800	3080	3388	3727	12995
7	M&E Cost	1950	1950	283	3617	7800
Total		18950	19230	17871	21543	77595

Project Management Fee (NIE Fee)

The project management fee (8.5% of the total budget) will be utilized by NABARD, the National Implementing Entity, to cover the costs associated with the provision of general management support. Table 27 below provides a breakdown of the estimated costs of providing these services.

Table 31: Breakdown of Costs for Project Management Fee

Particulars	Amount (US \$)
Financial Management	12,000
Information, Reporting, Knowledge Management	22,000
Performance Management - Progress Monitoring- Field Monitoring	15,000
Programme Support - Technical and Other to EE	26,600
Total	75,600

NIE Fee Budget Notes:

i. Finance, Budget and Treasury.

This covers general financial oversight, management and quality control to:

- Manage, monitor and track AF funding including allocating and monitoring expenditure based on agreed work plans, financial reporting to the AFB and the return of unspent funds to AF;
- Ensuring that financial management practices comply with AF requirements and support audits as required; E
- Ensuring financial reporting complies with AF standards; and
- Ensure cost efficient procurement processes and compliance with Government procurement rules and provide support to EE in this direction.

ii. Information, Reporting, Knowledge Management:

- This includes maintaining information management systems and specific project management databases to track and monitor project implementation
- Periodic Reporting to the AFB on the physical progress and AF result framework
- Creating platform for knowledge dissemination for the learning out of project

iii. Performance Management - Progress Monitoring- Field Monitoring:

- Providing oversight of the monitoring and evaluation function of the Executing Entity.
- Field monitoring at six monthly interval and progress reporting
- Providing guidance on AF reporting requirements; managing the relationship with the AF and ensuring outputs and outcomes match with AF expectations;
- responding to information requests and arranging revisions;

iv. Programme Support - Technical and Other Support to EE

- Providing technical support in the areas of risk management
- Policy, programming, and implementation support services;

- Providing guidance in establishing performance measurement processes; and
- Technical support on methodologies, TOR validation, identification of experts, results validation, and quality assurance.
- Technical support, troubleshooting, and support evaluation missions as necessary;
- Support on technical issues in programme implementation

G. Include a disbursement schedule with time-bound milestones.

Table 32: Disbursement Schedule

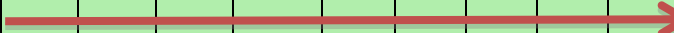
Project Fund Disbursement Schedule						
SI No	Particulars	Year 1	Year 2	Year 3	Year 4	Total
	Scheduled Date	November 2015 (after agreement signing)	Nov. 2016	Nov. 2017	Nov. 2018	
TO EXECUTING AGENCY						
1	Project Cost	128083	300808	321175	66308	816375
2	Execution cost	18950	19230	17871	21543	77595
3	Total Project Cost	147033	320038	339046	87852	893970
TO NATIONAL IMPLEMENTING ENTITY						
5	Project Management Cost (NIE)	18900	18900	18900	18900	75600
Total Amount Requested		165933	338938	357946	106752	969570

Table 33: Time-bound Milestones of the project

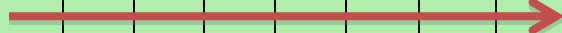
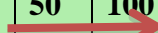
Outcome	Output	Activities	Year 1				Year 2				Year 3				Year 4			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
COMPONENT 1: Community Mobilization and Organization																		
Outcome 1.1: Improved community mobilization to collectively plan and undertake Climate Change Adaptation	Output 1.1: Local level awareness generation and mobilization of the community for Climate related hazards.	Awareness Generation Meetings in all 10 villages	100															
		Baseline Survey and Vulnerability assessment of all 10 villages through Participatory Rural Appraisal and preparation of Annual Adaptation Plan	25	50							75	100						
		Facilitation from Subject Matter Specialists/Technical Advisories			6	12	20	27	35	43	51	59	67	75	81	87	95	100
	Output 1.2: Strengthening of	Mobilization and Formation of CBOs	5	10	15	20	28	35	42	50	57	64	72	80	90	100		

	CBOs/POs for adaptation to climatic vulnerability	Training on suggested technologies for participants & Staff			10	20	32	45	57	70	85	100						
		Exposure visits on suggested technologies for participants		13	26	40	48	56	64	73	82	91	100					
COMPONENT 2: Water Resource Development and Climate Smart Farming Technology introduction																		
Outcome 2.1: Building resilience through increased water availability and efficient water use in hill region	Output 2.1.1: Creation of water reserves in regions through rain water tapping interventions	Rejuvenation of Natural Springs			6	13	23	33	43	53	65	77	89	100				
		Roof Top Rain Water Harvesting			6	13	21	29	38	46	55	63	72	80	90	100		
	Output 2.1.2: Adoption of efficient water use practices and	Introduction of Drip Irrigation for increase water use efficiency			5	10	18	25	32	40	50	60	70	80	90	100		

	technologies																	
Outcome 2.2: Adoption of Climate Smart agriculture technologies and farm diversification options for climate resilient livelihoods	Output 2.2 Introduction to climate smart farming technologies with hill specificity	Introduction of improved horticulture varieties			8	16	24	33	42	50	62	75	87	100				
		Introduction of high value vegetable cultivation under protected conditions using bamboo based poly houses			10	20	30	40	50	60	70	80	90	100				
		Conservation, revival and adoption of climate resilient indigenous food crops	6	13	19	25	31	37	43	50	56	63	69	75	81	88	94	100
Outcome 2.3: Improved potential of livestock	Output 2.3; Introduction of improved breeding and management	Introduction of Improved breeding services with required management			6	12	25	37	50	60	66	72	79	85	92	100		

resources as an option for livelihood stabilization in hills	service at door step of farmers	practices																
		Fodder Tree Plantation			10	20	30	40	50	60	70	80	90	100				
																		

COMPONENT 3: Knowledge Management including knowledge creation and wider dissemination action

Outcome 3: Knowledge generation based on field actions and wider dissemination to enhance awareness of hill communities and stakeholders as well as for better policy inputs	Output 3.1: Knowledge generation through consultation	Preparation of Technical reports which will cover field level data, experiences, approaches, technologies tested and best practices along with dossiers and documentary										12	25	37	50	62	75	87	100
	Output 3.2: Wider dissemination of acquired knowledge	To organize one multi stakeholder's consultation at national level																50	100
																			
																			

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

- A. Record of endorsement on behalf of the government** *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Ravi Shankar Prasad, IAS, Joint Secretary, Ministry of Environment and Forest (MoEF), Government of India	Date:
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- B. Implementing Entity certification** *Provide the name and signature of the implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National Action Plan on Climate Change) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.



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NABARD, Head Office, Mumbai
(Implementing Entity Co-ordinator)

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List of Acronyms

AI:	Artificial Insemination
BAIF:	Bhartiya Agro Industries Foundation Development Research Foundation
BIRD-UP:	BAIF Institute of Rural Development-Uttar Pradesh
BPL:	Below Poverty Line
CBO:	Community Based Organizations
CBRI:	Central Building Research Institute
CCAFS :	Climate Change Agriculture and Food Security
CHEA:	Central Himalayan Environment Association
CICERO:	Centre for International Climate and Environmental Research
CITH:	Centre institute of Temperate Horticulture
CPC:	Chief Programme Coordinator
CRiSTAL:	Community Based Risk Screening Tool: Adaptation and Livelihoods
CSWTRI:	Central Soil and Water Conservation Research and Training Institute
DBT:	Department of Biotechnology
DST:	Department of Science and Technology
FAO:	Food and Agriculture Organization
FCRA:	Foreign Contribution Regulation Act
FRI:	Forest Research Institute
GBHIPED:	GB Pant Institute Of Himalayan Environment and Development
GBPUAT:	GB Pant University of Agriculture and Technology
GCF:	General Circulation Model
GDP:	Gross Domestic Product
GHG:	GHG- Green House Gases
GOI:	Government of India
HARC:	Himalayan Action Research Centre
HESCO:	Himalayan Conservation Studies and Conservation Organization
HFRI:	Himalayan Forest Research Institute
HICAP:	Himalayan Climate Change Adaptation Programme
HO:	Head Office
HP:	Himachal Pradesh
HPKV:	Himachal Pradesh Krishi Vidyalaya
ICAR:	Indian Council of Agriculture Research
ICIMOD:	International Centre for Integrated Mountain Development
ICT:	Information Communication and Technology
IFAD:	International Fund for Agricultural Development
IHBT:	Institute of Himalayan Bio resource Technology
IHCAP:	Indian Himalayas Climate Adaptation Programme
IHR:	Indian Himalayan Region
IISD:	International Institute of Sustainable Development
IIT:	Indian Institute of Technology

IITM:	Indian Institute on Tropical Meteorology
IMD:	Indian Meteorological Department
INCCA:	Indian Network on Climate Change Assessment
IPCC:	Inter Panel on climate change
IUCN:	International Union for Conservation of Nature
KVK	Krishi Vigyan Kendra
M & E:	Monitoring and Evaluation
MDG:	Millennium Development Goals
MGNREGS:	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoEF:	Ministry of Environment and Forests
MoU:	Memorandum of Understanding
NABARD:	National Bank for Agriculture and Rural Development
NAIP:	National Agriculture Innovation Project
NAPCC:	National Action Plan for Climate Change
NGO:	Non- governmental Organization
NHM:	National Horticulture Mission
NIE:	National Implementing Entity
NMMI:	National Mission on Micro Irrigation
NRLM	National Rural Livelihood Mission
NSRC:	National Sensing Remote Centre
NTFP:	Non Timber Forest Produce
PAC:	Programme Advisory Committee
PMU:	Project Management Unit
POs:	Producer Organizations
PSI:	People Science Institute
RKVY:	Rashtriya Krishi Vikas Yojana
SAPCC:	State Action Plan for Climate Change
SAU:	State Agriculture University
SC:	Steering Committee
SDC:	Swiss Agency For Development And Cooperation
SEI:	Stockholm Environment Institute
SHG:	Self Help Group
SMS:	Short Messaging Service
TASK:	Territorial Approach for Sustainable Knowledge
TDF:	Tribal Development Fund (Program of NABARD)
TIME:	Technology Intervention in Mountain Intervention
UBFDB:	Uttarakhand Bamboo and Fiber Development Board
ULDB:	Uttarakhand Livestock Development Board
UNEP:	United Nation Environment Plan
UN:	United Nations

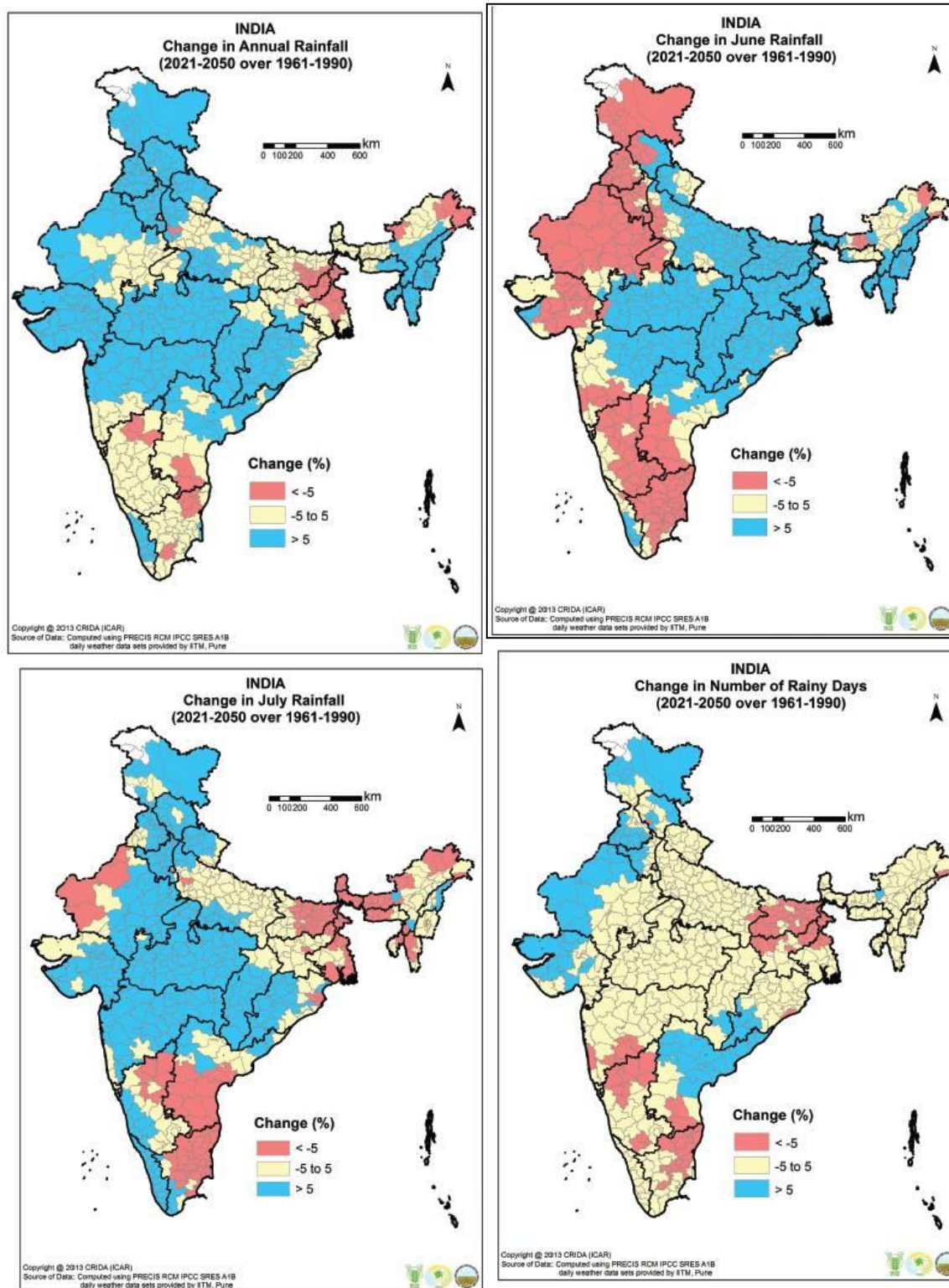
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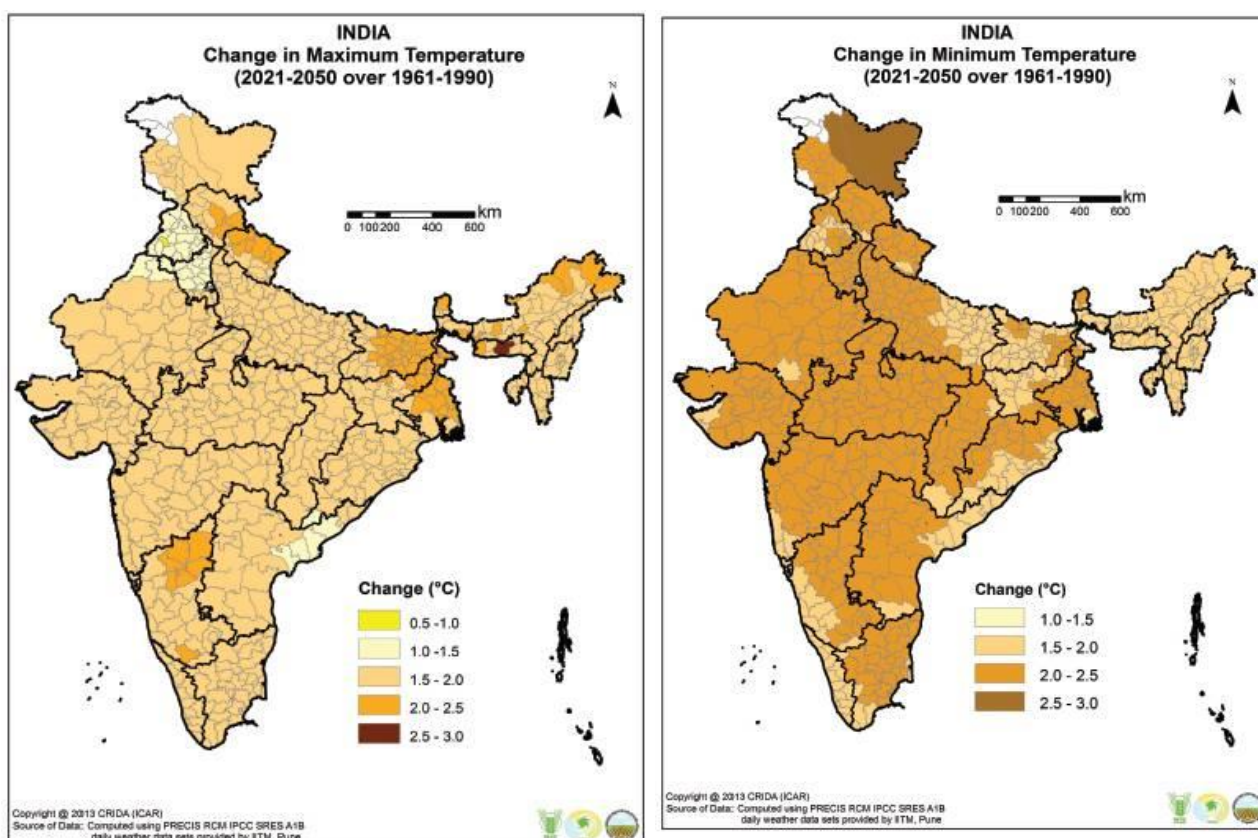
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Projected Climate Change in India (2021-2050 over 1961-1990)





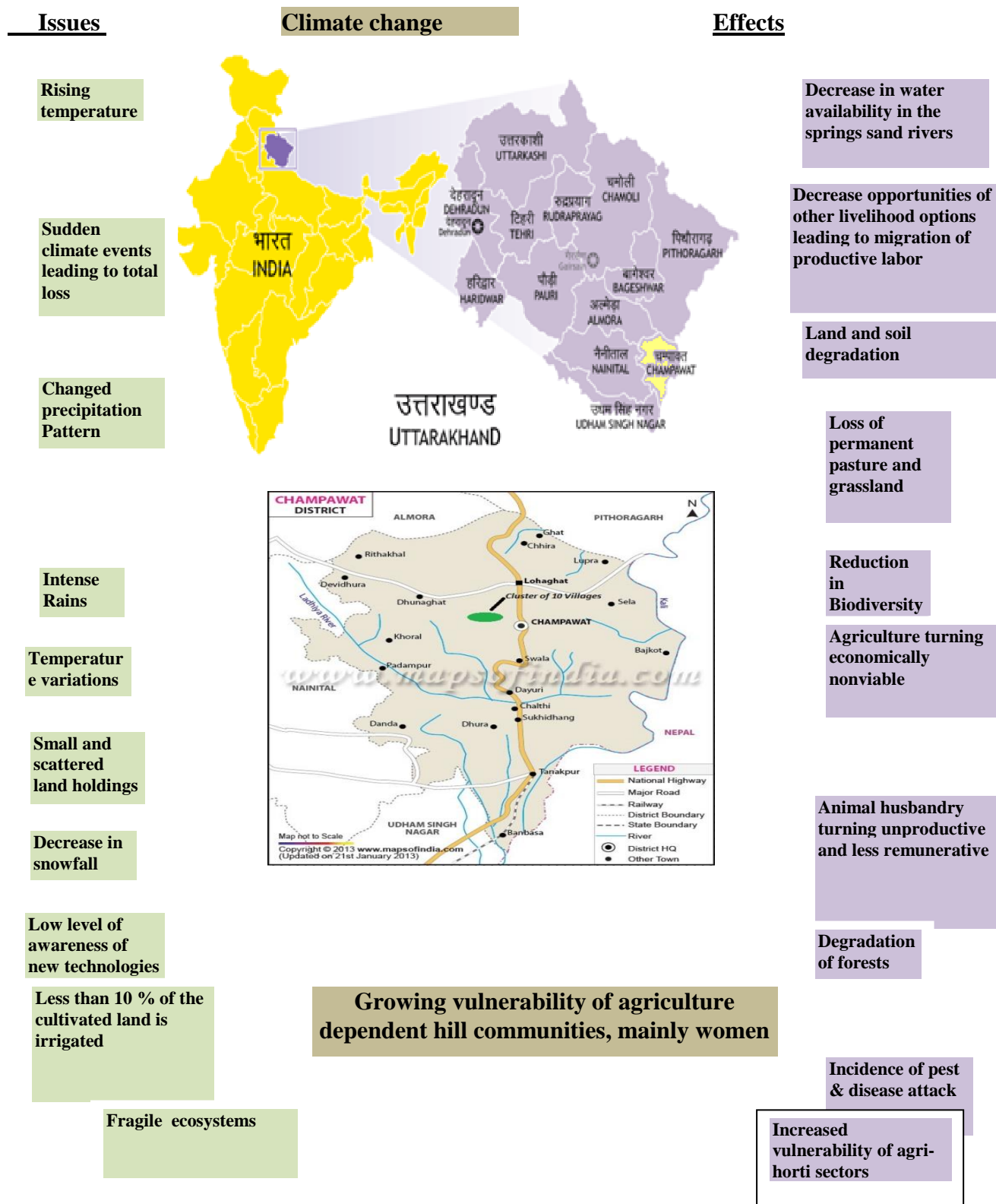
Projected climate change parameters in 2021-2050 over 1961-1990⁵

Parameter	2021-2050 over 1961-1990
Change in Annual Rainfall	-5 to 5%
Change in June Rainfall	-5 to 5%
Change in July Rainfall	-5 to 5%
Change in No. of Rainy Days	-5 to 5%
Change in Minimum Temperature	2.0 to 2.5 ⁰ C
Change in Maximum Temperature	1.5 to 2.0 ⁰ C

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Annexure 4:

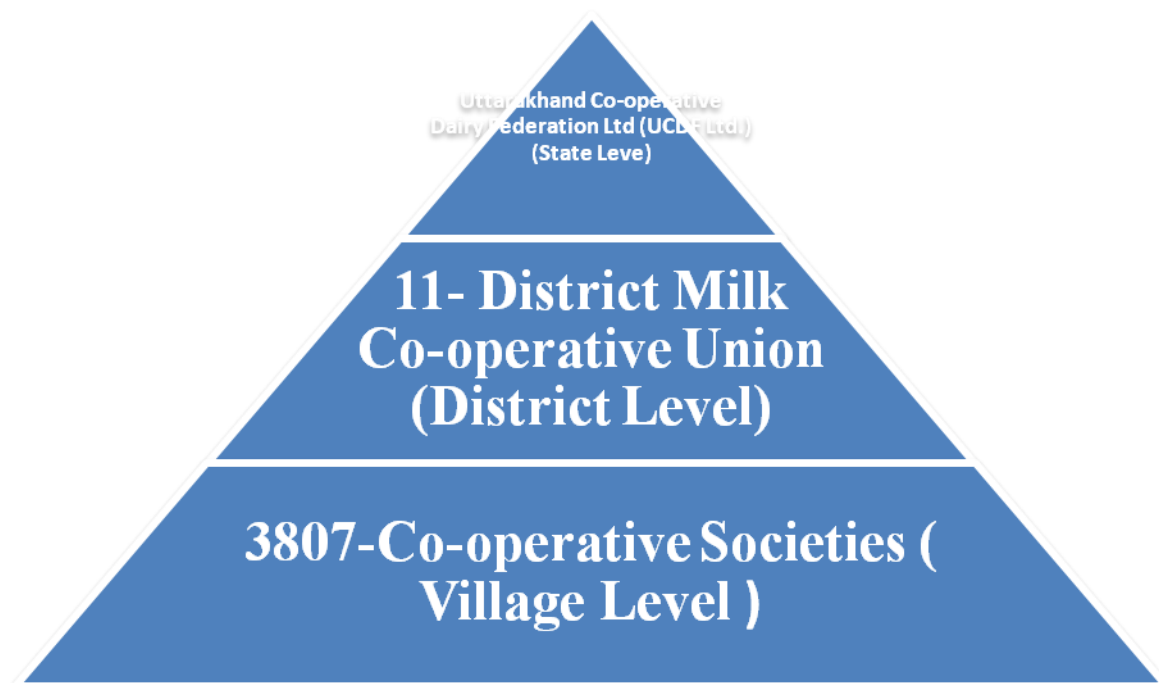
Pictorial Representation of issues related to climate change in Uttarakhand and Its effect



Anchal Dairy

Uttarakhand Co-operative Dairy Federation Ltd (UCDF Ltd.) is an apex level state federation of district milk Co-operative unions in the state of Uttarakhand. It was established in the year 2001, under registration no; 555, Dated 12-03-2001, with its head office at Mangal Parao, Haldwani (Nainital) for the successful implementation of the dairy programmes in the state. Product branding is "**ANCHAL**". The Uttarakhand Cooperative Dairy Federation Ltd (UCDF) came into existence as a successor body to the Uttar Pradesh Co-operative Dairy Federation Ltd. after the formation of Uttarakhand as 27th state on 9th Nov, 2000. The UCDF Ltd is registered under the Uttarakhand state cooperative act in the year 2001.

UCDF Ltd. is also working on "Anand Pattern" where, the first tier - Primary village Co-operative Society: An Anand Pattern village dairy cooperative society (DCS) is formed by milk producers. Any producer can become a DCS member by buying a share and committing to sell milk only to the society. Each DCS has a milk collection center where members take milk every day. Each member's milk is tested for quality with payments based on the percentage of fat and SNF. At the end of each year, a portion of the DCS profits is used to pay each member a patronage bonus based on the quantity of milk poured.



A District Cooperative Milk Producers' Union is second-tier organization, which is owned by dairy cooperative societies. It is a Union of primary village co-operative societies within a district. The Union buys all the societies' milk, then processes and markets fluid milk and products. Union also provides a range of inputs and services to village co-operative societies and their members: feed, veterinary care, artificial insemination to sustain the growth of milk production and the cooperatives' business. Union staff train and provide consulting services to support village co-operative society leaders and staff. The cooperative milk producers' unions in a state forms a State Federation which is an apex marketing body responsible for

marketing of milk and milk products of member unions. The Federation also plays a role in the overall development of the district unions federated to it. Maximizing farmer profit and productivity through cooperative effort is the hallmark of the Anand Pattern.

Members' Milk Unions under UCDF Ltd.

S No	Name & Address of DUSS	District	No. of Taluka Covered	Total Co-op Societies	Processing Capacity (In LPD)
1	Nainital Dugdh Utpadak Sahakari Sangh Ltd, Lalkuan	Nainital	8	512	50,000
2	Udham Singh Dugdh Utpadak Sahakari Sangh Ltd, Kanjabag Road, Khatima, , District- U.S.Nagar	U.S.Nagar	7	565	50,000
3	Pithoragarh Dugdh Utpadak Sahakari Sangh Ltd, Vin, District- Pithoragarh	Pithoragarh	8	275	5,000
4	Almora Dugdh Utpadak Sahakari Sangh Ltd, Patal Devi, Almora, District- Almora	Almora	11	484	20,000
5	Champawat Dugdh Utpadak Sahakari Sangh Ltd, Jut Patwa, District- Champawat	Champawat	11	484	20,000
6	Dehradun Dugdh Utpadak Sahakari Sangh Ltd, Raipur Road, Dehradun, District- Dehradun	Dehradun	6	293	20,000
7	Haridwar Dugdh Utpadak Sahakari Sangh Ltd, Vill- Shikarpur(Landhaura), District- Haridwar	Haridwar	6	287	30,000
8	Garhwal Dugdh Utpadak Sahakari Sangh Ltd, Dhobighat Pauri Road, Sri Nagar (Garhwal), District- Pauri Garhwal	Pauri Garhwal	15	296	20,000
9	Tehri Dugdh Utpadak Sahakari Sangh Ltd, H- Block New Tehri, District- Tehri Garhwal	Tehri Garhwal	09	200	10,000
10	Uttarkashi Dugdh Utpadak Sahakari Sangh Ltd, Matli, District- Uttarkashi	Uttarkashi	06	196	5,000
11	Chamoli Dugdh Utpadak Sahakari Sangh Ltd, Simali, District- Chamoli	Chamoli	09	283	5,000

All the 13 districts of the state are covered by 11-district level milk unions (district Rudraprayag and Bageshwar are included with the Srinagar and Almora milk unions respectively). There are 9 milk Processing plants of installed milk processing capacity 210 Kilo Liters per day and 44 chilling centers with a milk chilling capacity of 100 Kilo Liter/day. **At present, an average of Rs 2.9 Million per day milk price is paid to milk producers of the state.** They have linked their member through various govt. and other schemes for cross-breeding and other services.

Champawat Dugdh Utpadak Sahakari Sangh Ltd, Jut Patwa, District- Champawat is union of a total of 484 village level milk co-operative societies. As of now, 285 such village co-operatives are fully functional. It is present in all 11 blocks of Champawat district. It has 4 Bulk Milk Chilling Units having capacity of 11,000 ltr milk per day. For daily procurement of milk from villages, it has identified 20 procurement routes covering all the villages attached with the society. Champawat milk union is selling Milk and its value added products (Ghee, cream, curd, butter, paneer etc.).

Champawat Dugdh Utpadak Sahakari Sangh Ltd, Jut Patwa, District- Champawat: An Overview

Particulars	Details
Location	Jut Patwa, 2 kms from Champawat, Altitude: 1700 m
Processing Capacity	20,000LPD
Products	Milk, Ghee, Cream, Curd etc.
Bulk Milk Chilling Center	Tarikheth- capacity 5000 LPD, Chaukhutia- Capacity 2000 LPD, Marchula- Capacity 2000 LPD, Bageshwar-Capacity 2000 LPD
Procurement Route	20
Milk Sale Route	8
Total Village level Societies	484
Blocks Covered	11

a): Cost Benefit Analysis of improved horticulture varieties to 600 families

S No.	
1	Graft of Plum (20), Walnut (15), Malta (10) and Lemon (5) will be provided to the family having 0.1 Ha of land as selected by Village Committee. In the project area the economic life of a walnut tree may be up to 30 years; plum tree 20 years; malta, and lemon at least 20-25 years. Replanting would be needed after yields fall below economic levels. The analysis below is presented over a shorter period (10 years) only as an example to tree maturity and as yields stabilize.
2	Expenditure details of 0.1 Ha fruit tree plantation is based on similar project done in other district of Uttarakhand. Similarly production and price details are also referred from the project context.
3	It is assumed that participants will invest only on irrigation cost. The cost of pruning is not considered as it will be used by the participant as fuel.
4	54% of the cost under the project, while 46% of the cost is considered as family contribution during the project duration.
5	Considering 15% discounting factor, Benefit cost ratio of the activity is 1.7:1.

Yield Detail of Fruit Tree Cultivation per household

Expected Yield	1st Year	2nd Year	3rd Year	4th Year	5th Year	6 th Year	7th Year	8th year	9th Year	10 th Year
	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield	Per Plant Yield
Peach (20)										
Expected yield Per Tree	0	0	0	3	5	8	15	15	15	15
Total Yield	0	0	0	60	100	160	300	300	300	300

Expected Yield	1st Year	2nd Year	3rd Year	4th Year	5th Year	6 th Year	7th Year	8th year	9th Year	10 th Year
Expected Income from total Yield (Rs. 25/kg)	0	0	0	1500	2500	4000	7500	7500	7500	7500
Walnut (15)										
Expected yield Per Tree	0	0	0	1	2	3	4	5	8	10
Total Yield	0	0	0	15	30	45	60	75	120	150
Expected Income from total Yield (Rs. 80/kg)	0	0	0	1200	2400	3600	4800	6000	9600	12000
Malta (10)										
Expected yield Per Tree	0	0	0	4	6	8	12	15	15	15
Total Yield	0	0	0	40	60	80	120	150	150	150
Expected Income from total Yield (Rs. 10/kg)	0	0	0	400	600	800	1200	1500	1500	1500
Lemon (5)										
Expected yield Per Tree	0	0	0	0	0	5	8	10	12	15
Total Yield	0	0	0	0	0	25	40	50	60	75
Expected Income from total Yield (Rs. 20/kg)	0	0	0	0	0	500	800	1000	1200	1500

Expected Yield	1st Year	2nd Year	3rd Year	4th Year	5th Year	6 th Year	7th Year	8th year	9th Year	10 th Year
Grand Total Yield @ 0.1 Ha	0	0	0	115	190	310	520	575	630	675
Total Return from horticulture plantation	0	0	0	3100	5500	8900	14300	16000	19800	22500

:

Fruit Tree Plantation in Hilly Area

No. of Plants provided to Individual Family

Details	No. of Plants	Dimensions	Total Area
Peach	20	5 X 5 M	0.1 Ha
Walnut	15	5 X 5 M	
Malta	10	3 X 3 M	
Lemon	5	3 X 3 M	
Total	50		

Cost Structure of 1 Unit of Fruit Tree Cultivation proposed (INR)

S. No.	Subject/Operations	Unit	Rate	Yr- 01		Yr - 02	Value	Yr - 03	Value	Yr - 04	Value	Total
				Qty	Value	Qty		Qty		Qty		
A	Material											
i	Total Grafts (with	No	45	50	2250	10	450	0	0	0	0	2700

	transportation)											
ii	Boundary Plantation (Rs. 2 per plant)	No	5	50	250	10	50		0		0	300
iii	Fertilizers & Manures.								0		0	
a	Neem Cake (Pit Filling)	Kg	15	50	750	0	0	0	0	0	0	750
b	SSP /Rock Phosphate @ 200gm/pit	Kg	15	25	375	0	0	0	0	0	0	375
c	Insecticide @ 100 g/pit	Kg	40	5	200	0	0	0	0	0	0	200
	Sub-Total				3825		500		0		0	4325
B	Labour											0
i	Land preparation	MDs	150	1	150	0	0	0	0	0	0	150
ii	Digging of pits @ Rs. 35/pit	No.	35	50	1750	0	0	0	0	0	0	1750
iii	Filling of Pits and Planting @ Rs. 5/pit	No.	5	50	250	0	0	0	0	0	0	250
iv	Staking/Pruning/weeding /basin maint.	MDs	150	1	150	2	300	2	300	2	300	1050
v	FYM & Fertilize Application	MDs	150	1	150	2	300	2	300	2	300	1050
vi	Spraying (Avg. 3 sprays in a year)	MDs	150	3	450	3	450	3	450	3	450	1800
vii	Irrigation	MDs	150	12	1800	12	1800	12	1800	12	1800	7200
viii	Harvesting	MDs	100	0	0	0	0	0	0	10	1000	1000
	Sub-Total				4700		2850		2850		3850	14250
	Total Cost / Unit				8525		3350		2850		3850	18575

Cost Benefit Analysis of Fruit Tree Plantation per Household												
Sr.No.	Particulars	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	
a	Total Cost of Production	8525	3350	2850	3850	1500	1700	1900	2100	2300	2500	
b	Total Yield per unit (in Kg)	0	0	0	115	190	310	520	575	630	675	
c	Total Income per unit (In Rs)	0	0	0	3100	5500	8900	14300	16000	19800	22500	
d	Net Income	-8525	-3350	-2850	-750	4000	7200	12400	13900	17500	20000	
e	D F @ 15%	0.87	0.76	0.66	0.57	0.50	0.43	0.38	0.33	0.28	0.25	
f	DC @ 15%	7413.0	2533.1	1873.9	2201.2	745.8	735.0	714.3	686.5	653.8	618.0	18174.6
g	D Benefit @ 15%	0	0	0	1772.4	2734.5	3847.7	5375.9	5230.4	5628.4	5561.7	30151.0
	NPV	11976										
	BCR	1.7										
	IRR	28%										

Source Of Finance	Yr-1	Yr-2	Yr-3	Yr-4	Total	%
Grant under AF	6475	1500	1050	1050	10075	54
Family Contribution	2050	1850	1800	2800	8500	46
Total	8525	3350	2850	3850	18575	100

Looking at the Benefit Cost Ratio and IRR, this activity is financially viable and can be taken up by the Household

Annexure 6 (b) Cost Benefit analysis of high value vegetable cultivation under protected conditions (using bamboo based poly houses to minimize the damage and losses due to extreme weather events) to 200 families

S No.	Particulars
1	Cost under project will include the cost of Bamboo based Polyhouse and Irrigation tank and 10 gms of vegetable seeds, which is one time cost.
2	Life of Polyhouse and Irrigation Tank is considered as 5 years and 10 years respectively.
3	In the consecutive years, the family has to bear the cost of cultivation which is only Rs. 3,650 to gain at least Rs. 9000 a year.
4	3 models with different combinations are considered in the project. It will be completely based on the choice of the participants.
5	Expenditure details of 1 unit of Bamboo based polyhouse is based on similar project implemented in other cluster of Champawat district. Similarly production and price details are also referred from the project context.
6	69% of the cost under the project, while 31% of the cost is considered as family contribution during the project duration.
7	Considering 15% discounting factor, Benefit cost ratio of the activity is 1.2:1

Cost break up of Bamboo based polyhouse and Irrigation tank

Cost Details			Year 1			Year 2	Year 3	Year 4	Year 5
#	Particulars	Unit	Qty'	Rate	Total	No expenditure on Recurring Cost for this period			
1	Poly Sheet 120 GSM, UV Stabilized	Roll	1	7,000	7,000				
2	Bamboo 16'L, thin (2 nd grade)	No.	25	110	2,750				
3	Bamboo 16'L, thick (1 st grade)	No.	15	150	2,250				
4	Shed Net 50% (30'X3' & 20' X 6')	Roll	1	500	500				
5	Black Poly	Meter	10	5	50				
6	Nail (2", 3", 4" & 5")	Kg	0.75	80	60				
7	Labour Cost	No.	1	2,200	2,200				
8	GI wire (65 fit) and Plastic (90 fit)	No.	1	200	200				
9	Transportation Cost	No.	1	1,765	1,765				
					16,775				
Irrigation tank									
10	Bricks	No.	600	9	5,400				
11	Cement	Bag	5	375	1,875				
12	Sand	Bag	25	50	1,250				
14	Concrete	Bag	5	120	600				
15	Massion	Days	4	400	1,600				
16	Labour for tank	Days	8	250	2,000				
17	Vegetable Seed	gm	10	50	500				
					12,725				

Vegetables proposed to be planted in the Bamboo based Polyhouse						
	Plant	No. of Plant	Plant	No. of Plant	Plant	No. of Plants
Model-1 (Tomato+Cucumber)	Tomato	200			Cucumber	12
Model-2 (Capsicum+Cucumber)	Capsicum	200			Cucumber	12
Model-3 (Capsicum+Tomato+Cucumber)	Capsicum	100	Tomato	100	Cucumber	12

Yield Details of High Value Vegetable Proposed in the Project										
	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10
Model-1										
Tomato (200)										
Yield per Plant	5	5	5	5	5	5	5	5	5	5
Total Yield	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Expected return@ Rs. 10	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
Cucumber (12)										
Yield per Plant	5	5	5	5	5	5	5	5	5	5
Total Yield	60	60	60	60	60	60	60	60	60	60
Expected return@ Rs. 15	900	900	900	900	900	900	900	900	900	900
Expected Income/unit	10900	10900	10900	10900	10900	10900	10900	10900	10900	10900
Model-2										
Capsicum (200)										
Yield per Plant	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Yield	700	700	700	700	700	700	700	700	700	700
Price per plant @ Rs. 20	14000	14000	14000	14000	14000	14000	14000	14000	14000	14000
Cucumber (12)										
Yield per Plant	5	5	5	5	5	5	5	5	5	5
Total Yield	60	60	60	60	60	60	60	60	60	60
Expected return@ Rs. 15	900	900	900	900	900	900	900	900	900	900
Expected Income/unit	14900	14900	14900	14900	14900	14900	14900	14900	14900	14900
Model-3										
Tomato (100)										
Yield per Plant	5	5	5	5	5	5	5	5	5	5
Total Yield	500	500	500	500	500	500	500	500	500	500

Expected return@ Rs. 10	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Capsicum (100)										
Yield per Plant	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Yield	350	350	350	350	350	350	350	350	350	350
Price per plant @ Rs. 20	7000	7000	7000	7000	7000	7000	7000	7000	7000	7000
Cucumber (12)										
Yield per Plant	5	5	5	5	5	5	5	5	5	5
Total Yield	60	60	60	60	60	60	60	60	60	60
Expected return@ Rs. 15	900	900	900	900	900	900	900	900	900	900
Expected Income/unit	12900	12900	12900	12900	12900	12900	12900	12900	12900	12900

Cost Structure of High Value Vegetable cultivation in Bamboo based Polyhouse (INR)												
		Unit	Rate	Year 1		Year 2		Year 3		Year 4		Total
				quantity	Value	quantity	Value	quantity	Value	quantity	Value	
	Fixed Cost											
a	Construction of Polyhouse	No.	16,775	1	16775	0	-	0	-	0	-	16,775
b	Construction of Irrigation Tank	No.	12,725	1	12725		-		-		-	12,725
	Total Fixed Cost				29500	0	0	0	0	0	0	29500
	Variable Cost						-		-		-	-
a	Cost of Seed	gm	50	10	500	10	500	10	500	10	500	2,000
b	Fertilizer	Kg	5	200	1000	200	1,000	200	1,000	200	1,000	4,000
c	Pesticides	No.	150	3	450	3	450	3	450	3	450	1,800
d	After Care	MDs	300	4	1200	4	1,200	4	1,200	4	1,200	4,800
e	Miscellaneous Cost	No.	500	0	0	1	500	1	500	1	500	1,500
	Total Variable Cost				3150		3650		3650		3650	14100
	Total cost/unit				32650		3650		3650		3650	43600

Cost Benefit Analysis of High Value Vegetable Cultivation in Bamboo Based Polyhouse

Sr.No	Particulars	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	
a	Total Cost of Production	32650	3650	3650	3650	3650	47250
b	Total Income per unit (In Rs)	12900	12900	12900	12900	12900	
c	Net Income	-19750	9250	9250	9250	9250	17250
d	Discounted Factor @ 15%	0.87	0.76	0.66	0.57	0.50	
e	Discounted Cost @ 15%	28391.3	2759.9	2399.9	2086.9	1814.7	37452.8
f	Discounted Benefit @ 15%	11217.4	9754.3	8482.0	7375.6	6413.6	43242.8
	NPV	5790					
	BCR	1.2					
	IRR	31%					

	Source Of Finance	Yr-1	Yr-2	Yr-3	Yr-4	Total	%
a	Grant under AF	30000	0	0	0	30000	69
b	Family Contribution	2650	3650	3650	3650	13600	31
	Total	32650	3650	3650	3650	43600	

Based on the IRR and BCR, this project activity is also viable and cost effective at household level.

Annexure6 c): Cost benefit analysis of improved breeding services with required management practices

Assumptions for Livestock Management Practices				
#	Assumptions	Unit	Quantity	Remarks
1	Number of Cattle/household (<i>Breed of the cow - Desi</i>)	No.	2	Household having at least 2 desi breed cows will be targeted in the project
2	Number of households covered under the project	No.	800	During 4 years, total of 800 household will be covered, who will be provided with 4 times of AI services, deworming, vaccination and modification in cattle shed.
3	Rate of milk	Rs./kg	22.00	Rate of Milk is considered constant in calculation up to 10 years.
4	Average Milk production per desi breed of cow per annum	Litres	600	Average Milk production of 1 Desi breed cow is considered as 600 per annum
5	Average Milk production per crossbred breed of cow per annum	Litres	2100	Milk yield from Cross-breed cow will start from 5th year onwards, which will go upto 15-20 years, however, for calculation, only 10 years is considered.
6	Number of days a cow gives milk	No.	300	Average lactation day of a cow is considered as 300 days
7	Number of lactations for a desi cow breed	Years	3.5	
8	Number of lactations for a Crossbred of cow	Years	2.5	
9	Inter-calving period for a desi cow	Years	2.5	
10	Inter-calving period for a crossbred cow	Years	1.5	
11	Selling price of one cross bred cow	Rs.	14000.00	It is assumed that every alternate year a heifer will be born and will be sold in the market for income to the household.

Milk Yield Detail of Desi breed and Cross breed cow upto 10 years										
Milk Producing Cows in a particular Year	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10
Desi Cow (2) (Desi=Local breed of the cow)	1200									
Desi Cow (2) (Desi=Local breed of the cow)		1200								
Desi Cow (2) (Desi=Local breed of the cow)			1200							
Desi Cow (2) (Desi=Local breed of the cow)				1200						
Desi Cow + Cross bred					2700					
Cross bred + Cross bred						4200				
Cross bred + Cross bred							4200			
Cross bred + Cross bred								4200		
Cross bred + Cross bred									4200	
Cross bred + Cross bred										4200

Income from of Sale of Milk up to 10 years										
Milk Producing Cows in a particular Year	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10
Desi Cow (2) (Desi=Local breed of the cow)	26400									
Desi Cow (2) (Desi=Local breed of the cow)		26400								
Desi Cow (2) (Desi=Local breed of the cow)			26400							

Desi Cow (2) (Desi=Local breed of the cow)				26400						
Desi Cow + Cross bred					59400					
Cross bred + Cross bred						92400				
Cross bred + Cross bred							92400			
Cross bred + Cross bred								92400		
Cross bred + Cross bred									92400	
Cross bred + Cross bred										92400

Expenditure Detail for Desi Cow and Crossbred Cow in Hill Context

		Desi Cow				Crossbred Cow			
Particulars	Rate	Per day Quantity	Unit	Total quantity	Total	Per day Quantity	Unit	Total quantity	Total
Cost of Green Fodder during dry period required per cattle	1	5	Kg	2500	2500	10	Kg	2500	2500
Cost of Green fodder during milking period required per cattle	1	10	kg	4000	4000	20	kg	6000	6000
Cost of Dry fodder during dry period required per cattle	3	3	kg	1500	4500	5	kg	1250	3750
Cost of Dry fodder during milking period required per cattle	3	4	Kg	1600	4800	8	Kg	2400	7200
Concentrate required during Dry period per cattle	15	1	Kg	500	7500	2	Kg	500	7500
Concentrate required during milking period per cattle	15	3	Kg	1200	18000	4	Kg	1200	18000

Total Cost for a calving period					41300				44950
Inter calving period of cow					900				550
Cost for one year					16749				29830
		Desi Cattle				Crossbred Cattle			
Expenditure Component	Rate	Description	Unit	Quantity	Total	Description	Unit	Quantity	Total
Fodder cost for a year		As per details	No.	1	16749	As per details	No.	1	29830
Veteranary expenses	1000	Required 1 time in a year (Deworming, Vaccination etc)	No.	1	1000	Required 2 time in a year	No.	2	2000
Miscellaneous Cost	1000	Other Cost, If any	No.	1	1000	Other Cost, If any	No.	2	2000
Total Exp for a year per cattle					18749				33830

Cost structure of Rearing of 2 unit of cattle (INR)

S No.	Particulars	Unit	Rate	Year 1		Year 2		Year 3		Year 4		Total
				quantity	Value	quantity	Value	quantity	Value	quantity	Value	
a	Fodder cost for Desi cow per year	Per cattle	16749	2	33499	2	33499	2	33499	1	16749	117246
b	Fodder Cost for Cross breed Cow per year	Per cattle	29830	0	0	0	0	1	29830	1	29830	59661
c	Veteranary expenses	Per cattle	1000	2	2000	2	2000	3	3000	2	2000	9000
d	Miscellaneous Cost	per cattle	1000	2	2000	2	2000	3	3000	2	2000	9000

e	Modification of Cattle Housing	No	5000	1	5000	0	0	0	0	0	0	5000
	Total Exp for a year				42499		37499		69329		50580	199907

Cost Benefit Analysis of Rearing of 2 unit of Cattle following Scientific livestock management practices											
	Particulars	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10
A	Total Cost	42499	37499	69329	50580	50580	50580	50580	50580	50580	50580
B	Income										
i	Income from selling of milk per annum	26400	26400	26400	26400	59400	92400	92400	92400	92400	92400
ii	Sale of Heifer from 4th Yr and after every alternate yrs	0	0	0	14000	0	14000	0	14000	0	14000
	Total income	26400	26400	26400	40400	59400	106400	92400	106400	92400	106400
C	Net Income	-16099	-11099	-42929	10180	8820	55820	41820	55820	41820	55820
D	DF @ 20%	0.83	0.69	0.58	0.48	0.40	0.33	0.28	0.23	0.19	0.16
E	Discounted Cost @20%	35416	26041	40121	24392	20327	16939	14116	11763	9803	8169
F	Discounted benefits @20%	22000	18333	15278	19483	23872	35633	25787	24745	17908	17184
	NPV	13136									
	BCR	1.1									
	IRR	26%									

207087
220223

Looking at the Cost Benefit Analysis of this activity, it is also viable, as the household in the area are already incurring expenses related to rearing of 2 cattle but they are not getting enough return from the activity. In the case of AI services, they will get cross bred cows, whose yield is 3-4 times higher than yield received from desi cow.

Hence, it is beneficial in terms of higher returns from almost same investment from their side.

Consultation Process Details

List of villagers involved in field level consultation at Village Nariyalgaon

दिनांक : दि 05/04/14
स्थान नारियाण गाँव (चम्पाबल)

क्र. सं.	किसान का नाम	किसान के हस्ताक्षर
1	गोविंद चण्डा जोशी	गोविंद जोशी
2	हेम चंड नरियाण	हेम चंड
3	रमेश चंड जोशी	रमेश चंड
4	दिनेश चंड जोशी	दिनेश चंड
5	मधुसूदन सिंह	मधुसूदन सिंह
6	श्री दुर्गा दत्त	श्री दुर्गा दत्त
7	श्री राजेंद्र सिंह	श्री राजेंद्र सिंह
8	रवि चंड	रवि चंड
9	दान फेड केदारवा	दान फेड केदारवा
10	दिनेश चंड	दिनेश चंड
11	P D Joshi	P D Joshi
12	नारायण दत्त	नारायण दत्त
13	जयप्रकाश सिंह	जयप्रकाश सिंह
14	जयप्रकाश सिंह	जयप्रकाश सिंह
15	संजय नरियाण	संजय नरियाण
16	उमेश विश्वास	उमेश विश्वास
(17)	भास्कर दत्त	भास्कर दत्त
18	दीपक नरियाण	दीपक नरियाण
19	नारायण चंड नरियाण	नारायण चंड नरियाण
20	देवी दत्त जोशी	देवी दत्त जोशी
21	केदार चंड नरियाण ✓	केदार चंड नरियाण
22	सतीश चंड खकवाल	सतीश चंड खकवाल
23	केजव दत्त जोशी	केजव दत्त जोशी
24	रमेश चंड जोशी	रमेश चंड जोशी
25	प्रताप सिंह रावत	प्रताप सिंह रावत
26	शोरम कुमल	शोरम कुमल
28	मुकेश रावत	मुकेश रावत

05/04/2014

List of Participants, Eminent Scientists, Government Officials, and Development Professionals who participated in Brain Storming Workshop Organized by BAIF
On “Crafting Strategy for Sustainable Livelihoods and Natural Resource Management in Central and Western Himalayas”
(November 11-12, 2011)

Sr No	Name of the Delegate	Organization
1	Dr. A. S. Ninawe,	Advisor, Deptt of Biotechnology, GoI, New Delhi
2	Girish G. Sohani	President, BAIF, Pune
3	Ramesh Rawal	Executive Vice President, BAIF, New Delhi
4	AbhayGandhe	Senior Program Officer- SDTT
5	Dr. Rajashree Joshi	Sr. Program Coordinator BAIF, Pune
6	Dr. S. U. Ahmed	Scientist, Department of Biotechnology, GoI, New Delhi
7	Sachin M Patwardhan	Program officer SDTT
8	Dr. HariSharan Singh Advisor (Fodder)	ULDB-Uttarakhand Livelihood Development Board
9	Dr. M C Nautiyal, Ex Dean	Retired DEAN, College of Forestry, Dehradun
10	Dr. B P Nautiyal	Ex GM, NABARD, and Ex Director, Horticulture
11	Atul Shah	CHIRAG, Uttarakhand
12	Aadya Singh	CHIRAG
13	Dr. Vikas Vatsa	HIMCON
14	Dinesh Raturi	BAIF-Uttarakhand
15	RakeshBahuguna	HIMCON
16	Dr. R B P Singh	HIMCON
17	Dr. P S Bisht, Dean,	CFHA, GBPUACT, Ranichauri
18	Dr. V K Kediya,	CHFA, GBPUACT, Ranichaura
19	DrAmbrish Kumar, Sr. Scientist (Engg),	CSWC, RTI, Dehradun
20	Dr R K Maikhuri, Scientist 'E'	GBPIHED, Garhwal Unit, Srinagar, Uttarakhand-246174
21	VimalDhiman Forestry Manager	Uttarakhand Bamboo and Fibre Development Board (UBFDB, Dehradun)
22	Dr. S K Bhardwaj Scientist	Department of Environmental Science, University of Horticulture and Forestry, Nauni, Solan
23	Prof. K S Verma, Head	Department of Environmental Sciences, Univ of Horti and Forestry, Nauni, Solan
24	Vijay P S Adhikari	CHEA, Central Himalayan Environment Association
25	Krishna Trivedi	Appropriate Technology, India, Rudraprayag (UK)
26	Dr R B P Singh, Advisor	HIMCON, Dehradun
27	P Pandit, GM	CGM , NABARD
28	Malkit Singh, AGM	NABARD, Dehradun

29	DrRajendraMatupal, Addl. Manager	ULDB
30	Dr. MalavikaChauhan	Executive Director, Himmothan Society
31	DrYashpalBisht	Livestock specialists Himmothan Society
32	Dr. Rawat	GBPIHED
33	Dr. ShrikantKhadilkar	CPC- BAIF- Haridwar
34	Dr. Sunil Agrawal	Scientist –DST –New Delhi
35	Dr. D.K. Tiwari	Sericulture specialist – BAIF Himachal Pradesh
36	DrS.S.Roy	Advisor- BAIF Pune
37	Dr .J.N.Daniel	Program Director – BAIF –Pune

Stakeholder Consultation on 23 August 2012 (participants: 55 women: 16)

The details on stakeholders consultations held on 23 August 2015

S.D.P. Khera

आज दिनांक 23/8/2012 को सायाह एस.टी.पी. शेवतीखान
 में किसानों के साथ एक बैठक का आयोजन
 किया गया जिसमें सायाह पुने से राजश्री चौधरी,
 विक्रम काश्यप, नेहा काकर, सी.पी.टी. उत्तराखंड,
 डा. एस.के. सिंह अहोम आदि व सायाह एस.टी.पी.
 शेवतीखान के सभी कर्मचारी मौजूद थे,
 किसानों द्वारा दिनरी, लघुगीकार, बाक गांव
 गजनीगांव, कुजान गांव, कुनार गांव, भावर
 कापडी पारदगांव आदि के किसान मौजूद थे,
 इस गोष्ठी में तीन मुद्दे चलाये गये जिनमें 20वें से 30वें
 तक तथा 30 से 50 वर्ष तक एवं 50 से 60
 वित्तों की उम्र के लोग कुजान गांव उपस्थित थे
 जिसमें उनसे गांव तथा बलाबला के बारे में
 बदलावों के बारे में पूछा गया। गोष्ठी के निम्न
 लोग मौजूद थे,

1- सायाह कापडी	15 गीता चौधरी
2- बेलानारद बाहलोडी	16 लक्ष्मी देवी
3- चमच-ड	17 सुदेश चौधरी
4- लेखक कापडी	18 उमेश चौधरी
5- उमाकापडी	19
6- अहोम बाहलोडी	20 कलावती देवी
7- सुनरी देवी	21 मोनू सिंह
8- लीपती देवी	22
9- शंकर कापडी	23 लक्ष्मी देवी
10- Hemchandra	24 दीपक कानिका
11- मोनू देवी	25 कलकावत
12- सायाह दिनरी	26 मोहन सिंह
13- सुदेश चौधरी	27 आशा चौधरी
14- Deepak Singh	28 शिविका अहोम
	29 मोनू देवी

- ~~संस्कृत-२०२४~~
- 30 देमा देवी
 - 31 मनोज कानवडिया
 - 32 दिगंबर चौधरी
 - 33 प्रमोदा चौधरी
 - 34 गीतिका देवी
 - 35 लक्ष्मणा लामा
 - 36 प्रणाम सिंह
 - 37 वैरागदत्त
 - 38 शंकर बाबू
 - 39 जानकी देवी
 - 40 मोहिनी देवी
 - 41 लक्ष्मीका कानवडिया
 - 42 श्रीदेविका लामा
 - 43 महेन्द्रा-चन्द
 - 44 मिनाक्षी भट्ट
 - 45 श्रीदली देवी
 - 46 रूप सिंह
 - 47 मनोज ओली
 - 48 गीता देवी
 - 49 गोमती देवी
 - 50 निशा भनवाल
 - 51 जीवन-चन्द भट्ट
 - 52 मरागली देवी
 - 53 मुकेश दे उपा
 - 54 गिरिश
 - 55

About BAIF and its Programs in India and in the state of Uttarakhand

About BAIF Development Research Foundation (Project Execution Entity)

BAIF Development Research Foundation (previously registered as the Bharatiya Agro Industries Foundation), is a reputed voluntary organization established in 1967 by Dr. Manibhai Desai, a disciple of Mahatma Gandhi, at Urulikanchan, near Pune to promote sustainable livelihoods among rural communities of India.



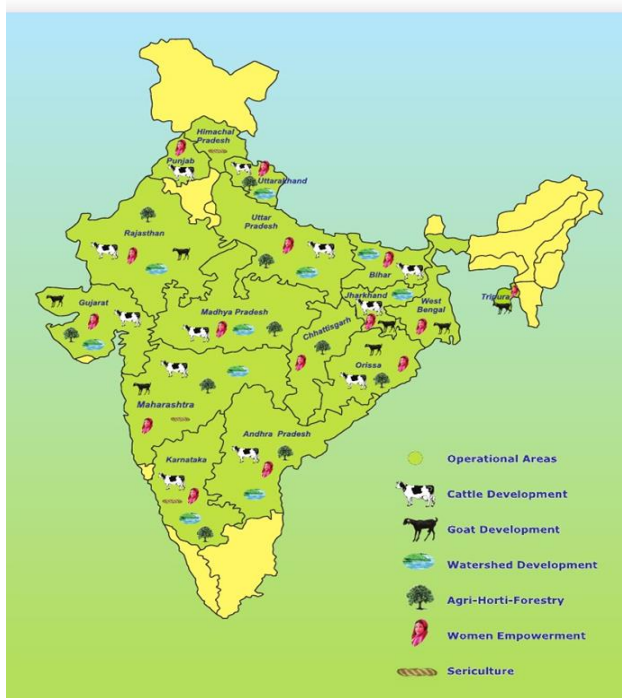
BAIF provides sustainable livelihood options to rural poor through management of natural resources, promotion of livestock development, watershed development and agri-horti-forestry as major income generation activities. **BAIF is serving more than 4.5 million poor families living in 60,000 villages spread over 16 states across the country** through the dedicated efforts of about 4500 employees.

Nature of Programme/Work:

The major activities of BAIF are the promotion of dairy husbandry, goat husbandry, water resources development, sustainable agriculture and agri-horti-forestry for the rehabilitation of rural communities on degraded lands, and various rural non-farm activities for generating employment for landless families. Emphasis on environmental sustainability and empowerment of women cut across all these programmes.

BAIF & Animal Husbandry

BAIF's priority was to take up promotion of dairy husbandry by providing doorstep services way back in 1970. For the first time in the country, BAIF demonstrated the feasibility of using sophisticated frozen semen technology for improving the breeding efficiency on low productive, non-descript cattle. BAIF emphasized on delivery of services at the doorstep primarily to reduce the drudgery of livestock owners and also to motivate them through direct dialogue and to provide answers to all the questions posed by small farmers. This worked as effective mentoring which enabled a large number of small farmers to adopt dairy husbandry as a dependable means of livelihood. As a result of BAIF's efficient technology blended with efficient delivery services, the programme achieved significant success. The conception rate of cattle went up to 55% as compared to less than 20% in other programmes. **The efficient technical guidance helped the cattle**



owners to take good care of the new born high yielding cows and buffaloes, which produced 2500-3000 liters per lactation and generated a net surplus of Rs. 7000 – 8000 per year. The participant families have enhanced their annual income from a meager sum of Rs. 8,000-10,000 to Rs. 45,000-55,000. Animal Husbandry has not only generated surplus income and year-round employment for all the members of the family particularly women, but also ensured nutritional supplementation for children and women and plenty of organic manure which gave a boost to the agricultural production. Looking to the prospect of providing gainful self-employment, the planning commission recommended that the programme be implemented across the country with the support under Integrated Rural Development Programme with the infrastructure development fund by GoI. **Thus, BAIF has been able to expand the programme to reach 30 lakh families spread over 46,000 villages in 12 states. Looking at the benefit of the programme, the farmers are willing to pay for the services provided by BAIF and hence an innovative programme has been initiated without seeking support from donor agencies.** This is a reflection of the replicability of the programme BAIF has also trained thousands of barefoot beneficiaries as para-vets for providing livestock breeding services on their own for their livelihood.

Watershed Programs

BAIF has also taken up watershed development programme sponsored by the government of India, NABARD and other agencies, where the budget and other activities are identified by the donors and other agencies. **Watershed development programme which aims at conservation and sustainable use of natural resources has been taken up covering over 120950 families spread over 673 watersheds in 1233 villages and covering about 348010 ha.** However, apart from the set activities, BAIF has initiated various innovative components such as promotion of improved cash crops, fruits and vegetables, application of bio fertilizers and vermicomposting and introduction of agro services for efficient backward and forward linkages. As a result, the participants of the watershed programme could enhance their crop yield and cropping intensity from 30-80% and their annual income has increased from Rs. 10,000 to over Rs. 35,000. The agri-horti-forestry programme known as the *wadi* programme is the brainchild of BAIF.

Agri-horti Plantation

In the early 80's, while promoting sustainable development in tribal regions of Gujarat, BAIF realized the problems of the tribal who could not meet their livelihood from collection of minor forest produce. In the absence of income, the tribal were trying to utilize the hilly terrain for agricultural production without success. This led to the migration of the entire family for livelihood and accelerated the degradation of forest resources. Looking to their plight, BAIF developed a unique programme for promoting *wadi* to establish fruit orchards on 0.4 ha land owned by them. To ensure food security, support was provided to use the inter-space for cultivation of food and vegetable crops while the borders were used for establishing medicinal herbs and multipurpose tree species which not only protected the fruit trees but also provided fodder, fuel, timber and medicinal herbs for home consumption. As women played a significant role in nurturing the orchards, it was necessary to address their drudgery, health problems and literacy. Development of children through health care and

literacy were the integral parts. **Thus, various interventions were introduced to ensure that women remained healthy and saved time through reduced drudgery, to devote their time to the development of the *wadi*. As a result of this innovative approach and hard work of the tribal, the families who hardly earned Rs. 6000 per annum earlier, could now generate a net surplus of Rs. 35,000 to Rs. 40,000 from the fifth year when the orchards started bearing fruits. With the prospects from their *wadis*, the tribal particularly the women stopped migrating and the children started attending schools.** Looking to the potential of the programme for wider replication, NABARD has set up a tribal development fund to promote the programme and the ministry of tribal affairs, government of India made a budget allocation for development of the *wadi* programme by the state governments, adopting the unique approach of BAIF's tribal rehabilitation. BAIF has been identified as a *wadi* resource center for capacity building of the implementing agencies.

BAIF's State-Level Associate Organizations

- i. BIRD, Andhra Pradesh
- ii. BAIF Bihar (under BIRD UP)
- iii. BAIF Uttarakhand (under BIRD UP)
- iv. BIRD-UP, Uttar Pradesh
- v. BIRVA, Jharkhand
- vi. BIRD-K, Karnataka
- vii. DHRUVA, Gujarat
- viii. GRISERV, Vadodara, Gujarat
- ix. MITTRA, Maharashtra
- x. RRIDMA, Rajasthan
- xi. SPESD, Bhopal, MP

✓ About BAIF Uttarakhand :

BIRD-UK has been working in Uttarakhand since year 1994 when it began its operations as a part of BIRD-Uttar Pradesh with the establishment of cattle development centers in 4 districts. However, after formation of separate state, work has been extended to 12 districts of state. Since past 5 years, a special program of Hill Area Development is taken up which focuses on improved agri+ horti and floriculture activities. Many farmers have adopted these technologies. The Integrated tribal development project in Dehradun district is promoting tree based farming, improved vegetable cultivation and fodder development and sericulture. Other activities pertain to taking up special program for women, like training, formation of Self Help Groups and income generation activities

Till date, cattle breed improvement program is ongoing in 12 districts of Uttarakhand benefiting around 60,000 families. Farmers are also getting educated about scientific management of livestock. A special research is also being piloted to test performance of French cow breed (alpine breed from Europe), which is good for cheese production.

BIRD- UK is one of the partners in NAIP (National Agriculture Innovation Project-supported by ICAR). The other consortium partners being VPKAS (Almora), GBPUAT

(Pantnagar), GBPHIED, (Kosi, Almora). It has close linkages with CITH, Mukteshwar and CSWRTI, Dehradun. The working relationships have also been developed with local NGOs such as PSI, HESCO and HARC based in Dehradun. NABARD –Dehradun is technical partner for TDF (Tribal Development Fund) project. BAIF is a member of the consortium hence it will be easier to extend the scope of collaboration with these research institutes in future.

✓ **Developing sustainable livelihoods in fragile hilly regions efforts through *BAIF Center for Development in Central and Western Himalayas***

BAIF is evolving and demonstrating suitable development models aimed at enhanced livelihood opportunities and improved natural-resource management in challenging niche areas. Under this initiative, the Center for Development in Fragile Hill Areas has been set up. Field work has been done in Augustmuni cluster in Rudraprayag district, in the Garhwal region; and Khetikhan cluster in Champavat district, in the Kumaon region. A range of interventions for sustainably improving incomes of local communities have been demonstrated.

Approach

Participatory analysis of contextual needs and emerging issues, followed by promotion of context-specific and altitude-specific technologies and processes at the household and community levels for: sustainably increasing returns from agriculture and animal husbandry, increasing availability of water, increasing production of fodder, diversifying land-based livelihoods, promoting alternative income-generation activities, and reducing drudgery of women; through enabling processes like conservation and revival of biodiversity resources, formation and strengthening of people's institutions, and building partnerships with research institutes and likeminded organizations having a similar mandate.

Key Outcomes (April 2007 -September 2014)

- Yield of food crops (wheat, paddy, and soybean) increased by 15-20% through promotion of suitable seed varieties and improved agro practices (115 families).
- Production of fruits (peach, apple, walnut) increased through promotion of new varieties, scientific management practices, and rejuvenation of old orchards (342 families).
- Floriculture crops like gladiolus, liliun and carnation introduced with supply chains, enhancing household income by Rs 7000-8000 in a short period (98 families).
- Cultivation of high-value vegetables such as capsicum, tomato and cucumber in bamboo framed poly houses doubled yields (200 families).
- Units for value-added production from malta fruit and rhododendron flowers helped generate additional employment for 65 women.
- French breed of alpine cow introduced for evaluation of production and reproduction parameters.
- Availability of fodder increased by 20-25%. Participatory silvipasture development done on 21ha of vanpanchayat land.

- Availability of water for irrigation and household consumption increased during water-scarcity months, through water management technologies such as diversion-based irrigation, gravity-fed irrigation-water tanks, and drip systems.
- Drudgery of women reduced due to improved access to water, fodder and alternative sources of income.
- Community participation in development programmes, especially of agriculture-dependent women, increased.

Directions for future development work in the region:

- Developing a streamlined intervention package and approach.
- Scouting and introduction of hill-specific technology to realise higher income and more productive assets, and ensure better resource management.
- Field-based adaptive trials around important livelihood support systems such as (i) agri-horti-forestry development (ii) livestock development (iii) water resource development (iv) drudgery reduction measures
- Introduction of combination of climate-smart technologies for building resilience of local communities.
- Creating a knowledge base and relevant documentation.
- Increasing mobilization of government and other resources to support scaling and replication of context-specific interventions.

✓ BAIF's Engagement in Climate Change

Building resilience to climate change is a new initiative of BAIF which is aimed at addressing risks of ecologically fragile zones, vulnerability of local communities and promotion of adaptation and mitigation measures. There is growing realization that the responses to alleviate climate-related adverse effects are not keeping pace when compared to the threats faced by rural communities. It is becoming increasingly evident that climate change and variability will have profound influence on key livelihood support systems and sectors on which rural communities depend and thus a comprehensive programme is essential. Recognizing the urgent need to work on these issues, climate change actions have been introduced within BAIF as a programme direction in light of changing development context and emerging development threats.

▪ Relevance of BAIF Activities in Climate Change

Although development projects of BAIF have not been directly addressing climate change issues in the past, the choice of interventions were such that they favorably impacted causative factors of climate change. Examples of this are:

- a. Livestock:** Stall feeding reduces vegetation loss and thereby increases carbon sinks; cross breeding of cattle for higher milk production results in fewer animals which means less emission of greenhouse gases.
- b. Crops:** Introduction of agroforestry systems increases biomass on farmland and serves as carbon sink; conservation of native landraces of crops such as *Indica* type rice enhances the gene pool available for climate adaptability.

c. Natural Resource Management: Water resources development favorably impacts soil-plant-water continuum and biomass production; sustainable harvest of Non-Timber Forest Produce helps protect forest resources by rural communities and prevent over-exploitation.

▪ **Climate Change Initiatives of BAIF Incorporated in Development Programmes**

- a. Understand climate change impact and coping strategies of farming communities;
- b. Introduce adaptation and mitigation strategies by incorporating climate smart technologies in livelihood programmes;
- c. Create climate change awareness among project beneficiaries; and
- d. Build internal capacity of the organization through training of staff.

Towards realising these aims, besides getting a few staff trained through short term trainings, BAIF has been interacting with Territorial Approach and Sustainable Knowledge (TASK) - a global Climate Change network based in France –to identified priority areas for BAIF to work on. Some of them are mentioned below:

- a. Climate friendly farming to produce more with less resources in terms of quantity and quality;
- b. Building adaptive capacity by maintaining Recovery tool kits' such as seed banks at village level;
- c. Recycling, resilience and restoration to minimize external energy input farming practices;
- d. Territorial climate planning with district as a unit to realize greater impact.

▪ **Project Implementation Experience**

As the climate-focused programme of BAIF is still at an early stage, it is mostly funded internally. However, there are many field-level actions that are covered as part of on-going livelihood enhancement projects. **A recent project, sponsored by the international programme on Climate Change, Agriculture and Food Security (CCAFS), had exclusive focus on Climate Change. This project assessed farmers' preferences and their willingness to pay for Climate Smart Technologies in Diverse Rainfall Zones of India.** This study, conducted in 27 villages of Rajasthan and Madhya Pradesh states, had a sample of 908 farmers.

APPENDIX 1

ENVIRONMENT AND SOCIAL MANAGEMENT PLAN- PROPOSED MECHANISM

Project/Programme Category:	REGULAR/SMALL SIZED PROJECT
Country/ies:	INDIA
Title of Project/Programme:	CLIMATE SMART ACTIONS AND STRATEGIES IN NORTH WESTERN HIMALAYAN REGION FOR SUSTAINABLE LIVELIHOODS OF AGRICULTURE-DEPENDENT HILL COMMUNITIES
Type of Implementing Entity:	NIE
Implementing Entity:	NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT (NABARD)
Executing Entity/ies:	BAIF DEVELOPMENT RESEARCH FOUNDATION
Amount of Financing Requested:	US\$ 969,570 (in U.S Dollars Equivalent)

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1.0 INTRODUCTION

The entire Himalayan zone, including the high mountains, the foothills and the Tarai area, constitutes an extremely fragile ecological zone. The economy of the IHR is predominantly rural and highly dependent on climate sensitive sectors like agri-horticulture and livestock; other economic activities are limited. Agriculture is mostly practiced on sloping lands and small parcels of terraced lands and relies entirely on the seasonal rainfall. Owing to the very small land holdings, families rely heavily on natural fodder resources including the forest areas to feed their livestock. There is continuous degradation of natural resources to meet the various needs of its growing population

This already stressed situation has been further aggravated in recent times by the effects of climate change. Increasing variation in precipitation (both rainfall and snow), and temperature has altered the soil moisture availability, plant phenology and viable altitudinal range, and pest susceptibility. These effects are likely to be exacerbated due to the impacts of climate change, such as increased temperature, altered precipitation patterns, episodes of drought, and biotic influences.

The climatic condition of Uttarakhand varies greatly due to variation in altitude and proximity towards the Himalayan ranges. As indicated in the *Uttarakhand State Action Plan for Climate Change, 2012*, climate change induced changes are already being experienced including receding glaciers and upwardly moving snowline, erratic rainfall, irregular winter rains, reduction in snow in winter, rise in temperature, increasing intensity and frequency of flash floods.

2.0 PROJECT DESCRIPTION

The project location is 10 villages/ gram panchayats in Champawat and Pati Block of Champawat District of Uttarkhand. As per the secondary information, 60 percent of the total households (1,337) are below the poverty line²⁰. All the households residing in these villages are small and marginal farmers have an average landholding of 1.11 ha. The project participants would include 800 vulnerable small and marginal farming families whose livelihoods are solely dependent on primary sectors such as agriculture and livestock

The project aims to improve the adaptive capacity of rural small and marginal farmers including hill women in North Western Himalayan region by introducing a combination of Climate Smart Farming Technologies along with required social engineering and capacity building processes. These packages of activities is expected to improve /sustain the

²⁰ **The Poverty Line** is an [economic benchmark](#) and [poverty threshold](#) used by the [government of India](#) to indicate economic disadvantage. India's official poverty line, in 2014, was ₹972 (US\$15) a month in rural areas.

livelihoods of vulnerable hill communities, show ways of diversification of income while also initiating the process of natural resource management in the region.

3.0 PROJECT COMPONENTS

The project comprises of three components, namely, community mobilisation & organisation; introduction of water resource development and climate smart technology and knowledge management. Component wise project activities have been designed as under:

Project Components	Activities
Component 1: Community Mobilization and Organization	1.1: Local level awareness generation and mobilization of the community for climate related hazards.
	1.2: Strengthening of CBOs/POs for adaptation to climatic vulnerability
Component 2: Introduction of Water Resource Development and Climate Smart Farming Technology	2.1.1 Creation of water reserves in regions through rain water tapping interventions
	2.1.2 Adoption of efficient water use practices and technologies
	2.2 Introduction to climate smart farming technologies with hill specificity
	2.3 Introduction of improved breeding service at door step of farmers with required management practices including fodder and feed management
Component 3: Knowledge Management including knowledge creation and wider dissemination actions	3.1: Knowledge generation through field action component
	3.2: Wider dissemination of acquired knowledge

4.0 BRIEF OVERVIEW OF RISKS AND MANAGEMENT MEASURES

The main purpose of ESMP is to explicitly understand the environmental and social risks on account of implementation of the proposed projects and to initiate appropriate mitigation measures. As seen from the table number 19, there are few risks associated with the project/sub-projects. For project components having minor risks, a management plan is already included as a project strategy. A screening process has been used to identify potential environmental & social impacts and risks, taking into consideration the AF's social and environmental principles as indicated below: A brief overview of the project risks identified based on ESP and mitigation measures as a part of project implementation is presented below:

4.1 Compliance with the law:

There are no activities which are against legal framework as laid down in India in this project. The project complies with Environment (Protection) Act, 1986 and Forest Conservation Act, 1980. Most of the activities proposed are in line with the legal bindings of a country and sub regions.

4.2 Access and Equity:

Limited or no access to different sections of population particularly marginal and vulnerable groups, non-observation of principle of equity are the possible risks

The project will undertake an assessment of the Access and Equity in respect of marginalized and vulnerable groups during the implementation stage. The project envisages providing access to three types of vulnerable populations i.e. Small and Marginal Farmers, Women headed households and Scheduled Caste households and this aspect is proposed to be monitored regularly.

The project envisages provision of fair and equitable access to the project beneficiaries in terms of alternate climate resilient livelihood options including provision of clean water and renewable energy options.

It shall be ensured that the project is not impeding access to any of the other requirements like health, clean water, sanitation, energy, education, housing, safe and decent working conditions and land rights.

The project activities are aimed at vulnerable and agriculture dependent households of selected region. To ensure access to fodder resources and equitable distribution, Silvi-pasture Management Committees (SMC) will be formed in each village, where participants will be made aware about the program and participants' role in its implementation and management.

For implementation of natural spring, a Village Committee will be formed which will consist of farmers and members of Village Panchayat and technical expert from Research Institute. It will ensure maximum coverage of the families living in the recharge zone and benefitting from this activity. After finalization of recharge zones and micro-planning of the water-harvesting structure in each village, a Water User Group will be formed which will consist of users of water under the particular activity.

Access and Use of Common Properties

Realizing the importance of vanpanchayats in fodder production for better milk yields the project plans to develop the vanpanchayats into community pasture lands following the principle of silvi-pasture through people's participation. For smooth operation of vanpanchayats, Silvi-pasture Management Committees (SMC) will be formed in each village, where participants will be made aware about the program and participants' role in its

implementation and management. All the physical work involving labor for development of Vanpanchayats into community Silvipasture will be done by members of the SMC from the village itself and they will be paid a fix amount against each activity by the SMC.

For selection of sites for natural spring rejuvenation and other operational issues, a Village Committee will be formed which will consist of farmers and members of Village Panchayat and technical expert from Research Institute. It will ensure maximum coverage of the families living in the recharge zone and benefitting from this activity. After finalization of recharge zones and micro-planning of the water-harvesting structure in each village, a Water User Group will be formed which will consist of users of water under the particular activity. Main responsibility of this user group will be operations and management of the water harvesting structure and sharing of benefits amongst the participants.

4.3 Marginlised and Vulnerable Groups

Non-inclusion/partial inclusion of marginalized and vulnerable groups in the programme, Non representation of these communities during consultation and selection for project interventions etc. are the likely risks identified

The project will focus on three types of vulnerable groups whose risks have been identified and accordingly project measures have been identified. Small and Marginal Farmers having lands less than 2 Ha, Women headed Households and Schedule Caste/Schedule Tribe Households are the three types of groups.

As a part of this project intervention, it is proposed to achieve farm diversification, reduce vulnerability, and promote environmentally sound and sustainable livelihoods for food security and risk mitigation, to ensure better adaptation with changing climatic conditions without compromising on production and productivity levels. The activities will help in creating a long term asset base in villages, plus an enhanced natural resource base and also will help in creating livelihoods and income for vulnerable groups .The project is planned to have a positive social impact on the vulnerable communities in the project area.

Selection process of beneficiaries for various interventions shall take care to include proportionate representation of members from these vulnerable groups.

At the village level, project planning, implementation and monitoring will be done with the participation of all village level groups. Care will be taken to ensure that there is proper representation from different age groups, caste, class, religion and ethnicity of the villages. The major purpose of this process is (i) to provide a platform to participate in planning project interventions, implementing and monitoring; (ii) to provide space for women and marginalized communities to participate in decision making; and to (iii) create ownership of all project activities implemented in the village.

The following criteria will be shared with the villagers to identify project participants:

- Families with sole dependence on agriculture / primary sector which are climate sensitive as only source of income and livelihoods
- Families staying in remote hill areas ,where alternative livelihood options are limited
- Farmers with basic minimum resources to meet their livelihood requirements
- Women headed families where productive men have migrated to cities and thus females are taking care of farming and thus bear direct burden of degradation of natural resources due to falling effects of climate change /variability
- Poor households(Including Scheduled caste households) to be jointly identified by villagers using participatory processes (considering poverty and marginalization perspectives of the villagers

4.4 Human Rights

The project does not affect the life and liberty of any individual or group. Neither does the project discriminate against any particular community or group or persons on grounds of gender, caste, ethnicity, ability or birth. The project upholds the fulfilment of the human rights of the villages and the target groups that it seeks to work with.

However, due care will be taken not to violate human rights during implementation stage.

4.5 Women and Gender Empowerment

Inadequate representation of women in various committees, disproportionate selection of women beneficiaries and insufficient measures for empowerment through skill and capacity development etc., are the possible risks identified.

Project is planned to ensure participation by women fully and equitably, receiving comparable socio-economic benefits and those they do not suffer adverse effects. Towards this end, women will be involved in decision making process through adequate representation of women in various committees.

Capacity building of women also will be taken care of through appropriate training modules. Adequate representation of women beneficiaries will be ensured for capacity building activities like training, exposure visits,

Many interventions like water harvesting, livestock management, renewable energy etc. are going to have direct impact in reducing the drudgery of women. The above measures will ensure participation by women fully and equitably, receive comparable socio-economic benefits so that they do not suffer adverse effects.

Women will also gain in terms of reduced drudgery on account of increased availability of fodder, fuel and water, which are planned as important project measures

Under this project, climate smart agriculture interventions are planned to be able to provide gender sensitive adaptation response. The women have been identified as primary stakeholders of this project. Further, most of the activities are designed after considering hardship of women and steps are planned to improve the natural resource base and thereby improve direct and indirect gains for hill women.

Thus project measures such as water resource development, fodder development, improved vegetables under controlled conditions / poly houses have been planned as interventions which would help improved access and availability for hill women and thereby reduce the hardship.

Under the project, agro biodiversity conservation is identified as an important component, where women will play important role and will also benefit

Project is planned to ensure participation by women fully and equitably, receiving comparable socio-economic benefits.

4.6 Labour Rights

Non-adherence to minimum wage, hours of work, worksite facilities, child labour are the major anticipated risks

The project will ensure that core labour rights are respected and labour laws that are applicable to any site that employs casual labour are followed. Freedom of association and the effective recognition of the right to collective bargaining will be respected. The wages will be determined on task allotted and the wage rate will be calculated on the basis of prevailing minimum wage rate for the task. The record of work done for each labour engaged will have to be maintained and the wages paid accordingly. The hours of work and the timing of the working hours will be determined in consultation with the labour and the prevailing practices in the area. Resting place with shade, facility for drinking water, pre-determined resting period, presence of and access to first aid box will have to be made available at all working sites in the project.

Positive discrimination in favour of women may be used to provide fair and equal opportunity to women who seek employment as labour and gain from the wages earned by her. All forms of negative discrimination in respect of employment and occupation should be eliminated

Project should not engage child labour in any of its activities and all forms of forced or compulsory labour may be eliminated.

Name, designation and number of the concerned official of EE to whom the labour and employment related grievances can be addressed shall be displayed in the project area.

4.7 Involuntary Resettlement

The project activities like adoption of climate smart agriculture technologies through introduction of improved horticulture varieties, high value vegetable cultivation under poly-house, introduction of improved breeding services etc., are to be implemented at individual household level for improving their coping capacity through diversification of climate sensitive livelihood. As such these activities will improve the economic condition of targeted household and thereby arresting the need for relocation on economical or livelihood reasons.

The criteria for selection of sites for individual interventions will include the fact that in case there is any possibility or likelihood of involuntary resettlement due to project activities that particular site will not be selected. This factor will be included in one of the factors for ESI screening safeguards.

4.8 Species and Habitats

Alteration of landscapes, destruction of natural habitats are the likely risks in implementation of the project

The project will work on adoption of climate smart agriculture technologies through introduction of improved horticulture varieties (600 families), high value vegetable cultivation under poly-house, introduction of improved breeding services etc. These activities will be carried out in the farmers' fields without any disturbance to the existing wildlife habitats and flora and fauna. The impact on habitats and species as a result of project related activities will be low and localized and will not affect the ecology of the region. On the other hand there is emphasis on the conservation of natural habitat through regeneration of community pastoral lands (Vanpanchayats) which are in the state of degradation. Project has a component to restore such habitats by adopting both mechanical and biological measures, which will set in process of natural regeneration leading to eventual restoration of various ecosystem services

4.9 Conservation of Biodiversity

Non-consideration to Biological Diversity Conservation and revival while implementing the project activities are the possible risks.

Conservation, revival and adoption of climate resilient indigenous food crops as risk mitigation and food security measure is one of the sub-components of the project. The main objective behind promoting agro-biodiversity is to conserve and revive diverse, native and sturdy crop cultivars with relevance to local foods and nutrition security, which can withstand the climate change and related vulnerability arising from that.

The activity is to be implemented by participatory approach in which sub activities include collection, fairs, pot cultivation, field cultivation, seed banks, etc. The project therefore is in fact promoting biodiversity. The project will not be introducing any exotic or invasive species of crops/animals in the project area.

In case of livestock intervention, care may be taken to see that activities lead to scientific management, fodder and feed development and improved feeding, use of de-worming and vaccination. The project may ensure not to use vaccines like Diaclofanac which are banned as per government order in 2006

4.10 Pollution preventions & resources:

Waste Disposal

The project activities especially related to construction of polyhouse and procurement of saplings of fodder/fruit trees in plastic bag may generate some amount of plastic wastes. Although, quantities of such wastes are minimal, proper disposal mechanisms of these non-degradable wastes will be incorporated as part of project strategy.

Water Quality

The quality of water from the spring rejuvenation is expected to be one of the best as the collection is through natural processes. Further, better infiltration of water on account of soil and water conservation activities in the catchment area, is expected to improve the physical quality of water in the springs. By and large use of fertilizers and pesticides in the project area is far less than the national average and hence possibility of chemical contamination is very low.

As regards, water harvested from roof, system of gravel filter has to be built in the design for improving the physical quality of the water.

Water Resource

Ground water will be positively impacted due to better recharge in the catchment area of the springs due to catchment area treatment. No adverse impact on ground water is visualized in development of natural spring

4.11 Public Health

Scientific technology developed by Bhabha Atomic Research Center (BARC) viz. 'Environmental isotopes $^{21}({}^{18}\text{O}/{}^{16}\text{O}, {}^2\text{H}/{}^1\text{H})$ ' will be used for identifying the recharge zone of drying springs and spring rejuvenation in the project area. Although application of the technology has no *health hazards*, *suitable precautions prescribed by BARC will be taken while applying the technology*. Services of qualified and experienced Scientists from BARC laboratory in HESCO-Dehradun campus, will be utilized for administering the technology.

Notwithstanding the above, it is proposed to assess the E&S risk on account of usage of isotopes for identification of recharge zone during implementation stage.

4.12 Physical and cultural infrastructure

There is no plan for any alteration to physical and cultural heritage in this project. On the contrary the project mentions need to revive traditional wisdom and useful climate smart agriculture traditions of local communities

4.13 Soil Conservation

The topography of the project area is undulating and in the absence of vegetative cover the rate of soil erosion is high. Most of the project interventions such as planting of horticulture and fodder trees, revival and conservation of indigenous crops etc., are aimed at improving crop coverage in the area, which in turn is expected to protect the land from further soil erosion.

In the catchment area of springs which are proposed to be regenerated, various treatments such as staggered trenches, creation of small ponds, and vegetative plantation will be undertaken thereby reducing the rate of soil erosion.

5.0 Mechanism for Risk Identification and Management

Project components under community mobilization and organization and knowledge management are not likely not have any adverse impact on environment or social wellbeing of the project area/project beneficiaries and hence no screening is envisaged for these activities.

The project will have three layers of environmental safeguards to the project and the sub projects that will be developed there under:

(a) Adoption of General Environment Safeguard by the project related to species and natural habitats; bio diversity; physical and cultural infrastructure.

²¹ "Environmental isotopes : www.academia.edu/5585470/Hydrological_Studies_Using_Isotopes

(b) Conformation of the activity specific ESMP to the technical guidelines and specifications such as prescriptions of BARC for administration of isotope, Soil Conservation Department for treatment of the catchment etc.

(c) Screening of ESI and preparation of ESMP for project activities. The ESI and ESMP will be prepared and presented in the format given in Format 1 and 2 of this document. Each of the ESI and ESMP will be prepared through an internal process by the EE. This screening process will score the activity on each of the environment and social parameters and based on the recommendations of the Technical Advisory Group. The activity that fails the score will not be funded.

5.1 Consultations and Public Disclosure

Consultations of key stakeholders will be undertaken as part of the screening of the Environment and Social Impact (ESI) and finalization of Environment and Social Management Plan (ESMP) of each of the activities under the proposed project.

The aim of consultations will be to disseminate information about the activity; verify the identification of potential impacts (ESI) and their proposed mitigation plan (ESMP); verify the significance of the impacts and the mitigation measures; and allow the stakeholders to express their concerns and opinion about the project activities. The consultations will be conducted at two levels: one, at the village level; second, at the state level.

5.1.1 Village Level Consultation

The screening of ESI and ESMP of the respective activities will be placed in the meeting of the Gram Sabha for comments and approval. A formal presentation of the ESI and ESMP will be made at the Gram Sabha meeting. Given the low levels of literacy the presentation of the ESI and ESMP will be undertaken orally and the comments of the members present will be recorded.

5.1.2 State Consultation

A consolidated statement on the ESI screening and ESMP will be placed in the Technical Advisory Group. The members will be facilitated to undertake field and undertake sample verification of the activity prepared under the project. The TAG can also outsource sample verification to a consultant that will report directly to the TAG. **State level consultation enables in identification of overall environmental and social risks at the project level.**

5.1.3 Public Disclosure

A copy of the ESI screening and ESMP will be submitted to the office of the Gram Panchayat where it can be accessed by any member of the village for future references. The activity will

form part of the documentation that will be in public domain and will be available at the district project offices for inspection with prior information. Public disclosure, particularly, is expected to bring out those risks of sub-projects which remained unidentified.

The Executing Entity is responsible for disclosing the final environmental and social assessment to project-affected people and other stakeholders. Project/programme performance reports including the status on implementation of environmental and social measures shall be publicly disclosed. Any significant proposed changes in the project/programme during implementation shall be made available for effective and timely public consultation with directly affected communities

6.0 Implementation Arrangements for Mitigation/Management Actions

The implementation arrangement includes the distribution of roles and responsibilities in the preparation of ESI and in the implementation of ESMP. The key players and their responsibilities will be as follows:

Organisation/ Designation	Responsibilities
Senior Technical Member of the Project Team	<ul style="list-style-type: none"> • Screening of ESI and preparation of ESMP through the process of community consultation and visit to project sites. • Coordinate with experts in geo-hydrology, agriculture engineering, and BARC Scientists for the assessment of impact. • Presentation of results of ESIs and ESMPs in the Technical Advisory Group (TAG). • Oversee implementation of ESMP that will be undertaken by Junior Technical members and Field Associates.
Junior Technical Member and the Field Associates of the Project Team	<ul style="list-style-type: none"> • Assist the Senior Technical Member in the screening of the ESI and preparation of ESMP at the project sites. • Presentation of results of ESI and ESMP in the meetings of the Gram Sabha./Gram Panchayat • Implementation of the ESMP at the village level.
Project Coordinator at the State level	<ul style="list-style-type: none"> • Monitor the progress and quality of ESI and ESMP • Ensure that the protocol for the presentation and placement of a copy of the reports of ESIs and ESMPs are placed in the Gram Sabha and the respective Gram Panchayat
Technical Advisory Group	<ul style="list-style-type: none"> • Technical Advisory Group reviews reports of ESIs and ESMPs. It can also undertake sample checks and give expert opinion on the quality of ESIs and the

	mitigation measures identified in ESMPs.
NIE (NABARD)	<ul style="list-style-type: none"> • Monitor and review the process of ESI screening and ESMP • Review the prepared ESI reports to ensure they conform to acceptable standards and quality • Sample check and verify the ESI and ESMP in the project villages

6.1 Project level Overall ESM Arrangements

The Job Descriptions and Performance Management systems of the respective project staff will include their responsibilities related to preparation of ESI Screening and implementation of ESMPs. Similarly, the Terms of References that will be developed for the Technical Advisory Groups will include their role and responsibility in ensuring that the project develops ESI Screening that includes environmental and social safeguards and implement ESMP to enhance the environmental and social impacts at the village level.

6.2 Capacity Development

The project staff will be given one training to undertake screening of ESI and preparation of ESMP in respect of spring rejuvenation.

7.0 Monitoring and Reporting

The monitoring will be undertaken by the Project Executing Agency. Each of environment and social parameters will be monitored along with the implementation of their mitigation measures. The Executing Agency will submit a Compliance and Impact Monitoring Report to the NIE every six months and the consolidated report will also be annexed in the Annual Report.

Role of NABARD as NIE: NABARD in the capacity of NIE, in accordance with its ESM system, will be closely involved in monitoring and review of ESI screening and implementation of ESMP. ESI reports will be reviewed to ensure they conform to acceptable standards and quality. NIE will also be involved in sample check and verification of the ESI and ESMP in the project villages.

- Details on specific oversight for issues related to ESS taken up by NABARD are given below:
 - Access and equity (selection of beneficiaries)
 - Marginalized and vulnerable groups (non-inclusion / partial inclusion)
 - Gender and women empowerment (disproportionate representation, negative discrimination)

- Involuntary settlement (specific to common structures and its impact, if any, on resettlement – physical / livelihood)
- Public health (use of isotopes and application of standards for its use to avoid any negative impact)

NABARD Appraisal visit and Assessment: The environmental monitoring will be done by NABARD which will ensure that the effective application of the measures produce the desired effects on the basis of the monitoring indicators defined and listed in the environmental and social management plan. The field monitoring and reporting would involve components related to environmental and social risk screening processes, ESS documentation at EE level, effectiveness of grievance mechanism, public disclosure and reporting.

Specific to the risks identified related to access and equity, marginalized and vulnerable groups, gender equity and women, for selection of beneficiaries will be closely monitored and supervised by NABARD through its District level Offices to ensure to the adherence to the selection criteria.

In order to ensure avoidance of any kind of involuntary settlement due to project activities, NABARD proposes to scrutinize the site plans prepared by EE before commencement of the work.

8.0 Implementation Schedule

The implementation Schedule of the ESMP will be as follows:

Activities	Time											
	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Development of Technical Guidelines for the Project												
Capacity Building of Project Team												
ESI screening of spring rejuvenation												
ESMP of spring rejuvenation												
Implementation of ESMP												
Monitoring and Reporting of ESMP												

9.0 COST FOR ESIA AND ESMP

The preparation and implementation of ESI and ESMP in respect of project activities will have costs that have been built in to the project budget. The cost implications and their source of funds are as follows:

ESIA/ESMP related activity	Source from where Cost will be met
Capacity Building of Project Team	Built in to Project activities cost under Component I B (ii) i.e. Training on suggested technologies for participants and staff
Screening of ESI and preparation of ESMP	Built in the Programme Execution Cost
ESMP	Built in to Project Activities Cost (Component 4)
Mitigation Measures	Built in to the Project Activities cost (Component II A (I)
Monitoring and Reporting	Built in the Programme Execution Cost

10.0 GRIEVANCE MECHANISM

The Executing Entity will establish a grievance redress mechanism early in the project implementation phase. EE will plan Grievance Mechanism to provide people affected by projects/programmes supported by AF with an accessible, transparent, fair and effective process for receiving and addressing their complaints about environmental or social harms caused by any such project.

This will be set up at the level of local village, in which any person aggrieved by any aspect of the Project can lodge an oral or written grievance to local authorities who are involved in project implementation.

If the aggrieved person is not satisfied with the outcome of initial stage consideration, or if local level review is unable to reach a proposed solution, the aggrieved person can refer the issue to EE will keep a record of all complaints referred to the grievance committee, including a description of issues raised and the outcome of the review process. Complaints regarding environmental and social issues of the project can be filed at the Office of the Executing Entity with a copy to NIE in writing. A system of monitoring the action taken and disposal of such complaints shall be put in place.

Name, designation and number of the concerned official of EE to whom the project activity related grievances can be addressed will be displayed in the project area.

Will set up system to receive and facilitate resolution of specific concerns of affected communities and project participants regarding environmental and social performance.

- All the project villages will have display board stating the name of the project and names of NIE and Executing Agency. The names of contact persons and their mobile numbers will also be displayed on these boards.
- The village committee and gram panchayat which finalizes the interventions will proactively disclose the grievance mechanism that exists in the project. To maintain consistency across villages a pamphlet related to the project comprising of the grievance mechanism will be printed and distributed in the village committee meeting. A copy of the pamphlet will be kept in the office of the Gram Panchayat so that it can be accessed during the course of project implementation.
- All grievances received either orally or in written form will be recorded in the Complaint Register maintained in the cluster office. Each such complaint will be identified by a complaint number and will be followed up and the resolution of the grievance will also be recorded. A consolidated statement of complaints received and resolved will be reported in the State Steering Committee.
- Information related to grievance mechanism will be provided in the language that is easily understood by the members of the village community.

FORMAT 1

FORMAT OF SCREENING OF ENVIRONMENTAL AND SOCIAL IMPACT OF PROJECT ACTIVITIES

1. PROJECT DESCRIPTION

- 1.1 Description of the proposed operation
- 1.2 Maps and diagrams of the project site
- 1.3 Area that will be affected and impacted
- 1.4 Settlements that will be affected
- 1.5 Population that will be affected (attach list of households)

2. Baseline Condition

- 2.1 Description of existing environmental and social condition
- 2.2 Attach PRA maps and other data that has been collected

3. Impacts and Risks

The assessment will be in terms of (a) Direct Environmental Risks; (b) Direct Environmental Impacts; (c) Indirect Environmental Risks; and (d) Indirect Environmental Risks on the following issues.

- 1. Access and Equity
 - 1.1. Access and Use of Commons
 - 1.2. Access to livelihoods
- 2. Vulnerable Groups
- 3. Human Rights
- 4. Gender and Women Empowerment
- 5. Labour Rights
 - 5.1. Workers Safety
- 6. Involuntary Resettlement
- 7. Species and Habitats
- 8. Bio diversity
- 9. Pollution preventions
 - 9.1. Waste Disposal
 - 9.2. Water Quality
 - 9.3. Soil Disposal
 - 9.4. Water Resources
- 10. Public Health
- 11. Physical and Cultural Infrastructure
- 12. Soil Erosion

4. Analysis of Alternatives

Description of alternatives that were identified and their assessment in terms of:

- (a) Direct and Indirect Environment and Social Impact
- (b) Opportunities for enhancing environmental and social benefits

5. Recommendations

Risk Management options in terms of:

- (i) Preventing Risk
- (ii) Avoiding Risk
- (iii) Mitigating Risk
- (iv) Transferring Risk
- (v) Absorbing Risk

6. Process Note for screening of ESI

6.1 Consultations held with different stakeholders in the community

6.2 Consultations held with women

6.3 Consultations held with Panchayat Representatives

6.4 Consultations held with Experts/Scientists

Format 2

FORMAT FOR ESMP OF PROJECT ACTIVITIES

1. Management Plan

Environment And Social Risk Parameter	Specific Risks	Mitigation Measure	Implementation Schedule for the mitigation measures	Responsibility for execution of the mitigation measures
1. Access and Equity				
1.1. Access and Use of Commons				
1.2. Access to livelihoods				
2. Vulnerable Groups				
3. Human Rights				
4. Gender and Women Empowerment				
5. Labour Rights				
5.1. Workers Safety				
6. Involuntary Resettlement				
7. Species and Habitats				
8. Bio diversity				
9. Pollution preventions				
9.1. Waste Disposal				
9.2. Water Quality				
9.3. Soil Disposal				
9.4. Water Resources				
10. Public Health				
11. Physical and Cultural Infrastructure				
12. Soil Erosion				

2. Consultation and Public Disclosure

The plan for consultation and public disclosure of the ESMP will be recorded here. The plan will be for:

- (a) Consultations for preparation and implementation of ESMP
- (b) Consultation with women of the village community
- (c) Notification to village community when will the activities be implemented
- (d) Disclosure of Monitoring and Sub Project Completion report

3. Monitoring Plan

The monitoring plan will comprise of the parameters for monitoring and the frequency with which the monitoring will be carried out. The recording and reporting procedures will also form part of the monitoring plan.

Mitigation Measure	Monitoring Parameter	Responsibility for monitoring	Recording and Reporting Frequency
1. Access and Equity			
1.1. Access and Use of Commons			
1.2. Access to livelihoods			
2. Vulnerable Groups			
3. Human Rights			
4. Gender and Women Empowerment			
5. Labour Rights			
5.1. Workers Safety			
6. Involuntary Resettlement			
7. Species and Habitats			
8. Bio diversity			
9. Pollution preventions			
9.1. Waste Disposal			
9.2. Water Quality			
9.3. Soil Disposal			
9.4. Water Resources			
10. Public Health			
11. Physical and Cultural Infrastructure			
12. Soil Erosion			