

DETAILED PROJECT REPORT

**Scaling-up Climate Resilient Agriculture Practices towards Climate
Smart Villages in Haryana**

Submitted by:
Department of Agriculture
Government of Haryana

Technical support:
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

May, 2016

For

NATIONAL ADAPTATION FUND FOR CLIMATE CHANGE (NAFCC)

Contents

PROJECT SUMMARY	3
1. PROJECT BACKGROUND	4
1.1 Project/ Programme Background and Context:	4
1.2 Project Objectives:	13
1.3 Details of Project/ Programme Executing Entity:	14
1.4 Project / Programme Components and Financing:	17
1.5 Projected Calendar:	19
2.0 PROJECT / PROGRAMME DESCRIPTION AND JUSTIFICATION	19
<i>Component 1: Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions</i>	21
<i>Component 2: Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies</i>	21
<i>Component 3: Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains</i>	22
<i>Component 4: Implementing/Innovating science based suitable climate change adaptation strategies/ practices</i>	22
<i>Component 5: Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing</i>	23
3.0 IMPLEMENTATION ARRANGEMENTS	37

PROJECT SUMMARY

Title of Project/Programme:	Scaling-up Climate Resilient Agriculture Practicestowards Climate Smart Villages (CSVs) in Haryana
Project/Programme Objective/s:	To improve the adaptive capacity of rural community to climate change through enhancing the portfolios of climate resilient agriculture interventions in targeted villages of Haryana
Project/ Programme Sector:	Agriculture
Name of Executing Entity/ies/Department:	Department of Agriculture, Government of Haryana
Beneficiaries:	Farming community of Haryana(Approximately, 300 families/village will be the target beneficiary, amongst which 35%of the overall beneficiary under the project would be women)
Project Duration: Start Date: End Date:	3 years October 1, 2016 (tentative) September 30, 2019(tentative)
Amount of Financing Requested (Rs.):	24,05,16,000
<u>Project Location</u> State: District:	Haryana Yamunanagar, Ambala, Kurukshetra, Karnal, Jind, Kaithal, Panipat, Sonipat, Sirsa and Fatehabad (Total 75,000 families in 250 villages will be covered under 10 districts)
Contact Details of Nodal Officer of the Executing Entity/ies/ Email: Mobile:	Shri Suresh Kumar Additional Director Agriculture (Extension), Department of Agriculture, Government of Haryana, Krishi Bhawan, Sector-21, Panchkula Tel (O):0172-2563004 Fax (O): 0172-2563004 Mobile: +91 9466111156 Email: adaext2014@gmail.com

1. PROJECT BACKGROUND

1.1 Project/ Programme Background and Context:

a) Provide brief information on the problem the proposed project/programme is aiming to solve

Anthropogenic activities are the dominant cause for changes in climate since 1950s as brought out by the 5th Assessment report (AR5) of Intergovernmental Panel on Climate Change (IPCC). These activities are leading to shift in various climatic parameters such as warming of atmosphere, oceans and land; diminishing of snow and ice cover; sea level rise etc. Scientific study conducted by India predicts that the annual mean surface air temperature of the country may rise from 3.5°C to 4.3°C by the end of the century. This has various implications on water availability, oceanic acidification, food production etc. Major impacts on agriculture sector are increased risk of water scarcity and food shortage causing malnutrition particularly for poorer populations in urban and rural settings.

Haryana, came into existence on 1st November, 1966, is a landlocked state in northern India. It is located between 27°39' to 30°35' N latitude and 74°28' and 77°36' E longitude. State has a geographical area of 44,212 km² (1.4% of country). As per 2011 census of India, the state is eighteenth largest by population with 25,353,081 inhabitants with a small and marginal farmers population of approx. 1,93,000. State is divided into 21 districts, 62 sub-divisions, 83 tehsils, 47 sub-tehsils and 126 blocks. District map of the state is at **Figure 1**.



Figure 1: District map of Haryana state

As per India State of Forest Report (2013), Forest Survey of India, forest and tree cover of the state is 6.49% of its geographical area. State has four main geographical features namely, Yamuna-Ghaggar plain (largest part of the state), Shivalik Hills to the northeast, Semi-desert sandy plain to the southwest, The Aravalli Range in the south.

The Yamuna river flows along the state's eastern boundary. Main seasonal river, the

Ghaggar rises in the outer Himalayas, between the Yamuna and the Satluj and enters the state near Pinjore in the Panchkula district. Another seasonal river Markanda river originates from the lower Shivalik Hills and enters Ambala.

Haryana is extremely hot in summer with a temperature of around 45 °C and mild in winter. The hottest months are May and June and the coldest December and January. Climate is arid to semi-arid with average rainfall of 354.5 mm. Around 29% of rainfall is received during the months from July to September, and the remaining rainfall is received during the period from December to February.

Key economic sector of the state is agriculture with a cultivated area of 36,160 km². Major source of irrigation is ground water (57% of the area is cultivated through ground water), followed by canal source of irrigation water (43% of area is cultivated through canal sources). Underground water found in the state is mainly brackish. Cultivated area has increased by 5.8% during 1950-2014. Trend in the cultivated area during 1950-2012 is shown in figure 2.

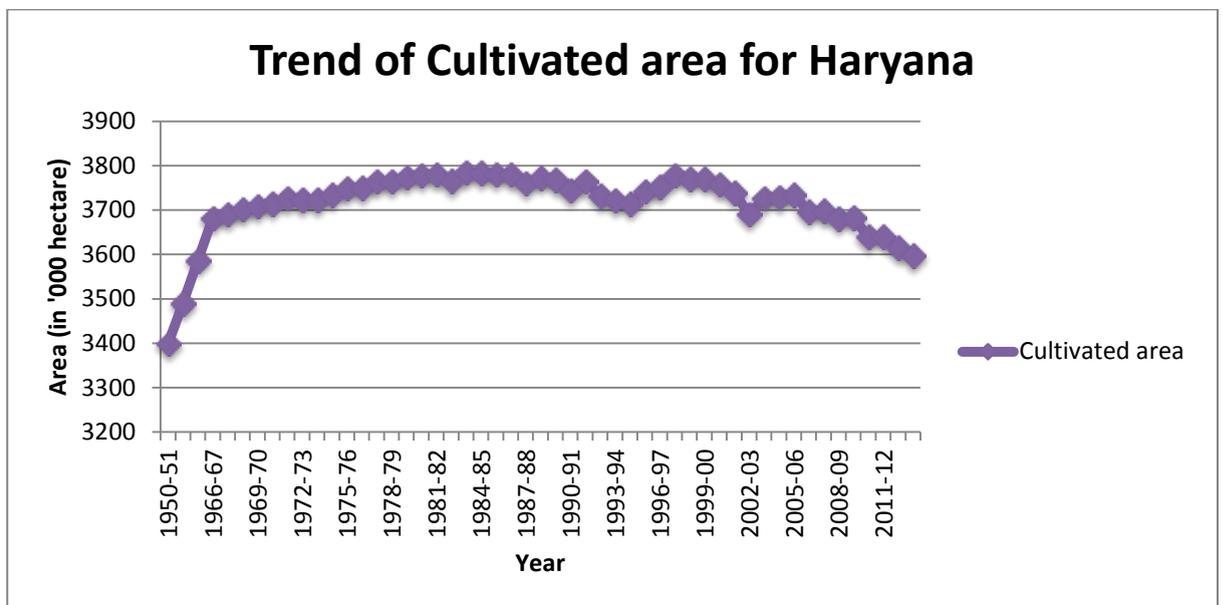


Figure 2: Trend in the cultivated area during 1950-2012 (Source: Census data for last 30 years for Haryana State)

There are two agro climatic zones in the state. The north western part is suitable for Rice, Wheat, Vegetable and temperate fruits and the south western part is suitable for high quality agricultural produce including tropical fruits, exotic vegetables and herbal and medicinal plants. Figure 3 shows the agro-climatic zones of the state.

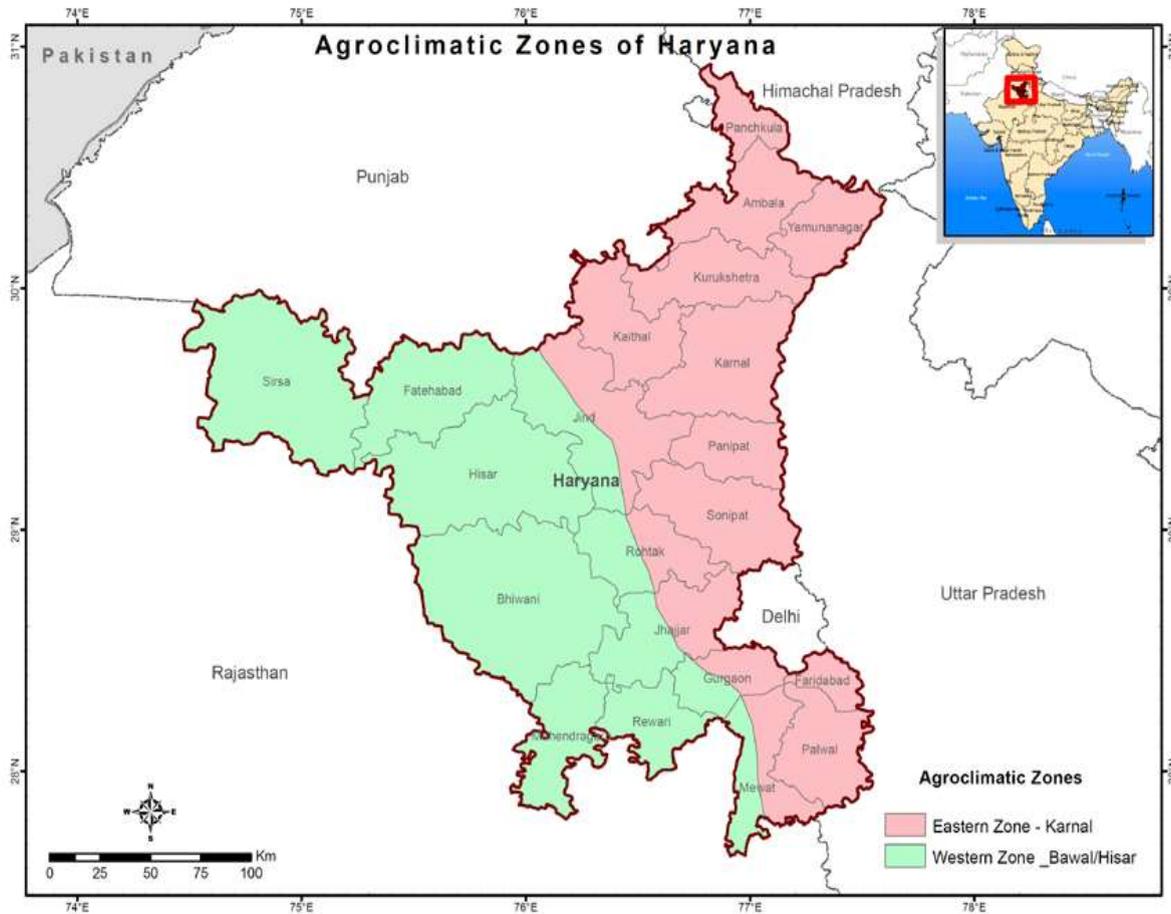


Figure 3: Agro-Climatic zone of Haryana state

The livelihood of major population is based on agriculture which is largely impacted by the effects of climate change. Major implications are weather variability; crop season shifting, temperature alterations and precipitation patterns which affect different aspects of crop production and integral agricultural ecosystem rising temperature and erratic rainfall (Haryana SAPCC-2011). Due to increased requirement of water for irrigation by agricultural crops, groundwater resources are being overexploited (55 out of 108 blocks already overexploited in Haryana by 2009) because of excessive withdrawal of water for irrigation. Agriculture is also facing twin challenges of resource fatigue and decelerating productivity growth of cereal crops. There also exist large yield gaps more particularly 'management yield gaps'¹, ranging from 14-47%, 18 to 70% and 36 to 77% in wheat, rice and maize, respectively. Problem of the farmers of the state are further exaggerated due to following non-climatic stresses:

- Declining of soil organic carbon and increasing multiple plant nutrition deficiencies (N, P, K, S, Zn, Fe)
- Development of herbicide resistance and a shift in weed flora and pest populations
- Poor management of crop residues, leading to pollution through burning

In order to adapt agriculture to increasing effects of climate variability and change, there is a need to transform traditional agricultural practices to more climate resilient

¹Management yield gap includes crop loss due to poor management in farmer's fields. This can be enhanced through improved crop inputs and its application.

agricultural practices. Therefore, the project titled 'Scaling Climate Resilient Agriculture practices through mainstreaming Climate Smart Villages in Haryana' proposes to deal with the emerging challenges of climate change, through mainstreaming climate smart agricultural interventions and practices. Climate Resilient Agriculture practices include all possible methods that are required to make agriculture production system more resilient to climate change. This project proposes to sustainably intensify crops and cropping systems in Haryana for enhancing and sustaining production at lesser costs by adopting climate resilient technologies, without deteriorating soil health while maintaining the flow of environmental services. Therefore, these practices bridge the management yield gaps in dominant crops for ensuring food security, poverty alleviation, nutritional diet for all, rural development, enhancing productivity, improve environmental quality and preserve natural resources.

b) Outline the economic, social development and climate change in line with the State Action plan on Climate Change and relevant Missions under National Action Plan on Climate Change

The proposed project activities are in line with the interventions of the National Mission on Sustainable Agriculture (NMSA) under National Action Plan on Climate Change. NMSA aims to make Indian agriculture more resilient to climate change through developing new varieties of thermal resistant crops, new credit and insurance mechanisms and improving productivity of rain-fed agriculture. The proposed activity is also highlighted under the Agriculture Chapter of Haryana State Action Plan on Climate Change.

The project proposes for sustainable agriculture practices through adoption of climate change adaptation and mitigation practices such as conservation agriculture (CA) based management practices (zero tillage, DSR, residue management), cropping system optimization/diversification; decision support (Nutrient Expert) and sensor (Green-Seeker) based nutrient site-specific nutrient management, precision water management (laser levelling, micro-irrigation), stress resilient cultivars, seed and fodder banks powered with value-added weather forecasts; ICT based agro-advisories; capacity building and knowledge & experience dissemination to wider population.

The project has been piloted in 27 villages of Karnal district, Haryana, jointly by International Maize and Wheat Improvement Centre (CIMMYT), Department of Agriculture-Govt. of Haryana, National Innovations in Climate Resilient Agriculture (NICRA) project under Indian Council for Agricultural Research (ICAR), Krishi Vigyan Kendras (KVKs) and farmers cooperatives under the aegis of Climate Change, Agriculture and Food Security (CCAFS). The CSVs successfully adopted a portfolio of smart interventions that cover the full spectrum of farm household activities including smart practices for managing water, weather, nutrient, carbon, energy and knowledge. Based on successful implementation of CSVs in 27 villages, it has been realised that it will be scaled out in 250 villages of 10 districts in Haryana. Some pictures of the CSVs implemented are at **Figure 4**.



Figure 4: Picture of 27 CSVs piloted in Karnal, Haryana

c) Include climate analysis and vulnerability analysis

Major crop grown in Haryana are Rice, Wheat, Jowar, Bajra, Barley, Maize, Gram, Sugarcane, Cotton, Toria, Taramira, Sarson and Pulses. On comparing the trend of area under production, it has been inferred that crops such as Jowar, Maize, Gram, Sugarcane, Cotton, Toria, Sarson and Pulses grown in Kharif season shows a negative growth. Climate variability trends play an essential role in reduction in yield of the above crops. As per the Hundal and Kaur (1996), it is estimated that temperature increase of 1°C, 2°C and 3°C from present day condition, reduces the grain yield of maize by 10.4%, 14.6% and 21.4%. Similar trends of yield reduction are seen on the other crops. Trend in area under each crop during 2000-2010 is at **Figure 5**.

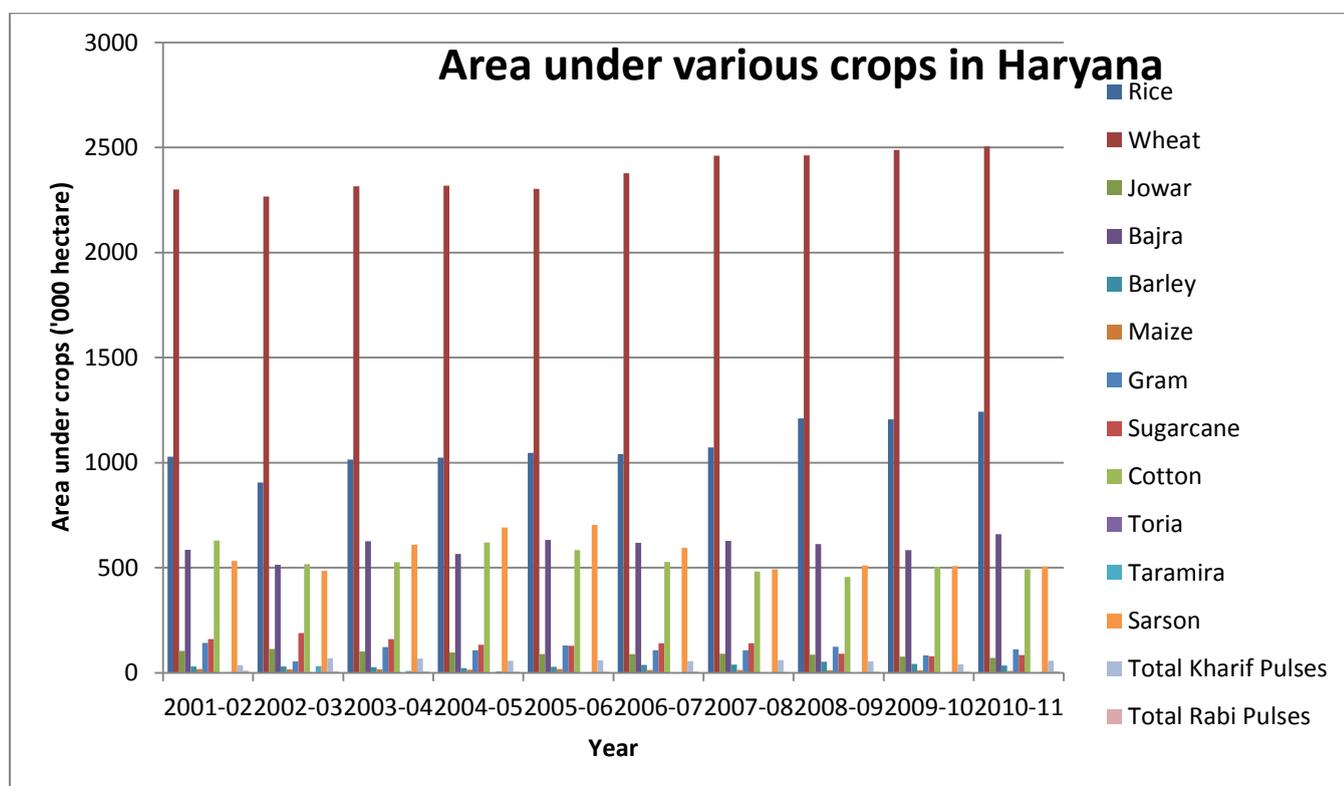


Figure 5: Trend in area under each crop during 2000-2010 (Source: DoA-GoH annual report 2000-2010)

Trends showing the dependence of agricultural crop on rainfall for irrigation is at **Figure 6**. It can be inferred that the crop has a high demand for rainfall which is not sufficient based on requirement. Further, there has been shift in monsoon patterns, which is another concern of the farmers, which destroys the crop due to its uncertainty.

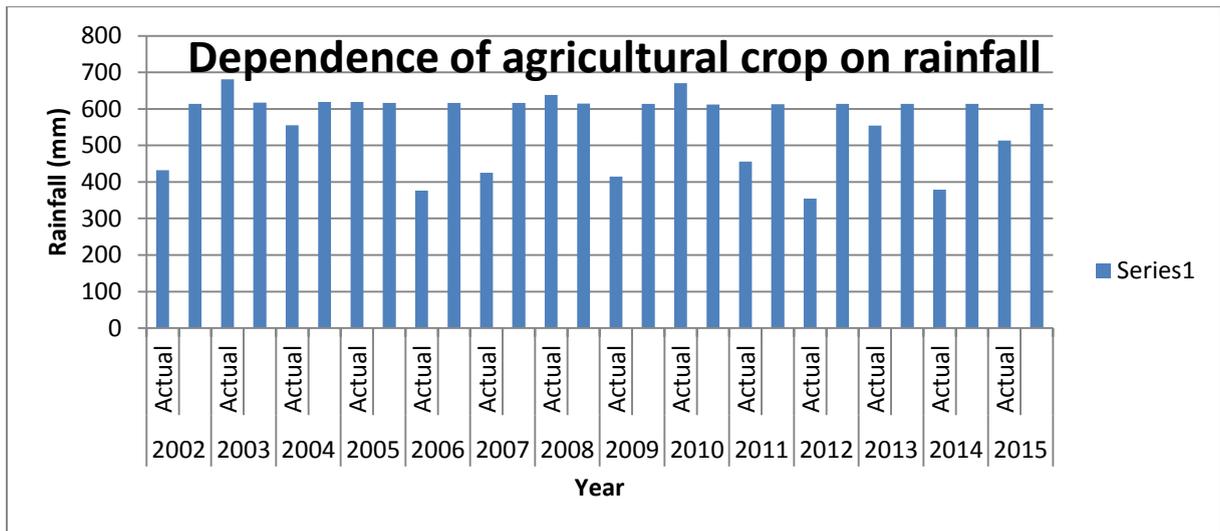


Figure 6: Dependence of agricultural crop on rainfall for irrigation (Source: DoA-GoH annual report 2002-2010)

As per the vulnerability study conducted by Indian Council of Agricultural Research conducted under the aegis of National Innovations in Climate Resilient Agriculture (NICRA) project, the districts of the Haryana are vulnerable to climate change. The northern half of Haryana had low normalized vulnerability (< 0.25) whereas it is higher in the southern districts of Faridabad, Mahendragarh, Bhiwani and Gurgaon (vulnerability ranging from 0.7 to 1.0) (Vulnerability of districts of Haryana due to climate change is at **Figure 7**).

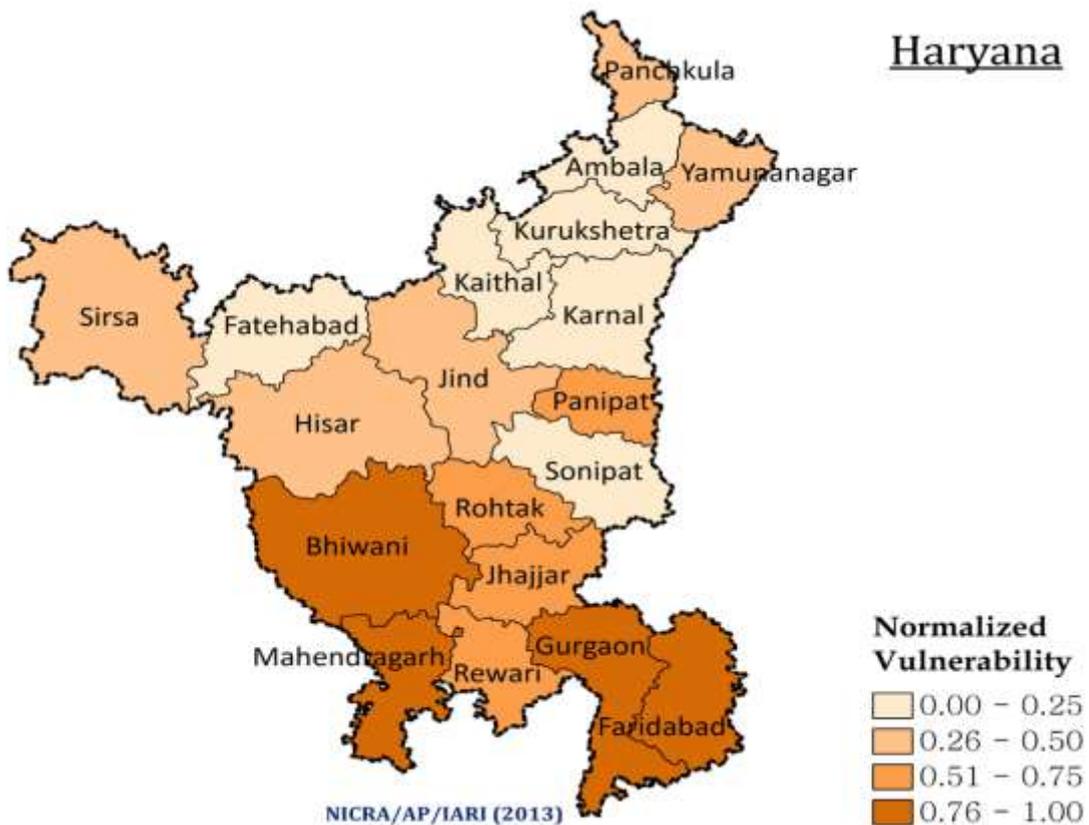


Figure 7: Vulnerability of districts of Haryana due to climate change

As per the District Level Assessment conducted by ICAR for 2050, it is projected that agriculture sector is likely to be severely affected due to climate change. Snap shot of

projected vulnerability of the districts of the state is at **Figure 8**.

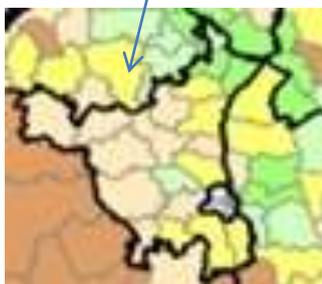
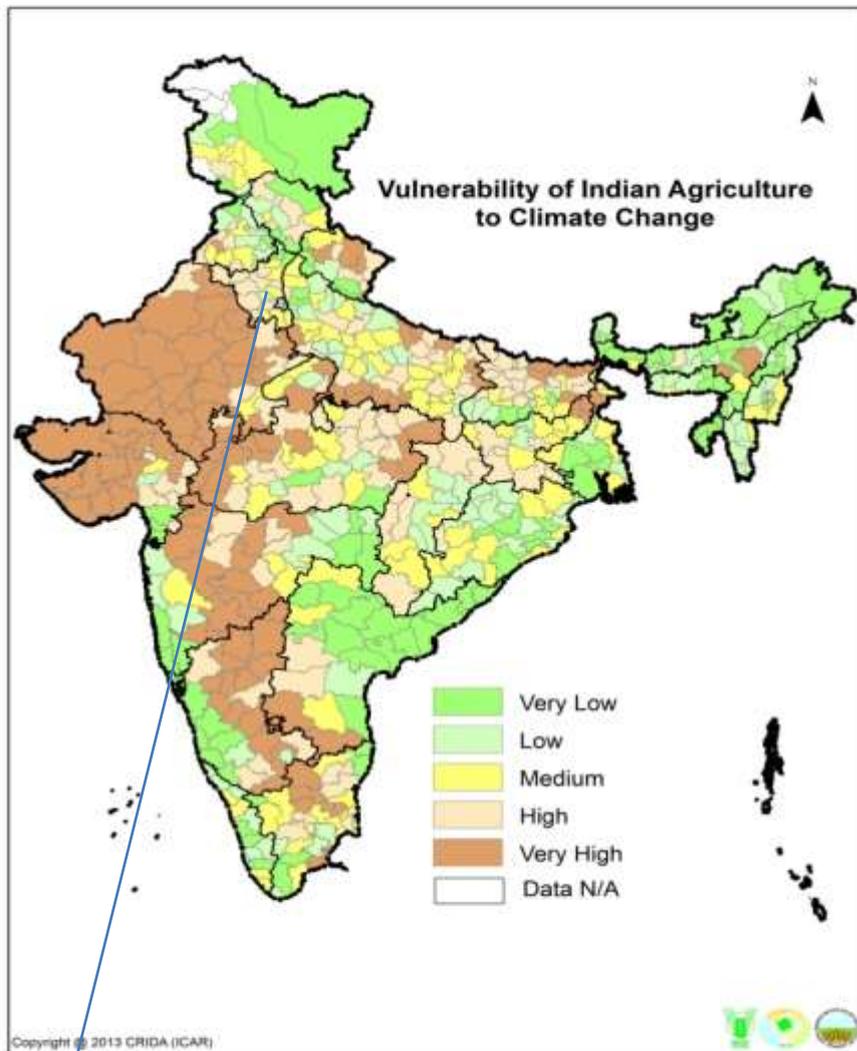


Figure 8: Projected vulnerability of the districts of Haryana

d) Project Location details – villages, block/ mandal, district.

The proposed project will be implemented in 250 villages of 10 districts namely, Yamunanagar, Ambala, Kurukshetra, Karnal, Jind, Kaithal, Panipat, Sonapat, Sirsa and Fatehabad. Location of the district is at **Figure 9**.



Figure9: Districts covered under the project in Haryana

The project will be implemented in northern part of Haryana. The areas are not equipped with water storage structures for agriculture resulting in low crop productivity and replacement of native climate adaptive crops with commercial crops. Further, farmers are also relying on ground water for fulfilling their water demand, leading to the reduction in ground water levels. Due to crop failure and inadequate water supply in the district, there is widespread distress migration of farmers. These areas have also been selected based on availability of water for agriculture purpose, farms having nutrient imbalance, farmers implementing residue burning.

1.2 Project Objectives:

The overall objective of the project is to improve the adaptive capacity of rural community to climate change through enhancing the portfolios of climate resilient agriculture interventions in targeted villages of Haryana. This objective is proposed to be achieved through following activities:

- Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions
- Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies
- Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains
- Implementing/Innovating science based suitable climate change adaptation strategies/ practices
- Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing

1.3 Details of Project/ Programme Executing Entity:

a) Name, Registration No. & Date, Registered Address, Project Office Address

Name and address (Registered and Project office):

Shri Suresh Kumar
 Additional Director Agriculture (Extension),
 Department of Agriculture,
 Government of Haryana,
 Krishi Bhawan, Sector-21, Panchkula
 Tel (O): 0172-2563004
 Fax (O): 0172-2563004
 Mobile: +91 9466111156
 Email: adaext2014@gmail.com

Registration No. and Date:

b) Available technical manpower for the proposed project implementation:

i. Department of Agriculture, Govt. of Haryana

Sr. No.	Post / Designation	Numbers	Specialization	Nature of Job
1.	Additional Director Agriculture	5	M.Sc. / Ph.D in Agriculture	Extension / Mechanization /Implementation of Water Saving Techniques / Miscellaneous
2.	Joint Director Agriculture	4	-do-	-do-
3.	Deputy Director Agriculture	21	-do-	-do-
4.	Sub-Divisional Agricultural Officer / Subject Matter Specialist / Quality Control Inspector/ Assistant Plant Protection Officer / Assistant Cane Development Officer etc.	139	B.Sc. (Honors Agriculture) / M.Sc. (Agriculture) / Ph.D in Agriculture	-do-
5.	Assistant Agriculture Engineer	11	B.Tech. Agriculture Engineering	Mechanization
6.	Agriculture Development Officer / Block Agriculture Officer / Technical Assistant etc.	754	B.Sc. (Honors Agriculture) / B.Sc. (Statistics)	Extension / Mechanization /Implementation of Water Saving Techniques / Miscellaneous

c) Three largest Climate Change Adaptation Projects handled (if already implemented)

Project	Objectives	Amount Sanctioned (lakhs)	Implementing Agency	Geographical Coverage	Implementation Period & Outcome
Climate Smart Villages (CSV)*	To educate farmers about the interventions related to climate change.	--	CIMMYT, Department of Agriculture, Haryana, DWR, CSSRI	27 numbers of Villages in district Karnal	2013-14
Crop Diversification Programme (CDP)	Alternate crop demonstrations for the replacement of Water Guzzling crops (Rice) etc.	Approx. Rs. 15.00 crore	Department of Agriculture, Haryana	10 numbers of districts having Rice-Wheat Crop rotation	Since 2013-14

*Directly, none of the projects handled wererelated to climate change but indirectly department has handled the NRM based projects related to adaptation strategies with changing climate. CSV is an initiative by NICRA and CIMMYT and not under the purview of DoA.

d) Three largest community based NRM projects handled by the State / Central Government are:

Department of Agriculture is implementing following NRM based schemes and programmes:

- Rashtriya Krishi Vikas Yojna (RKVY): This scheme aims to draw up plans for increased public investment in Agriculture by incorporating information on local requirements, geographical/climatic conditions, available natural resources/ technology and cropping patterns in their districts so as to significantly increase the productivity of Agriculture and its allied sectors and eventually maximize the returns of farmers in agriculture and its allied sectors. This scheme is covering the entire state.
- Crop diversification programme: This Programme aims to shifting the regional dominance of a single with more than one crops, so ensure food security and meet the demand of food, fruits, vegetables etc. It also aims at improving soil health.
- National Food Security Mission: The National Food Security Mission aims at enhancing the production of Rice, Wheat, Pulses, Coarse cereals and Commercial Crops.

e) Comment of availability of suitable infrastructure for implementation proposed projects (vehicles, computers, required software/ tools, etc.)

Suitable infrastructure is available with the Department of Agriculture for implementing the proposed project. Vehicles, computers and required software/tools may be purchased as per the demand of the project. The technical manpower is available at block level in every district and for implementing the climate resilient interventions, farmer would be strengthened.

f) Whether Executing Entity (EE) was blacklisted, barred from implementation of projects, faced any charges / legal cases related to mismanagement of project and funds. (please list any such incidences and reasons)

No

1.4 Project / Programme Components and Financing:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets.

No.	Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (Rs.)
1.	Targeting and identifying different climate vulnerable interventions in targeted climate smart villages in Haryana as per farmer's socio economic and bio-physical conditions	<ul style="list-style-type: none"> 75,000 families' perceptions on climate change impacts, existing coping/adaptation strategies to prevent the change and capacities to adapt to climate change will be identified and analysed Concerns/issues due to implications of climate change of 250 villages will be identified Prioritization of agronomic adaptation measures to be implemented at village level for 250 villages 	<ul style="list-style-type: none"> Stakeholders aware of the climate change impacts in the target region. Farm households and prioritized activity for implementation identified Finalized adaptation strategies suitable to the target locations and farm household typologies 	1,25,00,000
2.	Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies	<ul style="list-style-type: none"> Skill development of 1250 young farmers / entrepreneurs on effective implementation of climate smart agriculture practices. Once capacitated, a business model will be developed for sustaining the farmers capacity development activities 25 Capacity building trainings/workshops for farmers conducted 100 exposure visits to target villages/ farms where adaptation measures are implemented 	Farmers would be capacitated on effective implementation of agriculture practices. The implementation of agricultural practices will further be sustained by farmers.	1,75,00,000
3.	Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories	<ul style="list-style-type: none"> Seasonal climate forecast provided for wheat and maize crops for 250 target villages through utilising and linking existing weather 	<ul style="list-style-type: none"> Farmers adjust their farm planning and operational decisions based 	2,39,50,000

	for resource poor farmers in target domains	information of Chaudhary Charan Singh Haryana Agricultural University (CCSHAU) and M. Kisan services	on the climate forecast and also take preventive measures for saving the crops and minimizing the costs of production	
4.	Implementing/Innovating science based suitable climate change adaptation strategies/practices	<ul style="list-style-type: none"> • Implementation of suitable agronomic adaptation measures in 250 target villages in 10 districts of the state • Value chain integration of climate smart farm households • Shifting to wheat-maize system will reduce stress on water resources; diversify livelihood option and reduce emission Greenhouse Gas from paddy 	<ul style="list-style-type: none"> • Best Climate Change Adaptation measures implemented by the beneficiary households in the target locations • Improvement of resilience of farm households to the projected climate change impacts such as rise in temperature, erratic rainfall etc. • Enhanced farmer's income due to continued enhanced crop yield even during water stress conditions 	15,37,50,000
5.	Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing	Development of knowledge and outreach products like manuals, posters, films, research papers etc. dissemination the project activities, experience, challenges and outcomes	<ul style="list-style-type: none"> • Convergence of policies in programs that influence adaptation behaviour of farmers 	1,50,00,000
	Project Execution Cost			22,27,00,000
	Total Project Cost (Including coordination charges of 5%)			23,38,35,000
	Project Cycle Management Fee charged by the Implementing Entity (3% of the project cost)			66,81,000

Amount of Financing Requested	24,05,16,000
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1.5 Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme (projects which have four or more than four years of implementation period would require to have mid-term review after two years of implementation).

Milestones	Expected Dates
Start of Project/Programme Implementation	1 st October, 2016
Mid-term Review	31 st March, 2018
Project/Programme Closing	15 th September, 2019
Terminal Evaluation	30 th September, 2019

2.0 PROJECT / PROGRAMME DESCRIPTION AND JUSTIFICATION

i. What is the business-as-usual development for the targeted sector?

Farmers would continue cultivating rice-wheat through ground water extraction, which will continue to stress water resources in the region especially ground water and soil moisture. Shifting to wheat-maize system will not only reduce stress on water resources but also diversify livelihood option and reduce emission GreenhouseGas (GHG) from paddy as a co-benefit. The project therefore aims to improve the adaptive capacity of small holder farmers in Haryana by delivering a combination of climate resilient agriculture farming system interventions and enhance their capacity to ensure sustainability of the project. Major activities of the project will enhance resilience of agriculture sector to climate change.

Adapting to climate change often requires responses which range from adoption of concrete agricultural technologies, soil and water management practices at farm and landscape levels, economic and social safety nets which enable the poor farmers to cope with the vagaries of climate extremes. Individual and collective responses to the changing climate impinge on the perception of the problem, traditional knowledge and practices to deal with it. Therefore, the project constitutes components which focus on improved understanding of the most vulnerable regions and farm household to climate change impacts; develop capacities of farmers and departmental staff in responding adequately to climate change impacts; and designing and implementing a portfolio of adaptation measures at farming and community.

ii. What are the specific adaptation activities to be implemented to reduce the climate change vulnerability compared to the business-as-usual situation?

a) Component-wise details and justification of the project components

The proposed project has been piloted in 27 districts of Karnal district, Haryana under the aegis of CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and National Initiative on Climate Resilient Agriculture (NICRA). This was implemented by the National Agriculture Research Systems (NARS) and CIMMYT. The project was introduced to raise the awareness of farming communities about various technological, institutional and policy options that have a potential to increase their climatic resilience, adaptation, agricultural productivity and income while reducing emissions of greenhouse gases. Climate smart agriculture practices (CSAPs) will be used for scaling 250 CSVs in Haryana. The CSAPs includes conservation agriculture based management practices (zero tillage, DSR, residue management), cropping system optimization/diversification; decision support (Nutrient Expert) and sensor (Green-Seeker) based nutrient site-specific nutrient management, precision water management (laser levelling, micro-irrigation), stress resilient cultivars, seed and fodder banks powered with value-added weather forecasts; ICT based agro-advisories etc. Implementation of CSVs leads to various successful results:

- CA-based systems produced higher wheat yields (6% higher in 2013-14 and 13% higher in 2014-15) than conventional tillage systems in Karnal CSVs. Farmers who practiced conventional tillage during winter 2014-15, which had untimely heavy rains, averaged a 19% yield loss, whereas those practicing CA averaged a yield loss of only 10% in the same locations.
- CA based maize on permanent beds produced 15% higher yield in the abnormal year 2015 (~20 cm rainfall received in 15 hrs) at knee height stage.
- Zero tillage along with improved cultivars and proper residue management are quite efficient cultivation practices for RWS in Haryana. Also Green seeker based nitrogen management helped in increasing profit margins.
- In all CSVs mean grain yield of wheat was 14% higher with that of farmer practice trials whereas cost of cultivation was 17 % lower which ultimately increased net returns by 24% compared to farmer practice. The B: C ratio was 44% higher compared to FP.
- Nutrient expert based fertilizer management increased mean grain yield by 10% compared to conventional nutrient management. Although cost of cultivation was 3% higher in NE approach, net returns 12 % more compared to conventional nutrient management.
- Green seeker based Nitrogen management in wheat resulted in 4% higher profitability compared to the conventional practice of nitrogen application.

Therefore, the project proposes to be replicated in 250 villages which has been tried and tested in 27 villages in Haryana. The major components and activities under component are as follows:

Component 1: Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions

This component aims at identifying, mainstreaming and prioritising the demand driven adapted climate smart interventions at the target domains, for improving the adaptive capacity of rural livelihoods to climate change. This component therefore involves following activities:

Activity 1.1: Baseline survey

Baseline data of the practices being implemented will be collected through survey in each village and Focussed Group Discussions at community level. This will help in understanding the current vulnerability of the farmer at the village level due to climate change, existing coping strategy, identifying activities based on the geographical conditions of the field and socio-economic status of the farmers.

Activity 1.2: Data analysis and prioritising the climate smart agricultural practices

Data generated from the baseline survey of the villages and community will be analysed through qualified researchers/state department officials. Based on the various indicators on vulnerability, socio-economic criteria etc., agricultural practices will be identified and prioritized for each village and accordingly, necessary equipment would be bought for effective implementation of the practices.

Component 2: Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies

This component mainly **supports** in enhancing the skill of farmers on effective and efficient implementation of agronomic practices. This activity will not help in enhancing the yield of agricultural crop and increasing their income but also help in sustainable development of the activities. This component involves following activities:

Activity 2.1: Skill development of young farmers/entrepreneurs

In order to have greater impact, it is proposed that 5 young farmers/entrepreneurs interested in disseminating the agricultural information to farmers will be first trained. Youths will be trained twice in a year in 2 seasons i.e. Rabi and Kharif seasons. Since the agricultural technologies are need based on the season, skilled training will be provided for 2 years. These young farmers/entrepreneurs will also be provided with agricultural kits (including a tablet, package **and** practices information).

Activity 2.2: Training of farmers on agricultural practices

Skilled young farmers/entrepreneurs will further be responsible for training and capacity building of farmers (approx.300 families) of 250 villages. Farmers would be trained on effective and sustainable agronomic measures, so that farmer could implement the practices in their own fields.

Activity 2.3: Exposure visits/Travelling seminars for disseminating the field practices

The project has successfully created 27 CSVs of Karnal district, Haryana. Exposure visits

play an important role, which has led Govt. of Haryana to decide on development of more 250 CSVs in 10 districts. Exposure visits/Travelling seminars would also be arranged for the farmers at the district, inter-district and inter-state levels, so that the activities could be replicated in other villages of the same and different districts. The lesson/experience would also be useful for other state for replicating the CSVs activities in their state.

Component 3: Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains

This component aims at providing information to village farmers regarding the likely risk that they would suffer due to projected climate change implications. Based on agro-advisories, information on the likely activities that can be implemented to maximise the yield will be provided to the farmers in target domains. This component involves following activities:

Activity 3.1: Development of a network of knowledge partners

A network of knowledge partners for disseminating the information to young farmers/entrepreneurs regarding the application of real-time technologies through various workshops/seminars which is proposed to be done on the existing infrastructure facilities of government institutions.

Activity 3.2: Providing seasonal farming climate forecast and agro-advisories for planning agricultural practices

Information on the seasonal farming climate forecast and suitable agricultural activity to be implemented will be provided to farmers through the skilled youth. Young farmers will be trained on application of Information, Communication and Technology for agro-advisories services and planning the best practices. They will then be responsible for disseminating the information to farmers:

Component 4: Implementing/Innovating science based suitable climate change adaptation strategies/ practices

Activity 4.1: Developing excellence/innovation model in each village

It is proposed that a model field at one of the community/panchayat lands will be created in all target villages highlighting the best practices which could be implemented in the farms. This excellence/innovation model will be provided with Happy seeder and Multi-crop planter. Maize thresher will also be provided to 100 villages where Maize is a major crop. In case required, Maize will be used on a rotational basis amongst villages based on the need arising at each target village. The field will be used as a demonstration site with best practices on agriculture such as:

Zero-tillage: Zero-till or no-till farming is a way of growing crops without disturbing the soil through tillage using zero-till planter/drill. It increases the amount of water that infiltrates into the soil and increases organic matter retention and the cycling of nutrient in the soil. Zero-tillage improves soil properties, making it more resilient. It helps in timely planting, reduce cost, improve soil health, increase profits, help in adapting to terminal heat and reduce environmental foot prints. Zero tillage technology can be used in almost all major field crops
Direct seeded Rice: Traditional rice cultivation involves sprouting rice in a nursery and then

<p>transplanting the seeding into an intensively tilled field with standing water. With direct seeded rice, the rice seeds are sown directly in dry seedbed just like any other upland crop using multi-crop zero till planter. This eliminates the laborious process of manually transplanting seeding, significantly reduces the crop's water requirement and improve the soil's physical condition. In delayed/uneven distribution of rainfall conditions, the direct seeded rice suffers less than transplanted rice.</p>
<p>Raised bed planting: Planting crops (wheat, maize and a horticultural crops) in row geometry and on raised beds with furrow irrigation arrangements using a multi-crop raised bed planter. Helps in saving irrigation water by 30-40%, furrows act as drainage channel in case of heavy rains and hence save crops from excess moisture. This provides excellent opportunity for inter-culture operations and crop diversification. Beds can be used for longer time as permanent beds and without any tillage and hence save on cost, energy, increase income and improve soil health.</p>
<p>Residue management/mulching: Crop residue mulching is a system of maintaining a protective cover of vegetative residues and stubble on the soil surface. It adds to soil organic matter, which improves the quality of the seedbed and increases the water infiltration and retention capacity of the soil. Rice crop residue removing is one of the major practices in Bihar. Retention of the rice residue on soil surface acts as mulch and crops can be directly drilled without tillage while residue on surface using innovative planting machinery like Turbo Happy Seeder/Zero tillage.</p>
<p>Laser land leveling: A laser-leveller is a tractor-towed, laser-controlled device that achieves an exceptionally flat surface. Levelling the field ensures equitable reach and distribution of water and increases crop productivity. It also increases energy efficiency as less water means less need to run diesel pumps which is leads to less GHGs contribute to the environment. Most farmers in Bihar rent the irrigation on an hourly basis. Farmers irrigate with help of diesel pumps and pay between 100-150 Rupees an hour to irrigate the crop. The estimated greenhouse gas mitigation is 163, 600 MT of CO₂-eq per year (CIMMYT-CCAFS, 2014).</p>
<p>Alternate wetting and drying (AWD) in rice: In alternate wetting and drying, rice fields are alternately flooded and drained. The use of monitoring instrument like tensiometer can help farmers decide when to irrigate their fields. Alternate wet and drying reduces methane emissions by an average of 48 percent compared to continuous flooding. Combining this with precision fertilizer tools can further reduce greenhouse gas emission.</p>
<p>Nutrient Expert –decision support tool helps farmers decide location specific use of correct fertilizers for rice, wheat and maize in the hands of individual farmers. This site specific nutrient management tool adds value to soil testing and guide farmers for precision prescriptions even in absence of farmer's access to soil testing. The nutrient Expert is interactive software and is available for free use on websites.</p>

Activity 4.2: Replication of agricultural practices in other villages

Agricultural practices will be implemented in other villages based on its suitability for implementation in agricultural fields such as soil moisture content, availability of **nutrient**, socio-economic characteristics of field farmers, crop growing conditions etc. Necessary plantation inputs will be provided for the same. Equipment for implementing the practices can be taken from the model farm.

Component 5: Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing

Activity 5.1: Organising Workshops

Workshops would be organised for large number of stakeholders such as line departments, farmers, village councils etc. at the start of the project. Further, mid-term workshop would be organised around January/March, 2018 for reviewing the project activities. Final workshop would be organised during the end of project period to disseminate the result of final outcome/outputs of the project, challenges faced and highlighting the success.

Activity 5.2: Development of Knowledge products

Knowledge products such as films (bilingual), manuals for various project activities, posters and research papers will be developed for dissemination of the project implementation success stories to wider population.

b) Details of the social, economic and environment benefits of the project

Component/Activities	Key Benefits		
	Social	Economic	Environmental
Targeting and identifying different climate smart interventions in targeted climate vulnerable villages and enhancing farmers capacities	Farmers will be aware of the change implications and will be able to adopt/modify their farming activities.	The improved capabilities on risk will help marginal and small farmers in adopting the strategies to mitigate climate change impacts, which will enhance their income levels and improve their livelihood.	Perceptions of the farmers will change through adopting climate friendly activities
Implementation of real-time risk management and science based suitable climate change adaptation strategies/ practices	Farmers will implement efficient agricultural inputs based on climate variability parameters. This will be a sustainable practice to be adopted by farmers.	Improved cropping strategies and adoption of best management practices such as optimum nutrient use, soil moisture conservation etc. will increase the net household income through increased farm returns i.e. yields and/or a reduction in production costs Due to better adoption of improved policies, in addition to the benefit to the	Development of best management practices suitable and adaptable to each location will reduce the stress on natural resources. Better matching of cropping systems to seasonal rainfall variations is likely to increase water & nutrient use efficiencies, reduce the environmental impacts and improve watershed performance. Shifting to wheat-

		<p>farming community, an improvement on the government mechanisms for better planning of scarce water and other resources will lead to long term benefits to the state's economy</p> <p>Reduced cost of labour as Wheat and Maize are implemented through less farmer's interference</p>	<p>maize system will reduce stress on water resources; diversify livelihood option and reduce emission Greenhouse Gas from paddy</p>
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b) Sustainability of intervention

i. How will the project assure that the benefits achieved through its investments are sustained beyond the lifetime of the project?

The project follows a demand driven approach to developing adaptive capacities of stakeholders to climate change. Design of the various components is a result of the continuous collaborative engagement of the project partners in farmer-participatory climate adaptation research in the region. The adaptation strategies will be developed based on the thorough analysis of social, economic, agricultural and ecological dimensions of the problem of vulnerability to climate change conducted by the departments. The involvement of all the stakeholders in the design of the project supports the demand driven nature of the project promoting ownership and acceptance of the promoted solutions. Once the project is over, farmers will be provided requisite capacity for successfully implementing adaptation interventions in agriculture sector and will be well versed with the success rate of activities. This would therefore help farmers in comfortably applying and investing in these activities.

Implementation of the adaptation measures most suitable to different farm household typologies is done by the farmers themselves which is facilitated by trained young entrepreneurs/farmers and staff of the involved line departments (mainly DoA). The structured capacity development trainings for the staff through tools and manuals developed under the project provide ample scope for scaling up of capacity development of the entire staff of the department and farmers beyond the target district. The knowledge management strategy of the project ensures that the tools, manuals and other documents highlighting the key success factors and processes are available freely (open source) for utilization of stakeholders to sustain the adaptation beyond the project period and locations. These findings will help in ensuring sustainability.

d) Analysis of the cost-effectiveness of the proposed project / programme:

i. Cost effectiveness will compare alternative options available and how the proposed components/ intervention are best for given climatic conditions. **It will also how the community** has preferred the selected interventions and their views / concerns are addressed while designing the project/ programme

The proposal should compare to other possible interventions that could have taken place to help adapt and build resilience in the same sector, geographic region, and/or community. A comparison of the chosen option vis-a-vis alternative options may be provided as per the **Table:**

Table: Chosen options vis-a-vis alternative options

Activity	Proposed Alternatives	Benefits
Improved resilience through adoption of climate resilient farming/livelihood system	<ul style="list-style-type: none"> • Cultivating rice-wheat through ground water extraction, deep tillage etc. • Construction of canals and providing assured irrigation through lift irrigation is another option to improve the crop productivity <p>(pl check the objectives)</p>	<ul style="list-style-type: none"> • Activities proposed in the project are designed taking into account the climate change implications and to enhance the yield through multi-crop varieties, conserving soil moisture. • The activities proposed in this project intend to enhance skills and knowledge of farmers so that they will be able to adopt their production system according to climatic situation.
Developing and implementing the weather based agro-advisories for planning farming activities through existing services of M. Kisan and ICT services of CCSHAU	Existing services of M. Kisan and ICT services of CCSHAU are available to farmers. However, information regarding the activities to be implemented has not been provided to farmers, which resist them to plan their farm activities. Therefore, through this project existing services of M. Kisan and ICT services of CCSHAU and farmers will also be provided information on best practices so that they could easily implement/modify their practices based on climate variability features	Timely advice also helps farmers in taking preventing measures for reducing possible losses related to agriculture and other natural resource dependent livelihoods.

ii. Weighting of project activities:

How much funding will be allocated to 'investment activities', 'capacity building activities' and 'project management activities' respectively?

Type of Activity	List of Activities	Funding required (Rs.)
Investment activities	<ul style="list-style-type: none"> • Targeting and identifying different climate smart 	19,02,00,000

	<p>interventions in targeted climate smart villages in Haryana as per farmer's socioeconomic and biophysical conditions</p> <ul style="list-style-type: none"> • Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains • Implementing/Innovating science based suitable climate change adaptation strategies/ practices 	
Capacity building activities	<ul style="list-style-type: none"> • Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies • Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing 	3,25,00,000
Project management activities	<ul style="list-style-type: none"> • Monitoring and Evaluation • Coordination cost 	1,78,16,000

e) Alignment with the National and State Action Plans and other Policies / Programmes:

The proposed project aligns with the national and state strategies to strengthen adaptive capacities of stakeholders to impacts of the changing climate. The Indian government has responded with the launching of its National Action Plan on Climate Change (GoI, 2008). A key priority is for adaptation to focus on agriculture with possible adaptation strategies ranging from provision of better matched crop varieties, weather insurance to help farmers cope with crop losses and interventions to increase **water productivity**. Similarly, within the framework of NAPCC, states have been encouraged to prepare and implement State Action Plans on Climate Change (SAPCC). Proposed activity is also prioritized under the Agriculture Chapter of Haryana State Action Plan on Climate Change. Agriculture has been identified as the most vulnerable sector with a majority of rural poor dependent on it for their livelihoods.

f) Component wise technical standards:

(Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, standards related to pollution control, etc. The details need to be provided for each of the interventions proposed)

The overall objective of the project is in line with the National Mission on Sustainable Agriculture and highlighted under the SAPCC. The project will be governed as per the policy and preference of State Governments in adherence to all the specific local criteria. Apart from that the project would also adhere to the national scientific criteria with regard to adaption such as economic, social and environmental benefit etc. The involvement of the key stakeholders in the project formulation and the Project Management/ Implementation Mechanisms ensures compliance with the policy of participatory implementation of the project.

Activity	Applicable Standard	Application to project
Component 1: Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions	Standard guidelines provided by DoA on sustainable agriculture practices	Enhance the food security, nutrition level and income of small and marginal farmers
Component 2: Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies	Standard guidelines provided by DoA and CIMMYT	Enhance the capacities of farmers and state government officials for implementing climate change adaptation activities
Component 3: Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains	Standard guidelines and procedures of DoA and CCSHAU	Forecast uncertain events such as drought, extreme events etc. which would help farmers to plan for the future course of activities
Component 4: Implementing/ Innovating science based suitable climate change adaptation strategies/ practices	Standard guidelines provided by DoA Standard guidelines of Haryana civil works standards and MGNREGA	Implementation of sustainable agriculture practices
Component 5: Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing	Activities would be linked to National Mission for Strategic Knowledge on Climate Change under NAPCC and standard guidelines and procedures of DoA, CIMMYT and DoE	Mainstreaming of adaptation activities

g) Duplication Check:

(Describe if there is duplication of project / programme with other funding sources, if any)

Project	Objectives	Complementarity	Geographical
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			Coverage / Agency
National Food Security Mission	Food security	Enhancing the production of Rice, Wheat, Pulses, Coarse cereals and Commercial Crops.	Area under Wheat / Pulses (25 lakh hectare)
Crop Diversification Scheme	Water saving	Multi-cropping technologies (pl elaborate)	Area under Wheat / Rice (12 lakh hectare)
National Mission on Oilseed and Oil palm	Promotion of Oilseed crops	Implementation of oilseed plantation	Area under Oilseed Crops (6 lakh hectare)
Solar Water Pump	Enhance the renewable energy mix in total energy	Solar water pump is proposed be set up in the project villages by HREDA	Proposed to be implemented in entire state

h) Details on Stakeholder consultation:

(Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations).

Consultation	Date/ Place	Participation	Objective	Outcome
1 st meeting for developing the concept note on CSVs	Office of DoA, Chandigarh (August 20, 2015)	DoA, CIMMYT and DoE	To consider the concept of replication of the model of 27 pilot CSVs to other villages of Haryana	A concept was drafted on the similar lines of 27 pilot CSVs
2 nd meeting for discussing the draft detailed report on CSVs	Office of DoE, Chandigarh (April 29, 2016)	DoA, DoE, HREDA, DoI, DoAH, DoH and GIZ	To finalise the draft DPR as per the NAFCC template	Content of draft DPR was discussed in detailed
3 rd meeting for discussing the draft detailed report on CSVs	Office of CYMMIT, Delhi (May 2, 2016)	DoA, CIMMYT and GIZ	To discuss the successful activities of the 27 model CSVs	Experience were learnt from the experience of implementation of CSVs by CYMMIT

- i) Learning and knowledge management component to capture and disseminate lessons learned from the proposed project.

Component 5 of the project dealing with knowledge management and mainstreaming of adaptation strategies, describes both the cross-cutting and specific knowledge management functions that will be undertaken in this project. The project has been successfully piloted in 27 districts of Karnal. Based on successful results of pilots and demand by farmers, it has been envisaged to implement the project in 250 villages of the state. The project is expected to generate crucial learnings in terms building climate smart agricultural options. The knowledge will include adaptation techniques at the farm level, best practices, benefits of early warning information, sustainable agricultural practices that improve adaptation ability and resilience; institutional capacity to sustain community based efforts to adapt to climate change and other policy recommendations and technical guidelines produced by the project.

- j) Sustainability of the project outcomes has been taken into account when designing the project

Expected outcomes	Expected concrete Outputs	Sustainability Mechanism	Responsible parties
<ul style="list-style-type: none"> Stakeholders aware of the climate change impacts in the target region. Farm households and prioritized activity for implementation identified Finalized adaptation strategies suitable to the target locations and farm household typologies 	<ul style="list-style-type: none"> 75,000 families' perceptions on climate change impacts, existing coping/adaptation strategies to prevent the change and capacities to adapt to climate change will be identified and analysed Concerns/issues due to implications of climate change of 250 villages will be identified Prioritization of agronomic adaptation measures to be implemented at village level for 250 villages 	<p>Farmers will be aware of the implications of the climate change in their target domains and hence sustainably implement the practices even after the completion of the project.</p>	<p>Farmers and skilled young entrepreneurs</p>
<p>Farmers would be capacitated on effective implementation of agriculture practices. The implementation of agricultural practices will further be sustained by farmers.</p>	<ul style="list-style-type: none"> Skill development of 1250 young farmers / entrepreneurs on effective implementation of climate smart agriculture practices. Once capacitated, a 	<p>Capacity building of the farmers on how effectively the agronomics practices could be implemented. The activities could further be taken up by farmers. Skilled young entrepreneurs propose to develop business models which</p>	<p>DoA and CIMMTY eventually farmers, Village Councils etc.</p>

	<p>business model will be developed for sustaining the farmers capacity development activities</p> <ul style="list-style-type: none"> • 25 Capacity building trainings/workshops for farmers conducted • 100 exposure visits to target villages/ farms where adaptation measures are implemented 	will lead to sustainable activities.	
Farmers adjust their farm planning and operational decisions based on the climate forecast and also take preventive measures for saving the crops and minimizing the costs of production	Seasonal climate forecast provided for wheat and maize crops for 250 target villages through utilising and linking existing weather information of Chaudhary Charan Singh Haryana Agricultural University (CCSHAU) and M. Kisan services	Real time services of weather information are proposed to be provided through the existing services of CIMMYT and CCSHAU. Farmers/young entrepreneurs will be provided trainings on how existing weather information could be applied for planning farm practices.	DoA and CIMMTY eventually farmers, Village Councils etc.
<ul style="list-style-type: none"> • Best Climate Change Adaptation measures implemented by the beneficiary households in the target locations • Improvement of resilience of farm households to the projected climate change impacts such as rise in temperature, erratic rainfall etc. • Enhanced farmer's income due to continued enhanced crop yield even during water stress conditions 	<ul style="list-style-type: none"> • Implementation of suitable agronomic adaptation measures in 250 target villages in 10 districts of the state • Value chain integration of climate smart farm households • Shifting to wheat-maize system will reduce stress on water resources; diversify livelihood option and reduce emission Greenhouse Gas from paddy 	Once the practices are implemented by farmers, they will have hands-on experience on implementing the best practices. These best practices are proposed to be sustained through the farmers as they would learn the yield increment and also ensure its food security and effective utilisation of water for crop production, which will also enhance their income.	DoA and CIMMTY eventually farmers, Village Councils etc.
Convergence of policies in programs that influence adaptation behaviour of farmers	Development of knowledge and outreach products like manuals, posters, films, research papers etc.	Knowledge products (films, manuals, publication etc.) will be developed for replication in other districts and states.	Policy makers, state department officials, farmers

	dissemination the project activities, experience, challenges and outcomes		
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k) Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	<p>The project activities are in line with the priorities on climate change as predicted by Assessment report of Inter-governmental Panel on Climate Change and scientific report of Government of India. The activities are in-line with the National Mission for Sustainable Agriculture Mission under National Action Plan on Climate Change and Haryana Action Plan on Climate Change.</p> <p>The project activities are in convergence with the Environment Protection Act, 1986; Air (prevention and control of pollution) Act, 1981 and Water Pollution Control Act, 1984.</p>	No risk
Access and Equity	<p>The project provides fair and equitable access to the project beneficiaries and is based on clear vulnerability aspects linked to livestock productivity.</p> <p>During the project implementation and community level interventions, special focus will be given to women and disadvantaged groups in building their capacities and enabling their access to community level assets (knowledge and natural resources)</p>	<p><u>Risk:</u> Despite the best efforts to promote equity in the benefits of the project by selecting beneficiaries, in some cases, there may be a risk of diluting the principles of beneficiary selection.</p> <p><u>Mitigation option:</u>A common criteria for selecting the beneficiaries will be developed in order to have uniform selection of beneficiaries.</p>
Marginalized and Vulnerable Groups	<p>The beneficiaries of the project will be small and marginalised farmers at both household and community levels.</p> <p>Marginalized and vulnerable households will be identified through the household survey data</p>	Adaptation and capacity building measures are designed based on their adaptive capacities.

	analysis and are included as beneficiaries in the project.	Therefore, there is no risk for the community.
Human Rights	The project does not foresee any violation of human rights	No risk
Gender Equity and Women's Empowerment	Project would ensure participation by women fully and equitably, receive comparable socio-economic benefits and that they do not suffer adverse effect. It is proposed that amongst the total beneficiary, 35% would be women. Women would be involved in agricultural practices etc.	<p><u>Risk:</u> As per climate change studies, women are more prone to climate change compared to male population.</p> <p><u>Mitigation:</u> During the project implementation, gender differentiated impacts of climate change will be assessed and technologies and capacity development measures targeted at empowering women will be designed and Implemented</p>
Core Labour Rights	Payments to labour under the project will be made as per Government approved norms duly following minimum wage rate and hence ensuring core labour rights.	No risk
Indigenous Peoples	Not applicable to this project	No risk
Involuntary Resettlement	Not applicable to this project	No risk
Protection of Natural Habitats	Project does not affect any of the natural habitats	No risk
Conservation of Biological Diversity	The project would not cause any negative impact on biodiversity values. However, the project activities will positively enhance the biodiversity richness of the state by shifting to Wheat and Maize farming system, which are the traditional varieties of the state. (pl check)	No risk
Climate Change	To improve the adaptive capacity of rural community to climate change through portfolios of climate resilient agriculture interventions in targeted villages of Haryana. Project additionally has a co-benefit on reducing the GHG produced through adopting solar driven pumps, adopting land-levellers practices etc.,(pl elaborate	No risk

	how)which will contribute in mitigating the challenges of climate change	
Pollution Prevention and Resource Efficiency	Project activities are in convergence with the Air (prevention and control of pollution) Act, 1981 and Water Pollution Control Act, 1984 and Noise Pollution (Regulation and Control) Rules, 2000	No risk
Public Health	No adverse impact on public health related issues is envisaged.	No risk
Physical and Cultural Heritage	No adverse impact on cultural heritage related issues is identified.	No risk
Lands and Soil Conservation	The project envisages conserving the soil water, effectively utilising water, plantation of high yielding drought varieties etc. which will help in conserving the land resources.	No risk

3.0 IMPLEMENTATION ARRANGEMENTS

a) Describe the arrangements for project / programme implementation.

i. Who will implement the project and what are their comparative Advantages and capacity compared to other potential implementing institutions?

The implementation of the project will be through a multi-department coordination with the overall responsibility led by Department of Environment, Government of Haryana. Following are the responsibilities of the various implementing agencies:

Agency/committee	Responsibility
State Steering Committee	Project Steering Committee headed by the Chief Secretary will advise the project in financial and technical implementation, ensuring full implementation of project actions and review progress of the project against the agreed time lines.
Technical Advisory committee	<p>Technical Advisory Committee headed by Director General, Agriculture with following members:</p> <ul style="list-style-type: none"> • Director General, D/o Horticulture (DoH) • Director General, D/o Animal Husbandry (DoAH) • Director, D/o Environment and Forest (DoE&F) • Director, D/o Irrigation (DoI) • Director, Haryana Renewable Energy Development Agency (HAREDA) • General Manager, National Bank for Agriculture and Rural Development (NABARD) • Director, National Dairy Research Institute (NDRI) • Senior Professor, Chaudhary Charan Singh Haryana Agricultural University (CCSHAU) • Senior Scientist, Central Soil Salinity Research Institute (CSSRI) • Representative of Village Council (VCs) • Dr. M.L. Jat, South Asia Coordinator, International Maize and Wheat Improvement Centre (CIMMYT) <p>TAC will be responsible for:</p> <ul style="list-style-type: none"> • Preparing the implementation plan • Regular reviewing the progress of the implementation of the project • Overseeing execution of project activities, fund administration of the project and procurement of goods and services.
D/o Environment (DoE)	<p>DoE will be responsible for the following tasks:</p> <ul style="list-style-type: none"> • Oversee the project and main link with MoEFCC/NABARD for receiving the funds • Fund flow management, monitoring and reviewing the progress of the activity • Preparing progress report in consultation with DoA of the project for the steering committee meetings that will

Agency/committee	Responsibility
	happen annually <ul style="list-style-type: none"> • Preparing and submitting report and Utilisation Certificates to the NABARD
D/o Agriculture (DoA)	<ul style="list-style-type: none"> • Conducting stakeholder workshops and consultations at the state, district and community levels on appraising climate change impacts • Identification and finalising agriculture adaptation measures through research outputs and field demonstrations in the selected study villages in consultation with farming community • Implementation of Climate Change Adaptation measures in the beneficiary households in consultation with DoH, DoAH, NDRI, CCShAU, CSSRI and CIMMYT • Providing agro advisories in consultation with DoH, DoAH, NDRI, CCShAU, CSSRI and CIMMYT • Development a web portal to house the central knowledge repository on project activities to enable evidence based policy in consultation with DoH, DoAH, NDRI, CCShAU, CSSRI and CIMMYT
CIMMYT	<ul style="list-style-type: none"> • Conducting baseline households survey in consultation with DoA • Providing training to line departments on agronomic, NRM and economic adaptation measures in consultation with DoA • Arranging exposure visits to target villages/farms where adaptation measures are implemented in consultation with DoA

i. How will the project be coordinated with (and/or mainstreamed into) Related development activities of the targeted sector?

DoE being the nodal agency for climate change in Haryana state will be responsible for the overall coordination of implementing agencies. The project will have a Steering Committee and Project implementing team, for supervising the project activities; monitoring its implementation and taking policy decisions. Implementation plan of the project is as follows **(Figure 10)**:

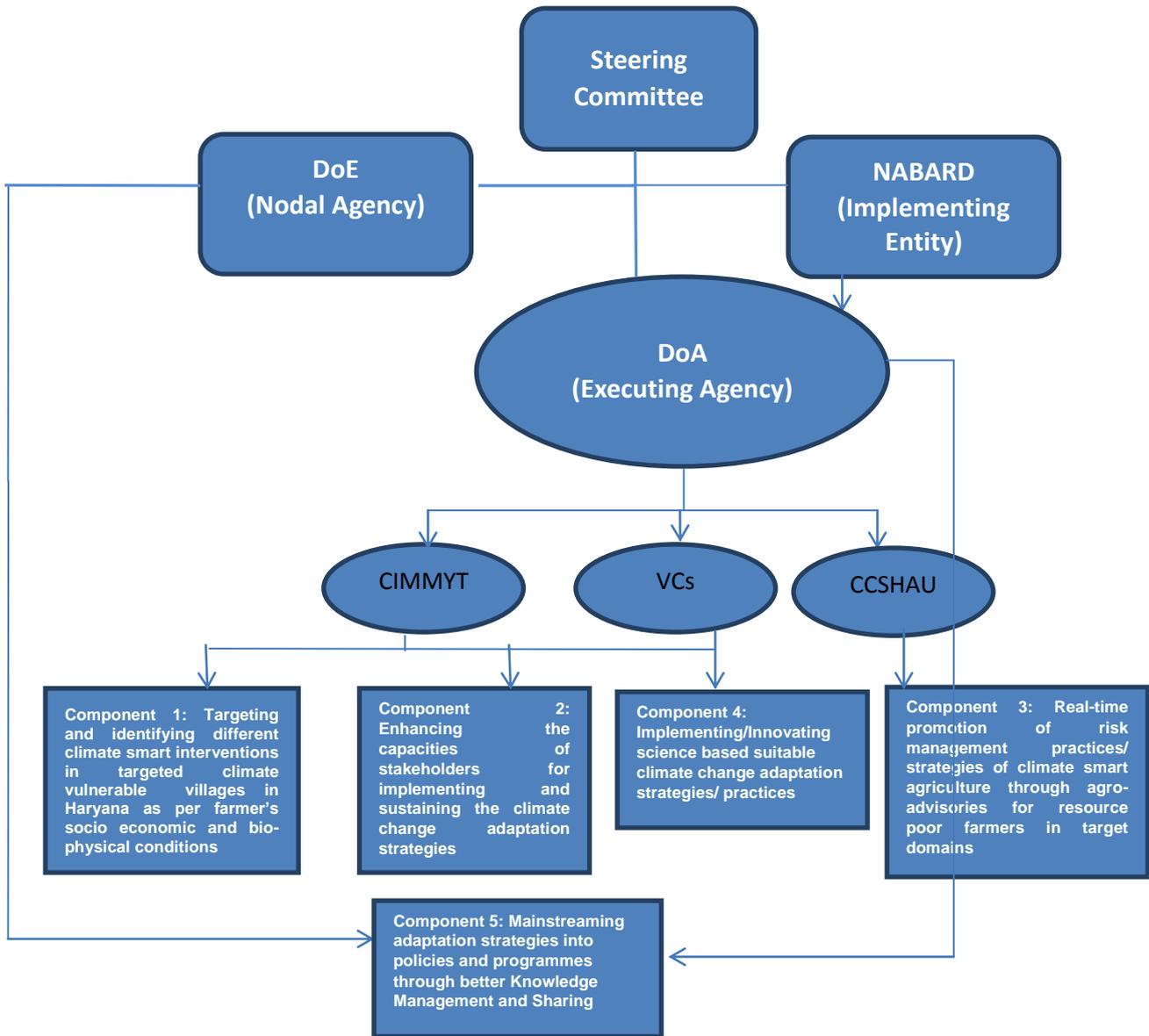


Figure 10: Implementation plan for the project

b) Describe the measures for financial and project / programme risk management (also include environmental and social risk, if any).

Risk	Rating (High / Medium / Low, etc.)	Mitigation Measure
The farmers might not agree to do all the different management approaches	High	Targeted capacity building along with exposure visits will build the consensus
Bureaucratic hassles may delay in initiating the project activities and sanctioning of funds	High	Bureaucrats dealing with the concerned subject will be special invitees for the State Steering Committee on Climate Change. This would enable the policy makers to be well versed with the progress of the project activities and thus ease in sanctioning of funds. Preliminary activities of the project will be initiated on time like baseline survey, capacity building of the community etc. and the information of initiation of project activities may be informed to the central ministry for ease in sanctioning of fund.
Events such as erratic rainfall, extreme high temperature may hassles the project activities	High	M. Kisan and other agro-advisories services will be used to prevent such risks
Timely execution	Low	Better coordination with implementing entities involved. The project will have advisory panel who will guide the teams regularly with regards allotment of budget, workload etc.
Social issues (selection of beneficiaries)	Medium	The project has been piloted in 27 villages of Karnal districts and through NAFCC, it is proposed to be implemented in 250 villages in 10 districts of Haryana. A common criteria will be developed for selecting the farming community for execution of adaptation strategies
All activities suggested may not come to fruition as planned which might lead to conversion of agricultural land to non-agricultural land.	Low	Since each activity is headed by exclusive entities with high level of competence and experience, outcome of all activities will be ensured. Continuous monitoring will be done to ensure the same.
Minimum Support Price programme in the state might lead to more subsidy for rice-wheat system, leading to their continued adoption and hence diluting the climate smart measures	High	Farmers would be capacitated at the inception level on the long term benefits of shifting to wheat and maize varieties. Successful interventions would also be shown through the model fields proposed to be set up in all target villages
Poor governmental/policy	High	Bureaucrats from the State Ground Water dept.

control over ground water extraction		will be a part of the State Steering Committee on Climate Change. This would make them aware of the long term benefits of water security interventions and enable them to strictly impose policy on the farmers.
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c) Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan. (Monitoring and evaluation cost need to be included in executing entity management cost).

The progress of activities will be monitored by Department of Agriculture based on the agreed upon outputs, indicators and timelines. This process will also be steered through a Technical Advisory Committee, which will be constituted at the beginning of the project. TAC and DoE will be responsible for providing information to NABARD and MoEFCC. After the information is received, M&E would be done by NABARD and third party appointed by MoEFCC.

d) Include a results framework for the project proposal, including milestones, targets and indicators with gender disaggregated data (as per the format in annexure 1).

Results Framework of the Project

Outcome/Output	Indicator	Baseline	Target	Source of Verification	Risks and Assumptions
Component 1: Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions					
<u>Outcome 1.1:</u> Stakeholders aware of the climate change impacts in the target region. Farm households and prioritized activity for implementation identified	Target communities understand and agree to implement the best practices on climate change adaptation in vulnerable locations	No evidence of understanding and agreement on climate change impacts and vulnerable locations/groups. Currently, about 5% stakeholders have a clear understanding of potential climate change impacts and recent climate change adaptation practices in agriculture sector	At least, 300 families per village in 250 target villages will be aware of the current climate change challenge in agriculture sector and agree to implement best practices in agriculture sector	Baseline surveys and focussed group discussion reports	<u>Assumptions:</u> Farmers agree to implement the informed best practices on agriculture. <u>Risks:</u> Activities might not lead to the desired output in one season, which might lead to discouragement amongst farmers.
<u>Output 1.1.1:</u> Village perceptions on climate change impacts, existing coping/adaptation strategies and capacities to adapt to climate change analysed and understood	Researchers and line department staff understand farmer's knowledge on climate change and their existing coping and adaptation practices, Knowledge of farm household typologies based on adaptive capacities integrated into development of adaptation	Majority of researchers and line department staff are aware of farmer's livelihood activities. However, climate change lens has not been adequately applied.	1250 young framers/entrepreneurs are able to analyse and prioritise the knowledge on farm household typologies based on adaptive capacities	Survey reports; Interviews with key villagers	<u>Assumptions:</u> Farmers willing to learn and update their skills on more advanced agricultural practices

	strategies by researchers and line department staff				
<u>Output 1.1.2:</u> Concerns/issues due to implications of climate change of the specific area is identified	Identification of concerns/issues of specific area for implementing adaptation strategies	Limited information of village concern regarding crop loss due to climate change is available	Concerns of approx. 300 families/ village for 250 villages will be identified and documented for prioritization of adaptation activities	Baseline survey reports on list of villages and beneficiary households for implementation	<u>Assumption:</u> Farmers cooperate in conducting the baseline survey.
<u>Outcome 1.2:</u> Finalized adaptation strategies suitable to the target locations and farm household typologies	A suit of best management practices to adapt climate change impact based on farm household typologies developed and communicated	No knowledge and information on the coherence and suitability of a mix of adaptation strategies available with farmers and line department officials	6-8 typologies based package of practice manuals which include adaptation packages specific to study locations.	Technical and operational package of practices documents	<u>Assumptions:</u> All stakeholders will participate and contribute in the preparation of package of practices
<u>Output 1.2.1:</u> Implementation of agronomic adaptation measures	Number of households plan to adopt following best practices: a. Zero tillage b. Direct seeding c. Residue management d. Nutrient management etc.	Farmers are going for traditional agricultural practices which are not climate resilient and hence are at high risk due to climate change implications	20-25% yield increase for wheat, maize and horticultural crops through adaptation of climate smart cropping system in 250 villages with 300 households/village at small and marginal farmer's land	Monitoring and Evaluation reports of NABARD and third party appointed by the MoEFCC on successful agronomic adaptation measures Visuals and films of project sites of target locations	<u>Assumptions:</u> Farmers are willing to learn & adapt therecommended climate smart package of practices
Component 2: Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains					

<p><u>Outcome 2:</u> Farmers adjust their farm planning and operational decisions based on the climate forecast and also take preventive measures for saving the crops and minimizing the costs of production</p>	<p>Losses prevented due to cropping system adjustments based on climate forecast and weather based agro advisories and hence increased crop income.</p>	<p>Farmers lack access to or do not utilize the seasonal climate forecasts and weather based agro-advisories</p>	<p>300 household per village in 250 villages utilize the seasonal climate forecasts and weather based agro advisories;</p> <p>10% increase in profitability due to enhanced yields of maize and wheat</p>	<p>Survey reports</p> <p>Focus group discussions</p>	<p><u>Assumptions:</u> Farmers trust the long-term climate forecasts and plan their practices accordingly <u>Risks:</u> Some farmers sow the seeds and apply fertilizers in the hope of securing the minimum grain for own consumption without waiting for the forecasts</p>
<p><u>Output 2.1:</u> Seasonal climate forecast</p>	<p>Number of farmers utilizing the seasonal climate forecast for farm planning decisions</p> <p>Losses prevented due to cropping system adjustments based on climate forecast</p>	<p>Only few farmers utilize the seasonal climate forecast for farm planning</p>	<p>At least 300 households per village in 250 village utilise seasonal climate forecasts for farming decisions</p> <p>25 capacity building trainings will be organised for the farmers for application of agro-advisories services</p>	<p>Survey reports</p> <p>Focus group discussions</p>	<p><u>Assumptions:</u> Farmers trust the long-term climate forecasts</p>
<p><u>Output 2.2:</u> Utilisation of existing weather information of CIMMYT and CCSHAU</p>	<p>ICT based information system set up for weather based agro-advisory system</p> <p>Number of farmers utilizing the weather based agro advisories provided</p>	<p>Only few farmers utilize the weather based agro-advisory system</p>	<p>At least 300 households per village in 250 village in the selected communities utilize the weather based agro-advisory services</p>	<p>Survey reports</p> <p>Focus group discussions</p> <p>Number of subscribers</p>	<p><u>Assumption:</u>Adequate capacity and interest of farmers to follow the advisories</p>

Component 3: Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies					
<u>Outcome 3:</u> Farmers would be capacitated on effective implementation of agriculture practices	300 families women and young farmers capacitated on potential climate change impacts, developing and implementing the adaptation strategies	Community are mainly trained on livelihood practices. Very few farmers are trained on identification of climate change adaptation strategies specific to farm typologies	At least, 300 marginalized and vulnerable families per village in 250 villages of the study villages are trained on the new adaptation portfolio.	Capacity building and training documents including visuals and reports	<u>Assumptions:</u> Farmers acknowledge the limitation of livelihood practices and actively participate in the trainings
<u>Output 3.1:</u> Skill development of 1250 young farmers /entrepreneurs on effective implementation of agriculture practices. Once capacitated, a business model will be developed for sustaining the implementation of activities	1250 young farmers /entrepreneurs certified on potential climate change impacts, developing and implementing the adaptation strategies. A tool kit on best practices with necessary equipment will also be provided	So far, a network of trained people does not exist which can guide farmers on agricultural best practices	1250 young farmers /entrepreneurs of the study villages are trained	Capacity building and training documents including visuals and reports	<u>Assumptions:</u> Youth express interest in implementing best practices on agriculture and willing to sustain the activities
<u>Output 3.2:</u> Capacity building workshops for farmers conducted	Number of training programmes organized Number of men and women farmers trained	Less than 1% farmers have capacities to adapt farm level climate smart agricultural practices	300 farmers families in each villages for 250 villages will be trained in climate smart agricultural practices	Training reports and visuals; Training manuals	<u>Assumptions:</u> Farmers show interest in the trainings Women have time and are allowed to participate
<u>Output 3.3:</u> Exposure visits to target villages/ farms where adaptation measures	Number of field visits organized Number of men and	No exclusive field visits to expose farmers to climate smart practices are	100 exposure visits/ field visits will be organized for farmers at district,	Field visit reports, visuals, videos	<u>Assumption:</u> Availability of enough comparable and successful adaptation sites

are implemented	women farmers participated	available	inter-district and inter-state levels		
Component 4: Implementing/Innovating science based suitable climate change adaptation strategies/ practices					
<u>Outcome 4:</u> Climate Change Adaptation measures implemented by the beneficiary households in the target locations	Improved resilience of farm households through stabilized crops yields, incomes and nutrition to climate change impacts compared to households not practicing climate smart agriculture	27 villages at a pilot scale practicing climate smart agriculture	300 households/ village for 250 villages to practice climate smart agriculture in the study villages	Impact evaluation Monitoring reports Remote sensing & GIS time series studies on cropping changes	<u>Assumptions:</u> Farmers are committed and willing to adopt the adaptation measures and are willing to contribute to the investment
<u>Output 4.1:</u> Implementation of Agronomic adaptation measures	Yield stabilization under water stress conditions	Presently 10-30% yield loss due to climate change in study regions	Yield stabilization suitable to changing climatic conditions and 15% higher yields compared to present activities	Field demonstrations Field data Monitoring and impact evaluation reports	<u>Assumptions:</u> Comparable rainfall years for assessments
<u>Output 4.2:</u> Value chain integration of climate smart farm households	Farmers might integrate the best practices into the value chain. Better producer share in consumer price for the farm produce of beneficiary households	Presently producer receives only 25-30% share in consumer price Existing value chains are not catering to the climate resilient crops. Smallholder farmers not integrated enough into the value chains	Implementation of strategies to improve smallholder and climate resilient crops into the value chains will result in 15-20% increase in existing producer share in consumer price	M&E Reports	<u>Assumptions:</u> Smallholder farmers willing to aggregate in order to access value chains

Component 5: Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing

<p><u>Outcome 5:</u> Knowledge based advisory system for integrating climate change adaptation strategies on agricultural into different agricultural policies</p>	<p>Convergence of policies in programs that influence adaptation behaviour of farmers</p>	<p>Lack of understanding on the trade-offs and complementarities of different policies and programs</p>	<p>Understanding of the incoherence and possible complementarities that can be achieved through convergence by the relevant stakeholders</p>	<p>Workshop reports with key stakeholders</p>	<p><u>Assumption:</u> Perception of climate change threat by stakeholders to their policies and programs <u>Risks:</u> Reluctance of stakeholders to converge</p>
<p><u>Output</u> 5.1:Development of knowledge and outreach products</p>	<p>Number of Policy makers/ Farmers/think tanks receive the information on the success of implementation of project activities for their decision making</p>	<p>Knowledge products on livelihood practices are available.</p>	<p>All interested Policy makers/ Farmers/think tanks receive and utilize weather based agro-advisories for farm planning and operations</p>	<p>Data on farmer subscriptions M&E Reports Exit survey</p>	<p><u>Assumptions:</u>Policy makers/ farmers/think tanks find the information and knowledge relevant</p>

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.

Financial requirement and other details of the project are as follows:

S.No.	ACTIVITY/MONTHS	Units	Unit cost (INR)	Total (INR)	Note	Institution responsible
1.	Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer's socio economic and bio-physical conditions	Detailed below	Detailed below	1,25,00,000	Detailed below	DoA (Lead) in consultation with CIMMYT and VCs
1.1.	Village Baseline survey					
1.1.1	Survey and travel cost	250	4,200	10,50,000	One survey per selected village (target 250) will be done at an average cost of Rs. 4200	
1.1.2	Survey equipment	250	5,000	12,50,000	Survey equipment kit @5000 for each village	
1.1.2	Focussed Group Discussions (FGDs) at a community level	10	20,000	2,00,000	10 FGDs will be conducted involving 25 villages each, which will cost Rs. 20,000	
1.2.	Analysis of village survey data and prioritising the activity for each village	250	33,000	82,50,000	300 families data per village will be analysed and accordingly activities will be prioritised (pl elaborate taking into	
2.	Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies	Detailed below	Detailed below	1,75,00,000	Detailed below	DoA (Lead) in consultation with CIMMYT and VCs
2.1.	Strengthening the farmer's skill on implementing agronomic measures					

S.No.	ACTIVITY/MONTHS	Units	Unit cost (INR)	Total (INR)	Note	Institution responsible
2.1.1.	Capacity building trainings	100	5,000	5,00,000	2 trainings for 2 seasons (Rabi and Kharif) will be done	
2.1.2.	Provision of kit for implementing agricultural practices	1250	10,000	1,25,00,000	Each skilled youth will be provided with kit for implementing agricultural practices. Kit will include a tab, package and practices etc. which will cost approx. Rs. 10,000	
2.2	Training of farmers for implementing climate smart agricultural practices	150	10,000	15,00,000	25 trainings for both seasons for 3 years will be conducted for farmers.	
2.3	Exposure visits/travelling seminars	100	30,000	30,00,000	5 Exposure visits each for the Rabi and Kharif season in 10 villages will be conducted for the farmers at 3 levels i.e. district, inter-districts and inter-state levels	
3.	Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains	Detailed below	Detailed below	2,39,50,000	Detailed below	DoA (Lead) in consultation with CIMMYT and CCSHAU
3.1	FGDs of knowledge partners for Strengthening youth on real time technologies	200	1,000	2,00,000	Knowledge partners would be taken on board for disseminating the information to youth regarding the application of real-time technologies. Existing infrastructure facilities of government institutions would be used for the same. A sitting fee of Rs. 1000 would be provided to each knowledge partner.	

S.No.	ACTIVITY/MONTHS	Units	Unit cost (INR)	Total (INR)	Note	Institution responsible
3.2	Provision of Green Seeder at village level	250	45,000	1,12,50,000	A Green Seeder to each village will be provided which cost approx. Rs. 45,000	
3.3	Information from real time technologies for planning agricultural practices			---	Information from existing meteorological services from M. Kisan and CCSHAU	
3.4	Provision of services on practices to be implemented at village level	250	50,000	1,25,00,000	Information to each village regarding the best practices to be implemented will be provided	
4.0	Implementing/Innovating science based suitable climate change adaptation strategies/ practices	Detailed below	Detailed below	15,37,50,000	Detailed below	DoA (Lead) in consultation with CIMMYT and VCs
4.1	Developing excellence centre (model) at each village					
4.1.1	Providing Happy Seeder	250	1,25,000	3,12,50,000	An happy seeder (@1,25,000) will be provided to model farm of each village, which can be utilised by village farmers	
4.1.2	Providing Multi-crop planter	250	60,000	1,50,00,000	A multi-crop planter (@60,000) will be provided to model farm of each village, which can be utilised by village farmers	
4.1.3	Providing Maize thresher	100	1,00,000	1,00,00,000	Maize thresher (@1,00,000) will be provided to 100 villages, where Maize is the primary grown crop	
4.2	Providing agricultural inputs to farming fields	1,500	65,000	9,75,00,000	Agricultural feed will be provided to farming fields of 250 villages twice in a year (Rabi and Kharif seasons) for 3 years	

S.No.	ACTIVITY/MONTHS	Units	Unit cost (INR)	Total (INR)	Note	Institution responsible
5.0	Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing	Detailed below	Detailed below	1,50,00,000	Detailed below	DoA (Lead) in consultation with NABARD, DoE, CCSHAU, CIMMYT, VCs
5.1	Conducting Project Workshops (Inception, mid-term and final)	3	2,00,000	6,00,000	3 Project workshops will be conducted at inception, mid-term and final levels	
5.2	Developing knowledge products	--	--	1,44,00,000	Atleast 2 films (bilingual), 4-5 manuals for various project activities, posters for workshops and 6 research papers will be developed	
	Total			22,27,00,000		
6.0	Cost of Management of the project including monitoring and evaluation			1,78,16,000	8% of the total cost	
6.1	NIE fee			66,81,000	3% of the total cost	
6.2	Charges for coordination, facilitation, visits/meetings, man power etc. during project implementation			1,11,35,000	5% of the total cost	
	GRAND TOTAL			24,05,16,000		

Proposed expenditure on cost of agri inputs, labour etc. to be incurred in the Model Farms may please be incorporated in the Estimate, if not done.

f) Include a disbursement schedule with time-bound milestones at the component level

Project has been proposed for the duration of 3years involving mainly **five** components namely, Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer’s socio economic and bio-physical conditions; Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies; Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains; Implementing/Innovating science based suitable climate change adaptation strategies/ practices and Mainstreaming adaptation strategies into policies and programmes through better Knowledge Management and Sharing. Based on the success and demand of the product, it will be replicated to other villages of the districts. The timeline for each activity are as follows:

S. No.	ACTIVITY	Year 1				Year 2				Year 3			
		3	6	9	12	3	6	9	12	3	6	9	12
1.	Targeting and identifying different climate smart interventions in targeted climate vulnerable villages in Haryana as per farmer’s socio economic and bio-physical conditions												
1.1	Village survey												
1.2	Focussed Group Discussions at community level												
1.3	Analysis of village survey data and prioritising the climate smart interventions for each village												
2.	Enhancing the capacities of stakeholders for implementing and sustaining the climate change adaptation strategies												
2.1	Skill development of 5 youths per village (Provision of certified training courses,												

S. No.	ACTIVITY	Year 1				Year 2				Year 3			
		3	6	9	12	3	6	9	12	3	6	9	12
	agricultural kits etc.)	■	■			■	■						
2.2	Trainings of farmers on agricultural technologies			■	■			■	■				
2.3	Exposure visits/Travelling seminars at district, inter-district and inter-state levels				■			■				■	■
3.	Real-time promotion of risk management practices/ strategies of climate smart agriculture through agro-advisories for resource poor farmers in target domains												
3.1	Development of a network of knowledge partners	■	■										
3.2	Regular provision of weather based agro advisories for planning agricultural operations by knowledge partners			■	■	■	■	■	■	■	■	■	■
4.	Implementing/Innovating science based suitable climate change adaptation strategies/practices												
4.1	Developing excellence/innovation model in each village (Provision of equipment, input material etc.)	■	■										
4.2	Replication of agricultural activities in other areas of villages using the equipment available at the model area of each village			■	■	■	■	■	■	■	■	■	
5.	Mainstreaming adaptation strategies into policies and programmes through better knowledge management and sharing												
5.1	Workshops- Inception, mid-term and final with partners and experts to review the project outcomes	■					■	■				■	■
5.2	Development of knowledge/outreach products (film, manual, booklets etc.) for disseminating the information to wider population											■	■

