Concept Note for Mainstreaming Climate Sensitive Planning of Budgetary Schemes

Agriculture Department

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Introduction - Climate Context and Agriculture Sector

Among the pressing development challenges for the country, coping with climate change impacts would demand utmost policy priority and action from Indian national and State governments. With rural, and particularly farm livelihoods highly vulnerable to projected changes in temperature and rainfall, the economic impacts would have a cascading effect across other sectors as well. While overarching policies and action plans are chalked out for sectoral responses (such as National Missions, SAPCC strategies etc.), it is equally important to enhance the understanding and capacity of government institutions on the dimensions of this challenge as it is to forecast future climate scenarios. This is owing to the significant scale of development programmes designed and delivered by the public administration.

In Chhattisgarh, paddy is grown in 3.7 million hectares and out of which about 70% is rainfed. Thus, rainfed rice production has always remained a challenge in Chhattisgarh. Under wide range of farming situations and soil conditions, except upland light soil, rice is widely accepted and grown by the farmers depending upon their socio-economic conditions. During kharif, growing of rice is a tradition while, in rabi, there are fewer options for the stakeholders to take profitable and/or suitable crops. Under these circumstances, farmers generally follow a cropping patter of rice – wheat, rice – mustard and rice – winter vegetables under partially or assured irrigation and rice- fallow, rice – utera (Lathyrus, chickpea and linseed) under rainfed situation.

There are evidences to suggest that there is considerable regional climate change including rainfall departures[1] on negative side impacting rural livelihood system and agricultural production –the source of food, income and employment security for majority of its people. There is scope to increase productivity and increase income from agriculture and allied sectors in the state. There is a direct link between climate change and food and economic security of the agrarian people of the state. The most vulnerable groups of the state live in drought prone areas, forests and rainfed farming situations. Even small unforeseen changes in the climate could cause irreversible losses and may force these people into destitution.

In line with the national guidelines, the State of Chhattisgarh has prepared its State Action Plan on Climate Change (SAPCC), with sector-specific strategies. ***The most pertinent climate change risks to the State include rainfall variability, increased periods of drought and rise in temperature. Spatial distribution of rainfall is also projected to become relatively skewed.*** Consequently, the agriculture sector would have to tackle the primary issue of maintaining productivity, especially during the *rabi* season. Associated concerns are irrigation coverage, soil health (which is at risk due to the prevalent practice of monoculture) and therefore food security (given the State is among the nation's important producers of paddy). The State's priority is therefore identified across areas of improving knowledge and information systems w.r.t weather patterns and climate, crop planning harmonised with agro-climatic zones, conservation of water and soil nutrients, efficiency in irrigation, crop diversification and strengthening market linkages, to name a few.

Analysis of public expenditure for climate linkages

Given the scope of climate change impacts on the State and the importance of addressing the same, ***steps should be taken towards integrating these concerns into the Government's planning and budgeting processes.*** An important step in this effort is the application of its Climate Change Financing Framework (CCFF) on public budgets – this helps the government ***identify and prioritise areas of intervention that are critical from a climate change perspective*****.** The current analysis proposes that deliberations on climate

[1] See Annexure 1

resilience building and climate proofing of interventions become an integral part of the government's annual budgeting decisions.

The fundamental premise of undertaking this exercise is two-fold:

1. **While most ongoing programmes in Departmental budgets may not have an explicit focus on climate change, their implementation could potentially yield climate co-benefits – these are opportunities for resilience building that should be identified.**
2. **If future climate projections were not taken into consideration in ongoing and new programmes, then the intended benefits would be significantly reduced due to adverse impacts of climate change – these are areas to improve the preparedness to future CC risks, i.e. for climate proofing**.

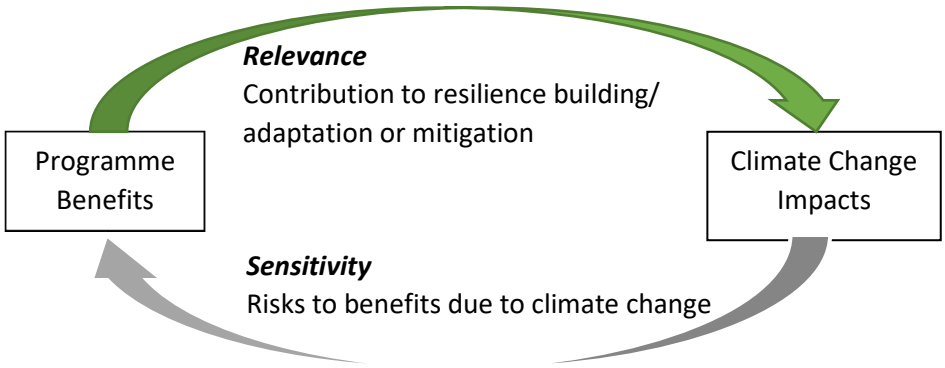
Therefore, the Climate Change Impact Appraisal (CCIA) is being proposed as a prioritisation tool to support the government in analysing and re-orienting its budget to improve the climate resilience of the community and infrastructure. CCIP has conducted this appraisal for three key sectors: Water Resources, Agriculture and Forestry. This report presents the CCIA results for the Chhattisgarh Agriculture Department.

Methodology – The Phased CCIA

The Phased CCIA is an assessment tool that involves an analysis of the benefits of programmes for their linkages with climate change factors (such as projected rise in temperature, erratic precipitation pattern, high intensity floods, longer drought spells etc.). The CCIA identifies 2 dimensions of programme benefits: the climate relevance and climate sensitivity (shown in Figure 1):

1. Climate change relevance: the potential contribution of the benefit to improving CC resilience or mitigation outcomes
2. Climate change sensitivity: the extent to which the benefit is affected by CC risks of the region being analysed

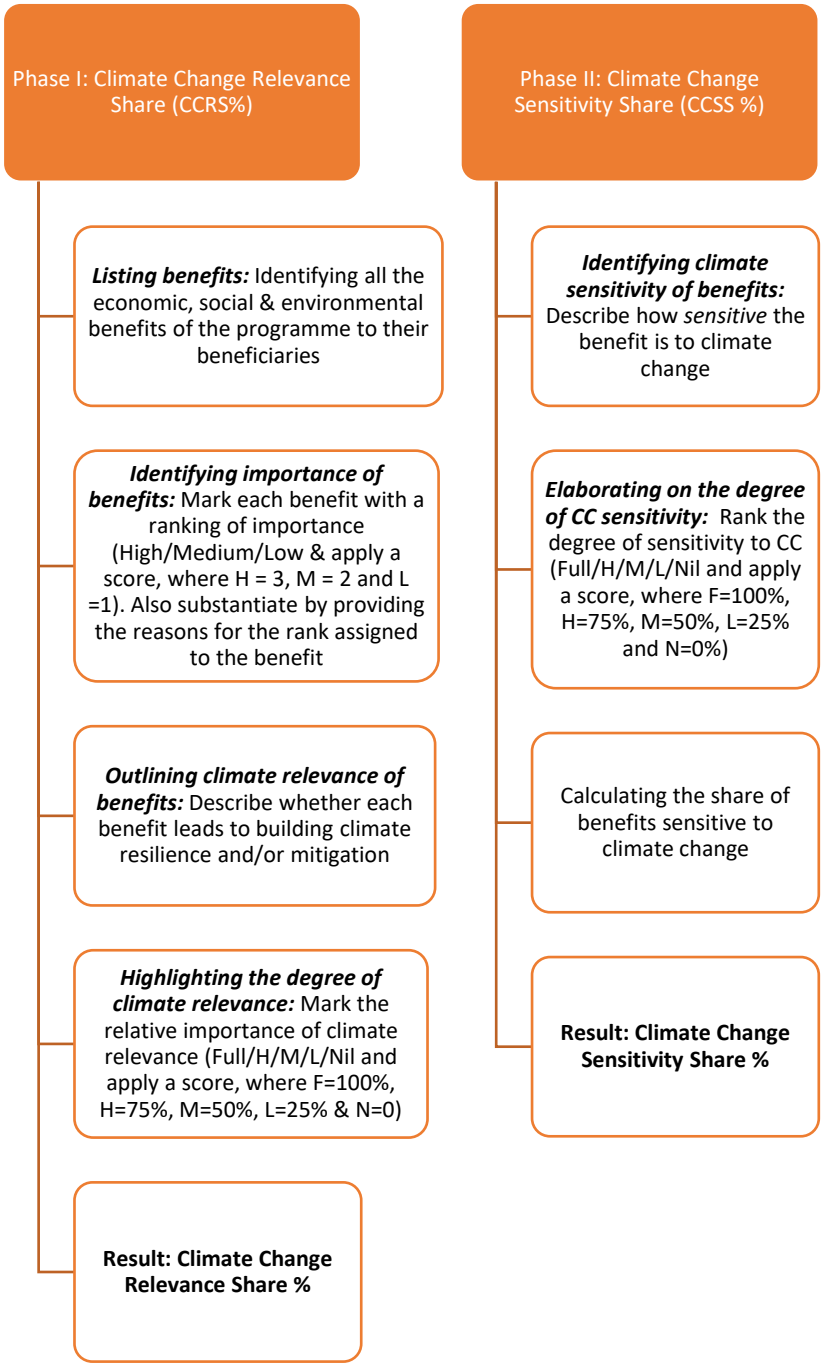
FIGURE 1: Climate Change Relevance and Sensitivity



Programmes/interventions with high CC relevance are valuable because of their default contribution to building CC resilience, and hence are good practices to be retained (and also funded on a sustained basis). High CC sensitivity in programmes relates to components that require some form of proofing effort (design level changes that would help reduce or eliminate adverse CC impacts). It is important that these interventions are funded only with special attention to such proofing – otherwise this investment would be at risk from future CC-induced losses and damages.

A summary of steps involved in conducting a Phased CCIA is shown below, and a detailed version is provided in Annex 2.

FIGURE 2: Steps in Phased CCIA



Source: Climate Change Innovation Programme, 2018

Table 1 shows the various possible combinations of CC relevance and sensitivity that may arise from the Phased CCIA, along with key policy recommendations. Based on time and resource availability, planners could adopt the appropriate response strategies for programmes in each of the four categories.

TABLE 1: Matrix of climate relevance and sensitivity

Phased CCIA Score		Climate Relevance (resilience building/adaptation/mitigation)	
		High	Low
Climate Sensitivity (loss and damage due to floods/cyclones/droughts)	High	**A high priority for scrutiny**: **Retain benefits** with *positive* climate sensitivity **Climate-proof benefits** with *negative* sensitivity	**Design changes** to enhance climate resilience and also **more climate proofing** effort to insure against welfare losses from climate hazards (in case of negative sensitivity) In case of *positive* sensitivity, enhancing climate resilience would reap dual benefits
	Low	Climate change benefits accrue with relatively less impact (or loss) from climate risks – ***low hanging fruits***	Regular monitoring and review effort – To explore the future scope of mainstreaming climate concerns. Comprehensive assessments needed to **evaluate allocations** in such programmes

Source: Climate Change Innovation Programme, 2018

Results from the Agriculture Department Budget

The Chhattisgarh Agriculture Department has a total budget of INR 4452.63 crores for the year 2018-19 (Budget Estimates). The Plan outlay accounts for 91% of this, and the top 10 schemes among this have been considered for further study (shown in Table 2).

TABLE 2: Top 10 Schemes included in the analysis

S.No	Scheme Number	Scheme Name	Budget Estimate 2018-19 (in INR `000)
1	8972	Bonus on paddy cultivation	21075000
2	7350	Integrated Watershed Management Programme (IWMP)	2000000
3	7242	Rashtriya Krishi Vikas Yojana (General)	1900000
4	8942	Rashtriya Krishi Vikas Yojana (Green Revolution)	1750000
5	9182	Indira Gandhi Krishi Vishwavidyalaya (IGKV)	1686600
6	7797	Pradhan Mantri Fasal Bima Yojana	1360000
7	7705	Mission for Integrated Development of Horticulture	1300000
8	7255	National Food Security Mission	1206000
9	6820	Krishi Samagra Vikas Yojana	930200
10	7853	NABARD funded Micro-irrigation scheme	930000

It is important to note the following regarding the schemes selected for the current analysis:

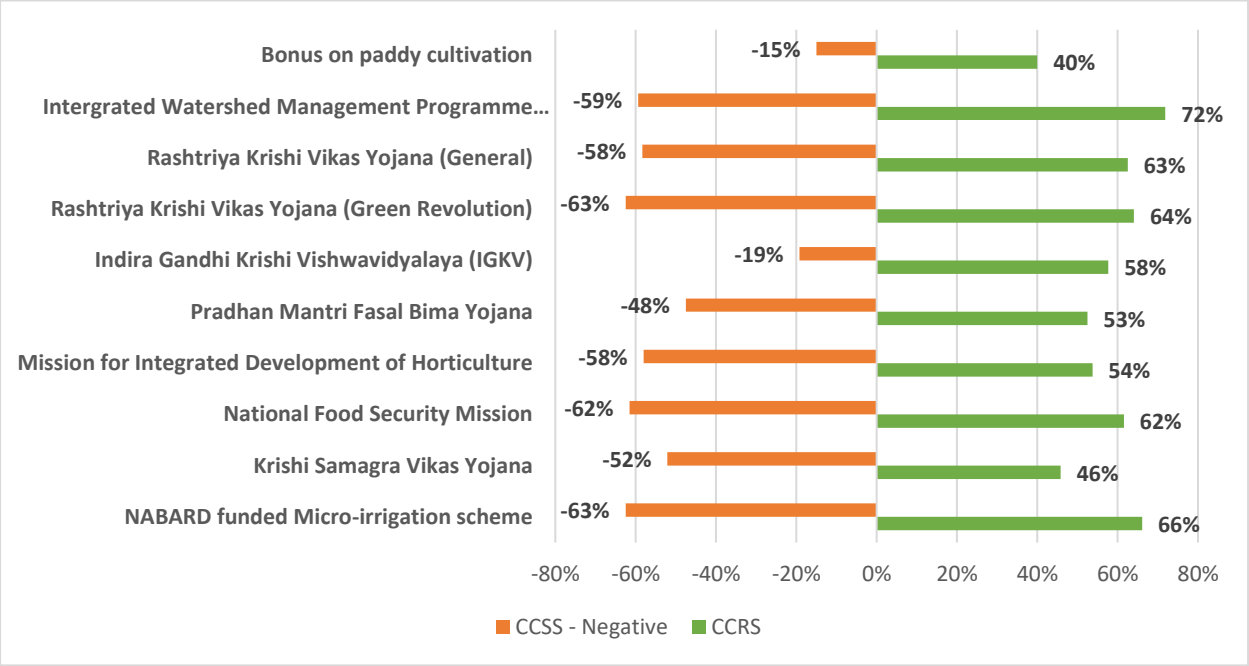
- The scope of this analysis is only the top 10 schemes of the Department budget – this has been done to demonstrate the Phased CCIA approach and familiarise planners in the government of the application of such a prioritisation tool.
- Moreover, these 10 schemes constitute 84% of the Plan outlay, hence covering a significant part of the Plan budget.

The schemes analysed are focused on improving production of food grains, pulses, horticulture crops, providing inputs support, nutrient and pest management demonstrations, water conservation as well as improving post-harvest market linkages. The CCIA analysis shows that:

- Highly climate relevant components provide benefits relating to water conservation, irrigation efficiency, enhanced soil moisture content and productivity gains (with a special focus on the vulnerable sections of the farming community). These are observed in the Integrated Watershed Management Programme (IWMP), NABARD-funded Micro Irrigation Scheme, Rashtriya Krishi Vikas Yojana and the National Food Security Mission (NFSM), which have a relatively high CCRS.
- Highly climate sensitive components relate to improving groundwater recharge, enhancing soil moisture and nutrient content, improving food security from increased food grain production and raising farm incomes, especially for the marginal and small farmer categories. The schemes on Micro Irrigation, Rashtriya Krishi Vikas Yojana (Green Revolution), IWMP and NFSM have a relatively high CCSS (it may be noted that most of these schemes also have a high CCRS).

Figure 3 shows the CC relevance and sensitivity of these ten schemes graphically, for comparison.

FIGURE 3: Phased CCIA Results: Agriculture



Way forward: Climate Proofing of top three climate-sensitive schemes

From the above Phased CCIA analysis, the top three most climate sensitive schemes are chosen for further scrutiny: to provide indicative guidelines for their climate proofing. Given the high climate sensitivity, these programmes require urgent policy attention (mainly in the form of climate proofing, as suggested in the top 2 quadrants of the matrix in Table 1). These schemes are:

1. 7853 – NABARD-funded Micro Irrigation Scheme
2. 8942 – Rashtriya Krishi Vikas Yojana (Green Revolution)
3. 7255 – National Food Security Mission

A summary of the Phased CCIA for these schemes is provided in Annex 3, while detailed analyses of benefits are separately provided in worksheets. The next step is to outline a set of proofing suggestions that could be considered by the concerned programme officers of the Agriculture Department for future planning w.r.t these schemes, such that their climate sensitivity is *reduced,* and their climate resilience is *enhanced*.

Proofing Guidelines for the Agriculture Sector

All the three schemes mentioned above have common benefits which needs to be protected from climate change concerns. These are: increased productivity, less exposure to rain-fed production by increasing irrigation access, improved soil and water management and better farm management. Even in areas where rainfall is ample, it is unevenly distributed; affecting the crop yields due to excess water at one time and due to water stress at others. Therefore, natural occurrence of rainfall both in time frame and space has to be managed for sustainable growth and development. It is obvious that low and fluctuating rainfall during crop growing season is a major constraint for improving crop production in rainfed regions. With almost negligible irrigation facilities in rainfed regions, rain water shortages often lead to moisture stress causing substantial reduction in crop yields. This is also true for Chhattisgarh as the onset of monsoon at the initial sowing stage, break monsoon conditions during crop growth stages and cessation of rainfall at the terminal stage determine the productivity of rice and other *kharif* crops.

The agriculture department in Chhattisgarh has already taken steps to strengthen real time weather based agro-advisory dissemination through Gramin Krishi Mausam Sewa Project. Weather based crop insurance for different crops through Pradhan Mantri Fasal Bima Yojna and Restructured Horticulture Based Crop Insurance scheme has been implemented by state Agriculture and Horticulture Departments. Awareness and motivational programme are being organized with reference to climate change and exposure visit is being organized for capacity building of farmers through training programmes at village level.

Other than these, some additional coping mechanisms could be included/ strengthened through the schemes mentioned above. Some of the coping mechanisms for the agriculture sector are listed below:

I. Crop/ cropping system management

<u>Mechanization in agriculture</u>:

Mechanization is an important coping mechanism in changing climate scenario. Through mechanization, farmers can cover more area within short span of time in extreme weather situation. It is also helpful to complete the various farm operations in time which will help in sustainable production particularly in rainfed agriculture. In state research by IGKV has developed MB plough, cultivator, rotovator, paddy puddler, Soyabean seed drill, mechanical rice transplanter, SRI marker, transplanting frame, seed cum fertilizer drill, rice planter, mechanical weeder, power weeder, power sprayer, PTO operated sprayer, duster, vertical conveyor reaper, tractor mounted reaper, harvester, multi-crop thrasher for completing farm operations within a specific limited period. Manufacturing these implements in large scale through partnership between IGKV and private sector and making them available to the farming community of the state will act as a coping mechanism against climate change. *This is one of the components of Rashtriya Krishi Vikas Yojana (Green Revolution) as well which may be focused upon exclusively for rapid farm mechanization. Suitable incentive mechanisms could be designed for the same to increase uptake*.

II. Soil and water conservation

a) Scientifically designed technique for construction of farm ponds, percolation tanks, dug wells, nala bandhan and check dams technology has been developed considering the station specific

requirement and demonstration has been carried out in the farmers' fields by IGKV. Harvesting surplus runoff in dug out ponds and recycling the same for providing supplemental irrigation to kharif crops or pre-sowing irrigation to rabi crops has proved to be the most successful technologies for adoption. Water harvesting becomes more relevant now in view of the recent increase in the extreme events wherein heavy rainfall is occurring in few days followed by long dry spells. Under such circumstances, the only answer is harvesting the surplus runoff during high rainfall events and using the same during dry spells for critical irrigation. *Unfortunately, water harvesting has not got focus in any of the three schemes. The agriculture department may consider introducing the same as part of any of these schemes. Simultaneously, crop diversification may be planned based on the water harvesting for sustainable crop production.*

b) While micro-irrigation system has been focussed on in all the three schemes, the agriculture department should also consider alternate moisture conservation techniques within the ambit of these schemes. These could include use of plasticulture, contour bunding, staggered trenches, Gabien structures and Soil mulch/ straw mulches. *It is possible that the department is already experimenting with such techniques in pilot scale, however large-scale uptake should be the focus of these schemes. Further, the department could consider introduction of new crops along with micro-irrigation system in convergence with the Water Resources Department through integrated planning of irrigation and agriculture at district levels to increase productivity, crop diversification and farmer income. This will ensure that the right crop suited to the water availability in a particular region is focussed on for production instead of depending on irrigation to produce unsustainable crops; for example, growing sugarcane in rain shadow areas.*

III. Crop production

a) Promotion of agro-climatic zone specific drought resistant varieties would help in sustainable crop production and lower input costs. Some of the varieties of paddy which are identified abiotic stress tolerant in different agro-climatic zones of Chhattisgarh are listed in **Annexure-IV**. However, the agriculture department needs to set up processes to manage the timely production and supply of different varieties of seeds depending on forecast weather patterns.

b) Broad bed furrow system and allied enterprises and technologies for rainfed farming according to the local need and agroclimatic situations to be promoted.

c) Location specific farming system and plan for crop diversification could be developed through IGKV and promoted through any of the schemes. Integrated Farming System which has already been developed for small, medium and marginal farming community of the state could be promoted through the schemes.

d) For variable rainfall scenarios, farm pond based Integrated Farming Solution along with pisciculture may be promoted. Another alternative is to promote mushroom cultivation and use of mushroom waste for preparation of organic manure/ vermicompost.

Annex 1: Regional Climate Change Studies in Chhattisgarh

Long term data analysis indicates that climatic variations are manifesting in the state.

For Jagdalpur station representing Bastar district, minimum temperature has gone down in all seasons and also on annual basis, but the most significant change has been observed in winter season when comparison is made between 1991-2013 and the base period of 1961-1990 which shows that winters are now harsher.

At Pendraroad, maximum temperature has shown increasing pattern in all seasons and on annual basis.

At Ambikapur, representing northern region of the state, minimum temperature has shown significant decreasing pattern at different levels during NEM, SWM, winter seasons and also on annual basis during 1991-2013. This decreasing temperature is creating favourable climatic condition for rabi crops in this region as wheat is the main crop in this region.

However, at Raipur, representing Chhattisgarh plains, there are significant increasing trends in minimum temperature at different levels which can have adverse consequences on rabi crops.

From the database of 1961-2013, decreasing trends of annual rainfall and SWM monsoonal rainfall has been found in Raigarh, Rajnandgaon districts. Whereas from the results of database of 1991-2013 which is more recent, decreasing trend in annual and SWM rainfall is observed in Ambikapur and there is rising trend in annual rainfall for Mahasamund. It can be very well observed that there are some districts like Raigarh and Rajnandgaon which are the worst affected and negative departure observed in these districts, -20.6% to -15.8% respectively during the period 1991-2013 as compared to 1961-90.

Change of south-western rainfall is analyzed and it can be very well observed that in most of the districts, negative departure of SW rainfall was observed and it is varying from -0.1% to -20.8% when the two time periods are compared. There are some districts where there is positive trend in SWM rainfall. One such district is Korba where increasing and positive trend of 7.6% is being observed in the recent past of 1991-2013.

ANNEX 2: PHASED CCIA – DETAILED STEPS

Listing and scoring the benefits:

- Describe (and discuss among yourselves) the activities/ scope of the scheme as well as the most pertinent risks of the climate scheme being analysed
- List all the benefits of the scheme, including development and climate relevant benefits. Include any major spillover or co-benefits of the programme, even if these are not explicit objectives of the scheme objectives (Column 1)
- Assign the degree of importance of each benefit (H/M/L) and score them as 3,2,1 respectively (Columns 2 & 3). Give the reason of the classification in the matrix (Column 4), for better understanding. Total up these scores.

Guide to scores:
High = 3
Medium = 2
Low = 1

Phase I - Climate Change Relevance:

- Describe whether the benefit can contribute towards CC resilience building or CC mitigation, with specific reference to CC factors identified in Step 1 (Column 5).
- Assign the degree of CC relevance (F/H/M/L/N) at (100% ,75% ,50% ,25% ,0 %) respectively (Columns 6 & 7). Ask the question: How strong is this benefit in contributing to CC resilience/mitigation? Give the reason of the classification in the matrix, for better understanding.

Guide to scores:
Nil = 0% (No scope/link with CC resilience)
Low = 25% (Very limited/marginal significance to CC)
Medium = 50% (Moderate linkage to CC resilience)
High = 75% (Predominant factor in contributing to CC resilience)
Full = 100% (Benefit has value only in the event of CC – e.g. mitigation outcomes)

Assess the parameters/factors that help building climate change resilience and decide how prominent each benefit is?
i.e. the more exclusive the benefit is, in contributing to CC resilience/mitigation, the higher its CC relevance. *List the CC relevance scores by comparing the importance of the benefit in the climate change scenario as compared to the non-climate change scenario.*

- Calculate the Climate change Relevance Share (CCRS) of benefits (Column 8) as:

CCRS = Degree of Relevance (Benefit score) * Total of degree of CC relevance
CCRS = Column 3 * Column 7

Total the CCRS of all these benefits and divide by total of benefit ranks. This gives the combined CCRS of the scheme

Phase II - Climate Change Sensitivity:

- Describe the risks from CC to each benefit (Column 9).
- Assign a score of (F/H/M/L/N) comprising 100%, 75%, 50%, 25% and 0 respectively (Columns 10 & 11). Ask the question: How exclusive are the risks to this benefit because of the climate change as compared to other factors? How strongly will the benefit be impacted in a climate change scenario as compared to the non-climate change scenario?
  Note: *Always consider the benefit through the context of the specific scheme: Not as the Generic/Sectoral phenomenon, independent of the scheme context.*
  Give the reason of the classification in the matrix, for better understanding.

Guide to scores:
Nil = 0% (No sensitivity to climate change impacts)
Low = 25% (Very limited/marginal sensitivity to CC impacts)
Medium = 50% (Moderate sensitivity to CC (CC is among the many factors that could affect this benefit, but not the dominant one)
High = 75% (Predominant sensitivity to CC i.e. CC impacts are likely to cause more damage than any other factors)
Full = 100% (The benefit is ONLY exposed to climate change risks, and not any other factor)

- Calculate the CC Sensitivity Share of the scheme (CCSS) of benefits (Column 12):

  Rank of Importance of benefits (Benefit score) * Degree of importance of CC sensitivity
  CCSS = Column 3 * Column 11

Total the CCSS of all the benefits and divide by total of the benefit ranks. Thus, CCSS of the scheme is the addition of CCSS of all the benefits

ANNEX 3: Phased CCIA Results of most climate sensitive schemes from the Agriculture Department Budget

TABLE A.1: 7853 – NABARD-funded Micro Irrigation Scheme

S.No	Benefits of the Project (including CC Benefits)	Relative importance of Benefit (H/M/L)	Score	Reason for benefit score	Climate resilience building and/or mitigation relevance	Relative Importance of climate relevance (F/H/M/L/N)	Score	Climate Change Relevance Share	Nature of sensitivity of benefit to CC	Relative importance of climate sensitivity (F/H/M/L/N)	Score	Direction	Climate sensitivity score
1	Improved access to irrigation, thereby increase in farm output	H	3	This is one of the primary motivations for supporting micro-irrigation	This enhances the farmers' capacity to sustain output even during varying rainfall patterns in the context of climate change	H	75%	2.25	There is greater benefit of micro-irrigation access to farm lands, when rainfall variability and longer drought spells are anticipated. Yet, changes in overall water availability would limit this benefit.	H	75%	Negative	-2.25
2	Increase in farm income from higher output, potential crop diversification and reduced crop loss, especially for the small and marginal farmers	H	3	This is a primary objective of this scheme, hence financial support is also greater for the marginal & small farmer categories	This contributes to income resilience of the relatively more vulnerable sections of society, hence a high score is given	H	75%	2.25	Similar to #1 above	H	75%	Negative	-2.25
3	Increased land under cultivation from improved irrigation facilities	M	2	This is a derived benefit from micro-irrigation (need not always occur, hence given a medium score of importance)	Similar contribution to income resilience	M	50%	1	Similar to #1 above	H	75%	Negative	-1.5
4	Improved water use efficiency from use of drip and	H	3	This is one of the primary motivations for supporting	Improves resilience by ensuring sustained availability of	H	75%	2.25	Micro irrigation is bound to receive greater thrust in the context of falling ground	M	50%	Negative	-1.5

	sprinkler systems			micro-irrigation	scarce water resources				water reserves, however this benefit would be impacted by an overall threat to water availability due to drought/erratic rainfall				
5	Improved plant/crop health from effective application of fertilisers and pesicides	M	2	This is a derived benefit from fertigation	This helps boost farm incomes, similar to #3 above	M	50%	1	Rising temperatures may change profile of pestilence, hence limit this benefit	M	50%	Negative	-1
6	Reduced cost of inputs from fertigation, and efficient use of labour and electricity	L	1	Cost savings that are realised help sustain micro-irrigation practices over time	Same as above	M	50%	0.5	Adaptive methods of farm management may require changes in input composition, hence this benefit may be impacted in the short to medium term	L	25%	Negative	-0.25
		Total	14				Total	9.25				Total	-8.75
CCRS								**66%**	**CCSS**				**-63%**

TABLE A.2: 8942 – Rashtriya Krishi Vikas Yojana (Green Revolution)

S.No	Benefits of the Project (including CC Benefits)	Relative importance of Benefit (H/M/L)	Score	Reason for benefit score	Climate resilience building and/or mitigation relevance	Relative Importance of climate relevance (F/H/M/L/N)	Score	Climate Change Relevance Share	Nature of sensitivity of benefit to CC	Relative importance of climate sensitivity (F/H/M/L/N)	Score	Direction	Climate sensitivity score
1	Increase in farm output from subsidies and demonstration (high yielding varieties of rice and wheat)	H	3	These are the major objectives of this component of RKVY aimed at `Bringing Green Revolution in Eastern India'	This contributes to income resilience of the relatively more vulnerable sections of society, hence a high score is given	H	75%	2.25	Risks of irregular rainfall and severe droughts limit the benefits of productivity enhancements to farms.	H	75%	Negative	-2.25
2	Increased farm incomes from subsidies for farm mechanisation (tractors, levellers, tillers, weeder and multi-crop threshers)	H	3			H	75%	2.25	This benefit would be limited by impacts on farm output from longer droughts, erratic rainfall etc.	H	75%	Negative	-2.25
3	Improved soil productivity from promotion of bio-fertilisers and other nutrient management practices	H	3		This contributes to #1 above, and is realised over a period of time, hence given a moderate score	M	50%	1.5	Shorter term risks like droughts and irregular rainfall would affect this process of enriching soil productivity, which is time bound. Howevere a moderate score is given due to the ameliorating effects from improved percolation and nutrient retention capacity	M	50%	Negative	-1.5
4	Improved access to irrigation from support for	M	2	This is a support function to the	This enhances the farmers' capacity to sustain output	H	75%	1.5	There is greater benefit of such minor	H	75%	Negative	-1.5

	construction of check-dams and minor irrigation tanks			above objectives	even during varying rainfall patterns in the context of climate change				irrigation access to farm lands, when rainfall variability and longer drought spells are anticipated. Yet, changes in overall water availability would limit this benefit.				
5	Improvement in water infiltration from construction of check-dams and tanks	M	2	This is a derived benefit from check-dams	This directly contributes to preserving soil moisture and water levels	H	75%	1.5	Similar to #4 above	H	75%	Negative	-1.5
6	Improved storage facilities for grains through support for sheds and spaces in godowns	M	2	This is a secondary benefit, to support/incentivise other RKVY initiatives to boost farm productivity and revenue	This helps maximise revenue from farm output, hence contributes to more stable farm incomes	M	50%	1	This is an institutional support, and CC risks are perceived more on physical infrastructure	M	50%	Negative	-1
7	Improved farming skills from cropping system based training	L	1	This is a support function to the objectives of mechanisation and improved farm management	This can help farmers become more prepared to tackle CC risks only to the extent training also focuses on this scenario (hence given a low relevance score)	L	25%	0.25	Climate risks could induce training modules to address adaptive techniques	L	25%	Positive	0.25
		Total	16				Total	10.25				Total	-9.75
CCRS								**64%**	**CCSS**				**-61%**

TABLE A.3: 7255 – National Food Security Mission

S.No	Benefits of the Project (including CC Benefits)	Relative importance of Benefit (H/M/L)	Score	Reason for benefit score	Climate resilience building and/or mitigation relevance	Relative Importance of climate relevance (F/H/M/L/N)	Score	Climate Change Relevance Share	Nature of sensitivity of benefit to CC	Relative importance of climate sensitivity (F/H/M/L/N)	Score	Direction	Climate sensitivity score
1	Improved food security from increased production of food grains and pulses	H	3	These are the primary objectives of NFSM	This contributes to greater resilience from both a financial and physical well-being perspective	M	50%	1.5	Risks of irregular rainfall and severe droughts limit the benefits of productivity enhancements to farms.	H	75%	Negative	-2.25
2	Improved farm productivity from use of high yielding seed varieties, mechanisation and input management	H	3		This contributes to income resilience of the relatively more vulnerable sections of society, hence a high score is given	H	75%	2.25		H	75%	Negative	-2.25
3	Improved farm incomes from support for input procurement and related training	M	2	This is a derived benefit from #2 above		H	75%	1.5	This benefit would be limited by impacts on farm output from longer droughts, erratic rainfall etc.	H	75%	Negative	-1.5
4	Improved water use efficiency from use of sprinkler systems and mobile rain guns	M	2	This is a secondary benefit to support improving grain production with higher irrigation capacity	Improves resilience by ensuring sustained availability of scarce water resources	H	75%	1.5	Micro irrigation is bound to receive greater thrust in the context of falling ground water reserves, however this benefit would be impacted by an overall threat to water availability due to drought/erratic rainfall	M	50%	Negative	-1
5	Improved storage facilities for grains through support for go-downs	M	2	This is a secondary benefit to support improving grain	This helps maximise revenue from farm output, hence contributes	M	50%	1	This is an institutional support, and CC risks are perceived more	M	50%	Negative	-1

				production with greater market linkages	to more stable farm incomes				on physical infrastructure				
6	Improved farming skills from cropping system based training	L	1	This is a support function to the objectives of NFSM	This can help farmers become more prepared to tackle CC risks only to the extent training also focuses on this scenario (hence given a low relevance score)	L	25%	0.25	Climate risks could induce training modules to address adaptive techniques	L	25%	Positive	0.25
		Total	13				Total	8				Total	-8
CCRS								**62%**	**CCSS***				**-62%**

* Only the negative climate sensitivity components are summed up here, to focus the attention on proofing requirements.

Annexure-IV: List of varieties of rice crop with abiotic stress tolerance in different agro-climatic zones (ACZ) of Chhattisgarh

ACZ	Delayed Monsoon	Drought Tolerance	Flooding/ Submergence Tolerance	Heat Tolerance
Central Plains	Vanprabha, Indira Rajeshwari, Indira Sona, Aditya, Danteshwari	Poornima, Tulsi, Kranti, Indira Barani Dhan -1, Samleshwari, Annada, Aditya, Kalinga-3	Jaldubi Baleshwari, Mahamaya	Karma Mahsuri
Northern Hills	Indira Rajeshwari, Vanprabha, Indira Sona	Poornima, Tulsi, Kranti, Indira Barani Dhan-1, Samleshwari, Annada, Aditya, Kalinga-3	Jaldubi Baleshwari, Mahamaya	Karma Mahsuri
Bastar Plateau	Vanprabha, Annada, Aditya, Samleshwari, Indira Sona	Pradhan, Lalu Chanda, Satka Vandana, Poornima	Jaldubi Baleshwari, Mahamaya	

Seeds for all the varieties are available from IGKV seed farm and Chhattisgarh Rajya Beej Avam Krishi Vikas Nigam

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