सत्यमेव जयते
Government of Rajasthan

Chief Minister's Rajasthan Economic Transformation Advisory Council (CMRETAC)

DEPARTMENT OF PLANNING, RAJASTHAN

POLICY STUDY ON RE-CALIBRATING INSTITUTIONS FOR CLIMATE ACTION

CEEW
THE COUNCIL

The Food and Land Use Coalition
India Country Platform

indicc associates
Technical Support Organisation
CMRETAC

2023

सत्यमेव जयते

Chief Minister, Rajasthan
& Chairman, Economic
Transformation Advisory Council

CHAIRMAN'S MESSAGE

Every state is important in the scheme of national development. We cannot assure the progress of India without the progress of the states. The Constitution binds us in a federal polity where every order of the government (Union, State and Local) has an important role to play. State governments are certainly closer to the people and hence bear an enormous responsibility towards ensuring effective delivery of goods and services.

In this endeavor, they have a direct, indirect, and enabling role to play. Rajasthan is committed towards that goal and has been at the forefront of many reforms since long. Our sincere and unceasing efforts, during the pandemic and otherwise, have been recognized widely.

The Bhilwara COVID-19 containment model has been recognized as a replicable model globally. Ours was also one of the first states in India which came up with a comprehensive strategy for economic revival in the wake of the pandemic. Besides taking a plethora of immediate steps to extend social and economic relief to the people during COVID-19, Rajasthan has also introduced several transformative measures in the recent past to boost the economy of the state. MSME Facilitation Act, 2019; Food Processing Policy, 2019; Tourism Policy, 2020; Mukyamantri Chiranjeevi Swasthya Bima Yojana, 2021; Handicraft Policy, 2022; Rajasthan Investment Promotion Scheme, 2022; Rajasthan Right to Health Care Act, 2022; Indira Gandhi Urban Employment Guarantee Scheme, 2022 and Vision 2030 are some of the path breaking initiatives undertaken by the government.

We also started a practice of 'thematic' annual budgets for converging our efforts and energy on most pressing issues and have ensured that governance is truly decentralized. Our campaigns on 'Prashasan Shehron Ke Sang Abhiyan' and 'Prashasan Gaon Ke Sang Abhiyan' are examples of that spirit.

While our efforts are incessant, structural slowdown and unexpected shocks like the pandemic can derail the economy. This calls for continuous preparedness on our part.

Creation of Chief Minister's Rajasthan Economic Transformation Advisory Council (CMRETAC) was a significant step to ensure our preparedness for short-term and long-term development objectives. In the year 2021-22, the Council prepared nine (09) policy studies on areas as diverse as Fiscal Management; Managing Urban Informal Sector; Integrated Agro-Business Infrastructure; Sustainable Agriculture; Doing Business; Quantifying Intangible Cultural Assets; Education and the New Paradigm (bridging digital divide); Medical Services; and Public Private Partnership in Infrastructure.

In the year 2022-23, the Council undertook six (06) new policy studies. These pertain to Building Energy Transition Roadmap; Financing Green Infrastructure; Urbanization of Rural Areas; Recalibrating Institutions to meet Climate Challenges; Using Data for Better Policy Formulation and Evidence-based Decision Making; and Redesigning Trade in the Era of E-commerce.

These policy areas may appear to be separate and discreet but one commonality that binds them all is that they are truly geared towards a bottom-up approach to the development of the state while embracing and addressing new challenges. I urge my colleagues in the state government to also focus on inter-linkages in these policy areas for the best possible outcomes.

I am confident that these fifteen (15) path breaking studies would be a valuable input for the state and I am happy to state that the present policy study is very much part of this endeavour.

I am grateful to the Members of the Council, my Ministerial colleagues, officers of the Government, all collaborators and organizations who have worked tirelessly to make this possible. My special acknowledgement to Dr. Arvind Mayaram, Vice Chairman, CMRETAC, whose leadership and contribution towards this endeavour have been extremely valuable. My appreciation is also to the entire team at CMRETAC which has diligently worked to put these reform-oriented studies together.

(Ashok Gehlot)

सत्यमेव जयते

Economic Advisor to CM
& Vice Chairman
CM's Rajasthan Economic
Transformation Advisory Council

VICE CHAIRMAN'S MESSAGE

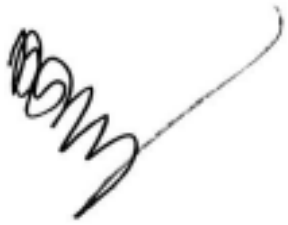
Between 1999–2018, more than 12,000 extreme weather events were recorded that led to losses worth USD 3.54 trillion globally. As per reports, India is the seventh-most vulnerable country with respect to climate extremes and suffered an annual loss of USD 87 billion due to extreme climate events.

Rajasthan is amongst the most vulnerable states in India. The rapidly changing patterns in rainfall and temperature have led to an increase in the frequency of extreme events in the state as well as erratic swapping trends. As per state-level ranking on the climate vulnerability index (CVI), Rajasthan ranks 7th. Around 88 per cent of districts in Rajasthan, which are home to 67 million people are vulnerable to drought or drought-like situations. Moreover, 10 per cent of the most vulnerable districts in India are from Rajasthan.

Climate action is therefore, one of the most important imperatives for the state. With this in mind, the Chief Minister's Rajasthan Economic Transformation Advisory Council (CMRETAC) in collaboration with the Council on Energy, Environment and Water (CEEW) prepared this policy study to identify key institutions and departments that need recalibration for climate action. Accordingly, an extensive research was carried out for three key department namely Energy, Water, Agriculture and Disaster management.

The study presents actionable ideas, including immediate interventions such as a user-friendly 'climate sensitivity checklist' for policy screening and larger structural changes for consolidating data from various departments, amongst others.

I extend my sincere gratitude to the Hon’ble Chief Minister for his unwavering support and guidance. I also express my gratitude to Hon’ble concerned Ministers, esteemed members of CMRETAC for their valuable guidance, concerned secretaries, other officers in the government, Technical Support Organization to CMRETAC and all other collaborators.



(Dr. Arvind Mayaram)

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Finally, any error or omission that may have remained is solely ours and should not be ascribed to any of the above acknowledged person or institutions.

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LIST OF ABBREVIATIONS

ACZ	:	Agroclimatic Zones
AHD	:	Animal Husbandry Department
ATMA	:	Agricultural Technology Management Agency
Aw	:	Hot With A Seasonally Dry Characteristic
BAU	:	Business-As-Usual
BWh.	:	Tropical Desert With A Hot And Arid Climate
CAF	:	Capacity Assessment Framework
CDP	:	Carbon Disclosure Project
CMRETAC	:	Chief Minister'S Rajasthan Economic Transformation Advisory Council
CMRETAC	:	Chief Minister Rajasthan Economic Transformation Advisory Council
CPDP	:	Camel Protection and Development Policy
CRC	:	Climate Resilience Centre
Csa	:	Interior Mediterranean- Featuring Mild Winters And Dry, Hot Summers
CVI	:	Climate Vulnerability Index
Cwa	:	Mild, Dry Winters And Hot Summers
DBT	:	Direct Benefit Transfer
DES	:	Directorate of Economics and Statistics
DMRD	:	Disaster Management and Relief Department
DoA	:	Department Of Agriculture
DoCC	:	Department of Climate Change
DoG	:	Directorate of Gopalan
DoH	:	Department of Horticulture
DoHD	:	Department of Dairy and Animal Husbandry
DoITC	:	Department of Information Technology and Communication
DRD	:	Department of Rural Development
ERCP	:	Eastern Rajasthan Canal Project
ETT	:	Embryo Transfer Technology
FFFA	:	Fertigation, Foliar Fertilisation And Automation

FOLU	:	Food And Land Use Coalition
GBSY	:	Gaushala Biogas Sahbhagita Yojna
GD	:	Gypsum Distribution
GHGs	:	Greenhouse Gas Emissions
GIAG	:	Grant-In-Aid To Gaushalas
GIS	:	Geographical Information Systems
GJCCD	:	Climate change department, Government of Gujarat
GSDP	:	Gross State Domestic Product
GVV	:	Gaushala Vikas Yojna
GWD	:	Groundwater Department
HAPs	:	Heat Action Plans
ICAR	:	Indian Council Of Agricultural Research
ILO	:	International Labour Organisation
IPP	:	Irrigation Pipeline Program
IPPP	:	Innovative Poultry Productivity Project
JJM	:	Jal Jeevan Mission
JMRC	:	Jaipur Metro Rail Corporation
JSA	:	Jal Shakti Abhiyan
JSA:CTR	:	Jal Shakti Abhiyan: Catch The Rain
KIIs	:	Key Informant Interviews
lpcd	:	Litres Per Capita Per Day
M&E	:	Department Of Monitoring And Evaluation
MBSY	:	Mukhyamantri Beej Swavlamban Yojana
MHMC	:	Mangrove cell, Government of Maharashtra
MJPMSKY	:	Mahatma Jyotiba Phoole Mandi Shramik Kalyan Yojana
MMYKY-SDT	:	Mukhyamantri Yuva Kaushal Yojna-Skill Development Tech
MoHUA	:	Urban Development and Housing
MoJS	:	Ministry Of Jal Shakti
MSP	:	Minimum Support Prices
NADCP	:	National Animal Disease Control Programme
NADCP-FMD	:	National Animal Disease Control Programme-Foot and mouth disease and Brucellosis
NAIP IV	:	National Artificial Insemination Programme

NDCs	:	Nationally Determined Contributions
NDSP-PPPR	:	National Dairy Support Programme-Pest Preventive Pest Restriction
NFSM	:	National Food Security Mission
NGJSY	:	Nandi Gaushala Jan Sahbhagita Yojna
NHM_PHM	:	National Horticulture Mission-Post Harvest Management
NHM-ENFO	:	National Horticulture Mission-Establishment Of New Flower Orchard
NHM-MH	:	National Horticulture Mission-Mechanisation in Horticulture
NHM-MP	:	National Horticulture Mission-Mushroom Production
NHM-NEFO	:	National Horticulture Mission-New Establishment Of Fruit Orchards
NHM-OF	:	National Horticulture Mission - Organic farming
NHM-P	:	National Horticulture Mission - Production
NHM-PNH	:	National Horticulture-Polyhouses and Net Houses
NHM-V	:	National Horticulture Mission - Vermicompost
NLM-PE	:	National Livestock Mission-Poultry Entrepreneurship
NMSA-A	:	National Mission for Sustainable Agriculture - Agroforestry
NMSA-RAD	:	National Mission for Sustainable Agriculture - Rainfed Area Development
NPAI	:	National Programme on AI
OFP	:	Organic Farming Policy
PD	:	Planning Department
PHED	:	Public Health Engineering Department
PIB	:	Press Information Bureau
PKVY	:	Paramparagat Krishi Vikas Yojana
PM FME	:	Pradhan Mantri Formalisation of Micro food processing Enterprises
PMFBY	:	Pradhan Mantri Fasal Bima Yojana
PMKSY	:	Pradhan Mantri Krishi Sinchayee Yojna
PMKSY-HKKP	:	Pradhan Mantri Krishi Sinchayee Yojana-Har Khet Ko Pani
PMKUSUM-B	:	Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan-Component B

PNAY	:	Pashudhan Nishulk Aarogya Yojana
PRD	:	Panchayati Raj Department
PSNJSY	:	Panchayat Samiti Nandishala Jan Sahbhagita Yojana
PWD	:	Public Works Department
RBOs	:	River Basin Organizations
RCDF	:	Rajasthan Co-operative and Dairy Federation
RDPRD	:	Rural Development And Panchayati Raj Department
RGKSSY	:	Rajiv Gandhi Krishak Sathi Sahayata Yojana
RJBCB	:	Rajasthan Pollution Control Board
RJCFA	:	Rajasthan State Cattle Fairs Act
RJPBES	:	Rajasthan Agro-Processing, Agri-Business And Agri Export Promotion Scheme 2019
RKVY-HGMTB	:	Rashtriya Krishi Vikas Yojana-High Genetic Merit Tharparkar Bulls
RS	:	Remote Sensing
RSRTC	:	Rajasthan State Road Transport Corporation
SAPCC	:	State'S Action Plan On Climate Change
SDMA	:	State Disaster Management Authority
SHC	:	Soil Health Card
SMART	:	Specific, Measurable, Achievable, Realistic, And Timely
SWIC	:	State Water Informatics Centre
SWRPD	:	State Water Resource and Planning Department
VBGS	:	Vadh se bachaye govansh ko sahayata
WDC	:	Watershed Development and Soil Conservation
WRD	:	Water Resources Department
WSDSC	:	Watershed Development And Soil Conservation Department

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EXECUTIVE SUMMARY

Background

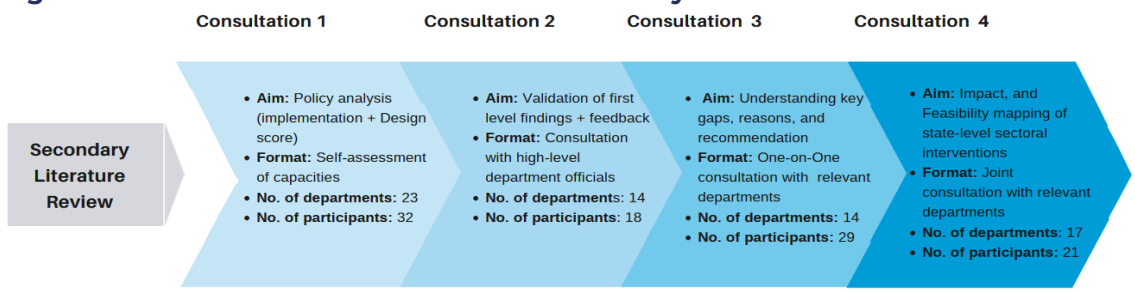
Climate change is creating significant risks to people, livelihoods, and the economy of Rajasthan, particularly with regard to water and food security. Since 2000, there has been a six-fold increase in the frequency and intensity of extreme droughts, four-fold rise in those of extreme floods, and four-fold spurt in those of cyclones in the state. Around 88 per cent of the districts are exposed to extreme droughts/drought-like conditions and 27 per cent to extreme floods. Moreover, multiple districts are witnessing a swap of extreme weather events: drought-prone districts are becoming flood-prone and vice-versa. In summary, a vast part of Rajasthan is exposed to climate risks, which are materialised with higher frequency and intensity, impacting every district/region differently (Mohanty and Wadhawan 2021).

At the same time, lack of disaster preparedness entails a very heavy cost. As per UN estimates, the direct costs of India's lack of climate action to combat climate change and its impacts in the last two decades amounted to INR 13.14 lakh crore (USD 179.5 billion). Therefore, it is imperative for the state to transition to a much more responsive, targeted, and coherent institutional response to mitigate, adapt, and build resilience to adverse impacts of climate change. To enable such a climate action in the state, the Chief Minister's Rajasthan Economic Transformation Advisory Council (CMRETAC), under the chairmanship of the chief minister, commissioned the Council on Energy, Environment and Water (CEEW) to conduct this scoping study to identify the following: (i) which institutions need to be recalibrated; (ii) what are the recalibrations required; and (iii) how can the recalibrations be executed.

Methodology

We employed a four-step consultation process to assess the capacity of the relevant state departments, identify the strategies to address the capacity gaps, and prioritise the strategies to form a phased road map (Figure ES1).

Figure ES1: Consultation framework for the study



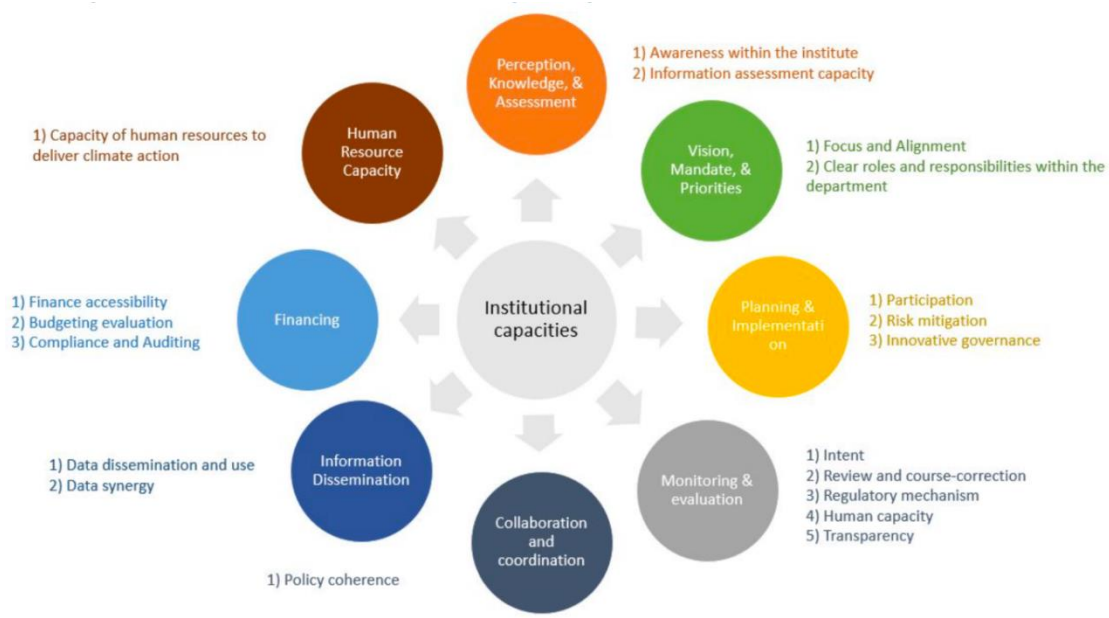
Source: Authors' compilation

In the first consultation, officials from the relevant departments assessed the ability of the existing institutions governing the state's disaster management, agriculture, and

water sectors for climate action (mitigation, adaptation, and resilience). For this assessment, we employed a Capacity Assessment Framework (CAF) consisting of 8 indicators and 19 sub-indicators (Figure ES2).

During this consultation, we also focused on understanding the effectiveness of various existing climate-relevant policies (policies, schemes, or programmes are collectively referred to as policies in this section) in the agriculture, environment, and water sectors. Overall, 26 policies from the water sector and 63 from the agriculture sector were considered in the assessment.

Figure ES2: Synthesised Capacity Assessment Framework



Source: Authors' synthesis

The second consultation involved a multi-departmental meeting to validate the capacity gaps identified in the previous consultation. In the third round of consultation, we conducted key informant interviews (KIIs) with 29 key officials from 14 relevant departments to develop a long list of interventions that addressed the capacity gaps. The fourth consultation was a two-part workshop aimed at prioritising the identified interventions. The first part of this multi-departmental consultation focused on scoring the state-level interventions on the expected lead time required to implement them. The second part of the workshop was focused on scoring the sectoral interventions on their potential impact and expected lead time to implement.

Results and findings

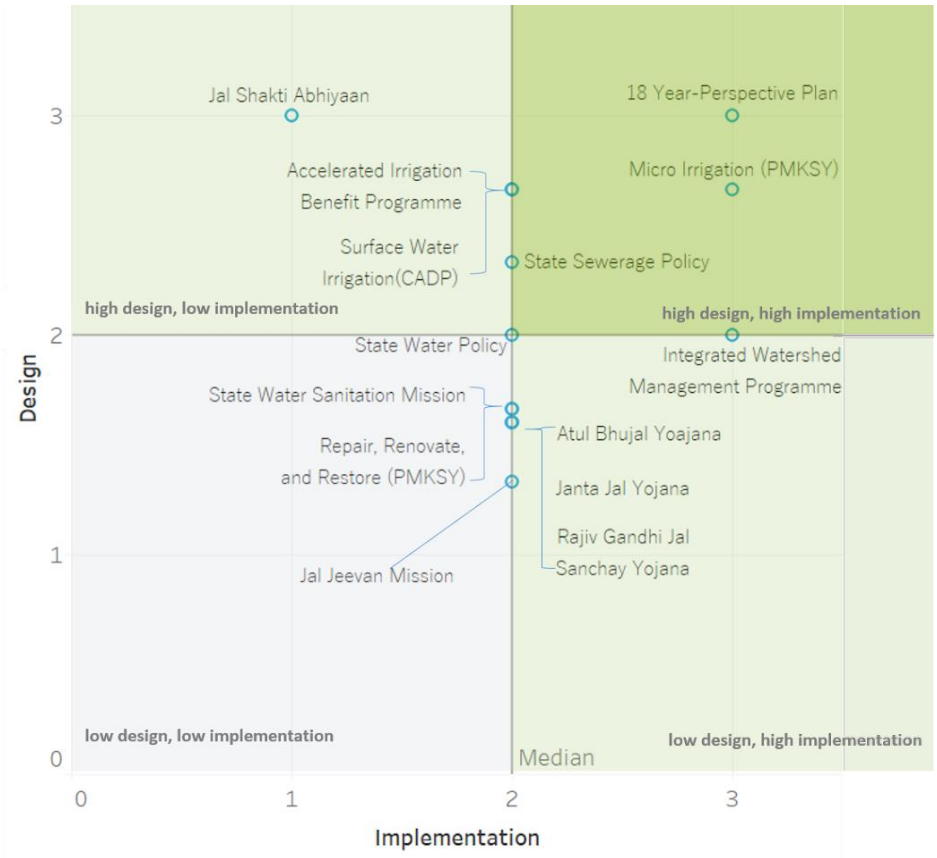
1. The assessment of the state's agriculture and water sector policies on the design (i.e. relevance to climate action) and implementation revealed a mixed bag: state officials felt that there exist not only those policies that can be improved in their design and extent of implementation but also those, such as *Pradhan Mantri Krishi Sinchai Yojna* (refer Figure ES3) and the 18-year

perspective plan (refer Figure ES4), that are well designed and implemented, and need to be capitalised upon for transferable and accessible learnings for others.

Figure ES3: Cluster classification on the effectiveness of agriculture and allied policy implementation and design scores received through stakeholder consultations

Acronyms: Refer to Annexure I for understanding acronyms used in the above chart
Source: Authors' synthesis

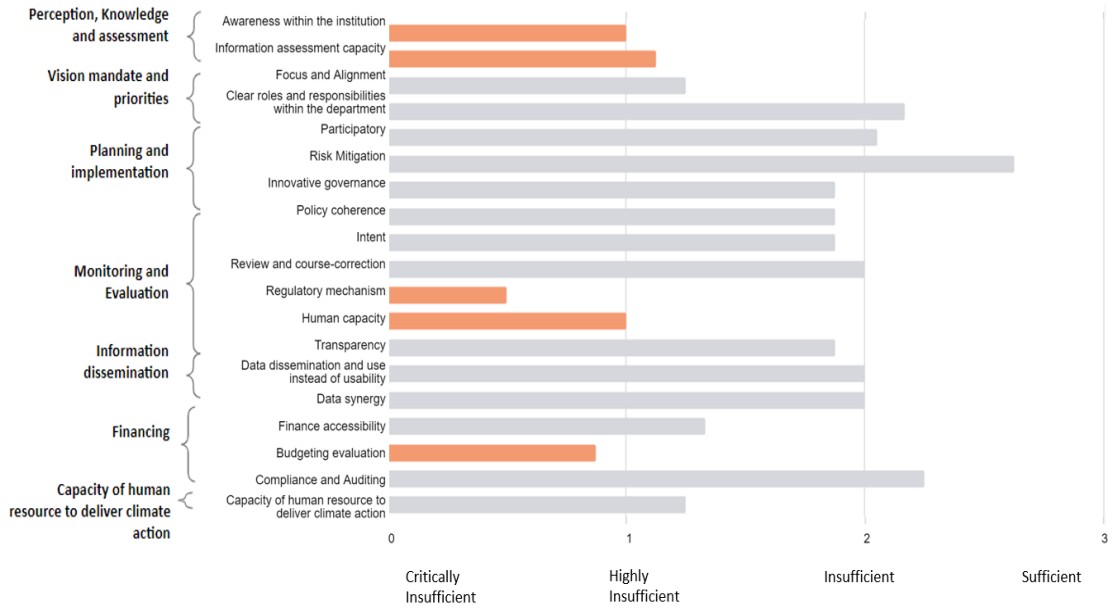
Figure ES4: Cluster classification on the effectiveness of water sector policy implementation and design scores received through stakeholder consultations



Source: *Authors' synthesis*

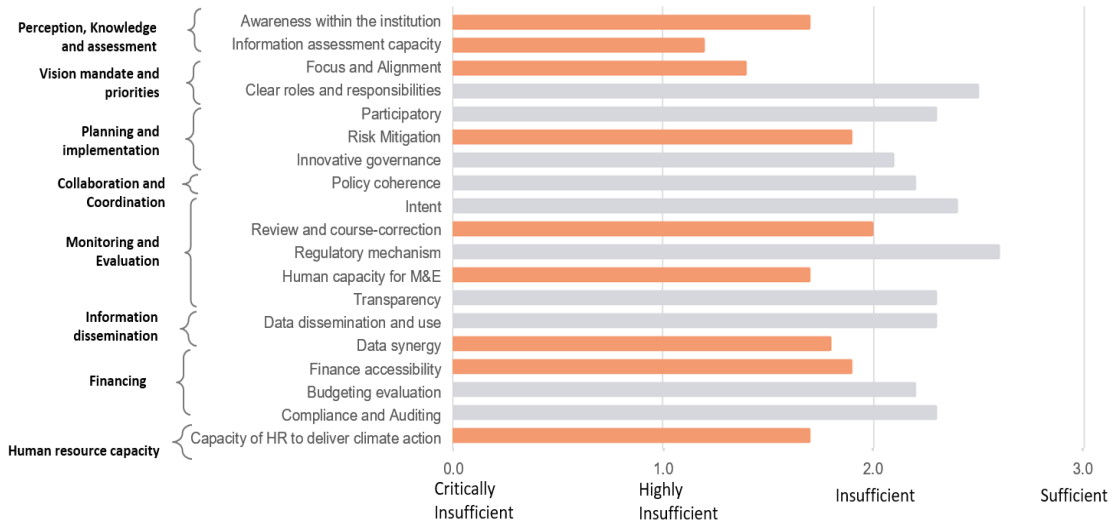
2. State officials mapped the capacity gaps of the institutions governing disaster management, agriculture, and water sectors towards delivering climate action, as shown in Figures ES5, ES6, and ES7, respectively.

Figure ES5: Key capacity gaps that emerged after round 1 of consultations with six departments of the agriculture sector of the Government of Rajasthan



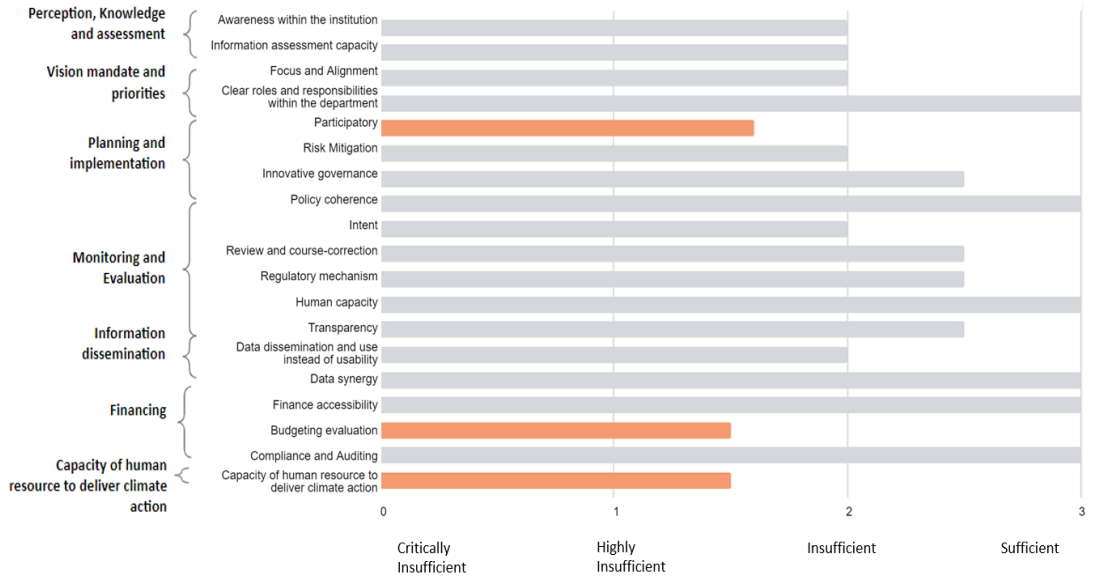
Source: Authors' compilation

Figure ES6: Key capacity gaps that emerged after round 1 of consultations with six departments of the water sector of the Government of Rajasthan



Source: Authors' compilation

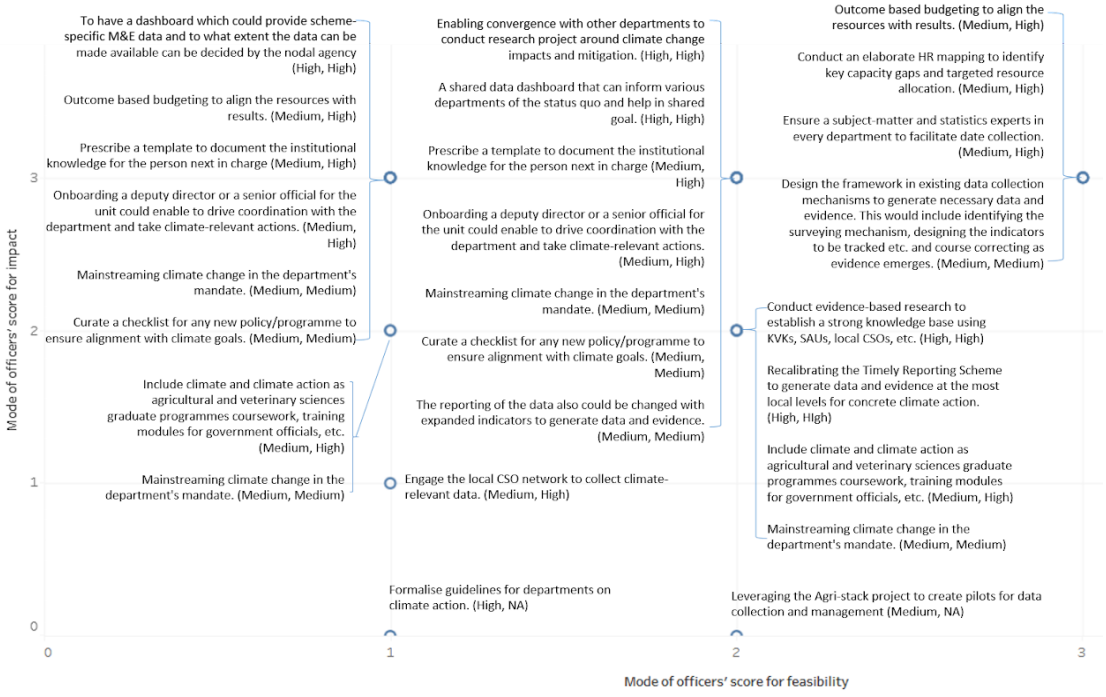
Figure ES7: Key capacity gaps that emerged after round 1 of consultations with State Disaster Management Authority (SDMA), Rajasthan



Source: Authors' compilation

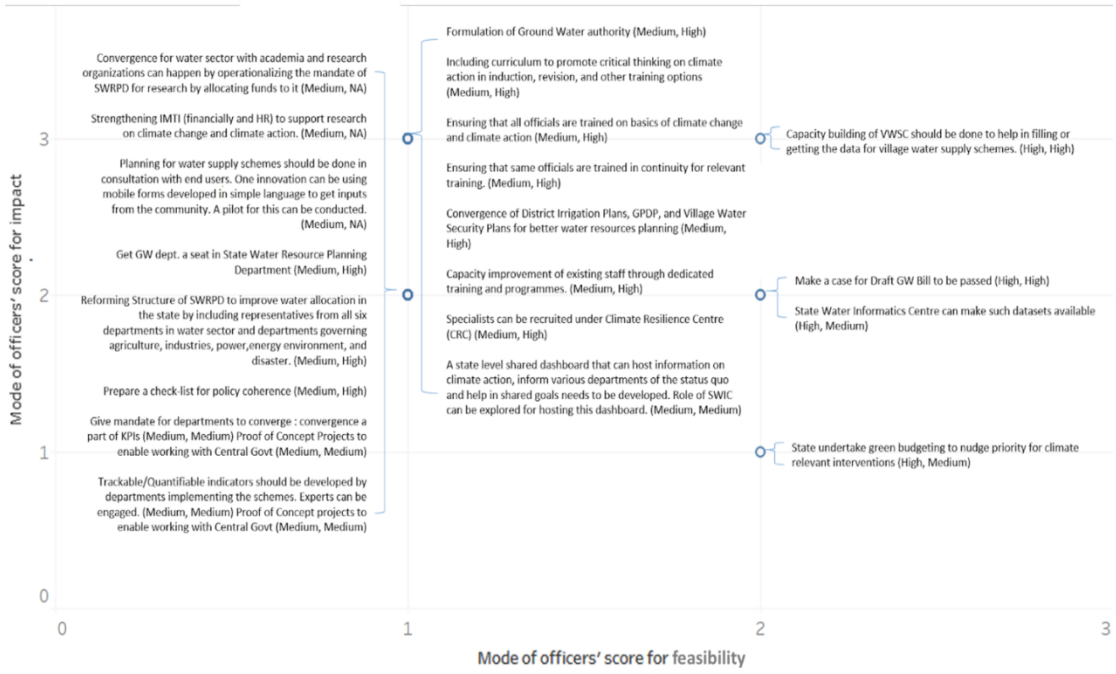
3. The state officials identified interventions to address the above-identified institutional capacity gaps in the agriculture, water, and disaster management sectors, as shown in Figures ES8, ES9, and ES10, respectively. They assessed their impact and feasibility scores to enable prioritisation.

Figure ES8: Impact and feasibility assessment scores of the identified agriculture-sector interventions



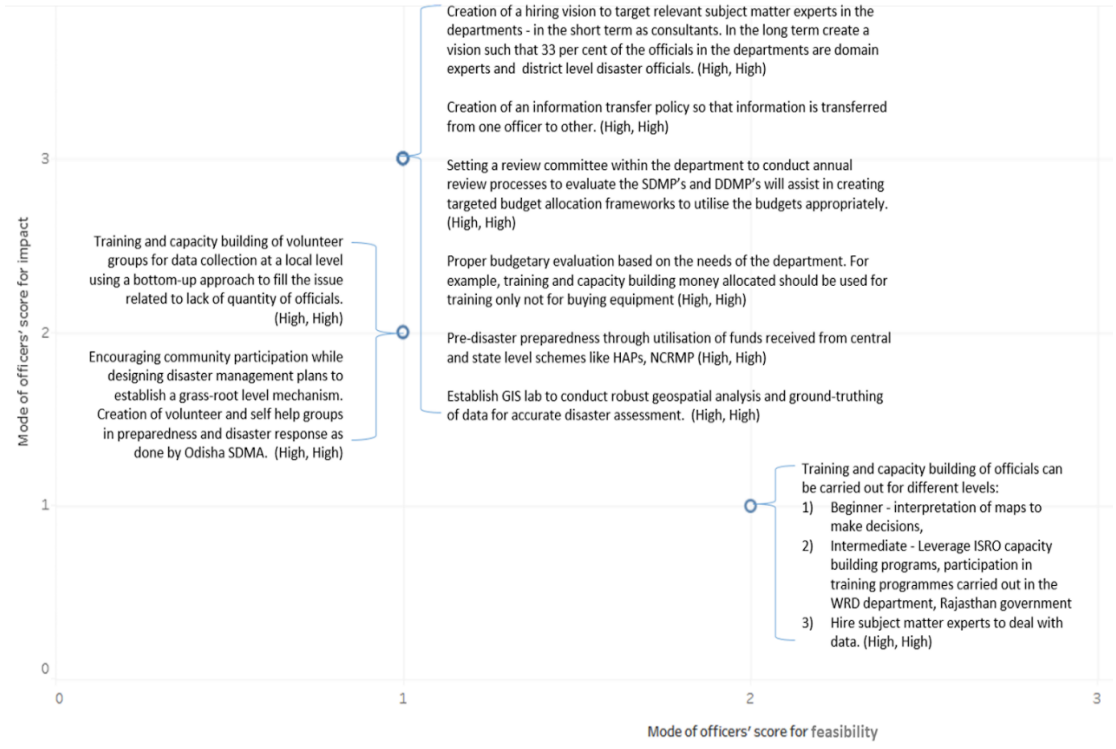
Source: Authors' compilation

Figure ES9: Impact and feasibility assessment scores of the identified water-sector interventions



Source: Authors' compilation

Figure ES10: Impact and feasibility assessment scores of the identified disaster management sector interventions



Source: Authors' compilation

Interpreting the above charts:

- Feasibility scoring: 0 = Not feasible, 1 = Feasible within 2 years (including 2 years), 2 = Feasible in 3–5 years, 3 = Feasible in 6–10 years
- Impact scoring: Measured as % of the target capacity gap addressed; 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above
- Confidence level of the feasibility and impact assessment of each intervention, assessed based on variation observed among officers' scoring, is noted within brackets after every intervention as: (confidence level of feasibility scores, confidence level of impact scores)

4. Over and above the sectoral interventions, 23 state-wide interventions were identified that are applicable across the three sectors (Figure ES11). Out of which, 13 interventions have been ranked as being feasible in the short term, that is, within two years from the start of 2023. State officials believe that most of the recalibration interventions necessary for solving challenges in collaboration and coordination, planning and implementation, information assessment capacity, and monitoring and evaluation can be made in the short term. Further, they felt that most of the interventions that target vision, mandate, and priorities; perception and knowledge; and financing and human resource improvement may require a period of 2–5 years for implementation. Lastly, strengthening collaboration and coordination with the central government was assessed by state officials to be feasible only in the long term (5–10 years).

1 INTRODUCTION

1.1 Why is climate change a concern?

Climate change refers to the long-term variations of the Earth's climate, including changes in temperature, precipitation patterns, and sea levels. The sixth assessment report by the Intergovernmental Panel on Climate Change (IPCC) confirms the human-induced changes in climate due to excess greenhouse gas emissions (GHGs) and unsustainable land-use–land-cover practices, which is all set to cross the 1.5-degree mark (increase in global temperature 1.5°C above pre-industrial levels). In a 1.5°C climate scenario, climate change poses great challenges and threats to a significant number of emerging economies around the world as a country's economic growth is intricately linked with climate risks.

Climate change poses unprecedented challenges to human-made and natural ecosystems through its influence on climate extremes. The most obvious evidence, arguably, is the surge in the frequency of extreme events at the local scale. Extreme weather events led to 4,95,000 human deaths across the world between 1999 and 2018. Further, more than 12,000 extreme weather events were recorded that led to losses worth USD 3.54 trillion (measured in terms of purchasing power parity (PPP)) during this period. Against this backdrop of changing climate, the frequency, intensity, spatial extent, duration, and pattern of weather and climate events are also changing, leading to a surge in the climate extremes.

India is the seventh-most vulnerable country with respect to climate extremes (Germanwatch 2020). India suffered an annual loss of USD 87 billion due to extreme climate events (WMO 2020). According to a study by CEEW, India experienced an exponential increase in extreme events during the period 1970–2019, with a marked acceleration between 2000 and 2019 (Mohanty 2020). The CEEW study found that floods and droughts have become increasingly common in many regions across various climatic zones in India. Furthermore, another study by CEEW revealed a new pattern—that a staggering 40 per cent of the Indian districts are now witnessing a swap in the usual trend: historically flood-prone areas are now witnessing more frequent droughts and vice-versa whereas some districts are also witnessing both extremes simultaneously.

Thus, climate action is necessary at global and national scales while context-specific and targeted interventions are needed at the sub-national and district levels. Climate action refers to the efforts necessary to address climate change, including both adaptation and mitigation strategies. Climate adaptation refers to actions taken to help communities and ecosystems adapt to the impacts of climate change that are already

being implemented or are expected to occur in the near future. Adaptation measures can include measures such as building sea walls to protect coastal communities from rising sea levels, developing drought-resistant crops to help farmers cope with changing weather patterns, or improving building codes to make structures more resilient to extreme weather events.

On the other hand, climate mitigation refers to actions taken to reduce or prevent the emission of greenhouse gases (GHGs) that cause climate change. Mitigation measures can include reducing the use of fossil fuels, increasing the use of renewable energy sources, improving energy efficiency, and adopting more sustainable land-use practices. Both adaptation and mitigation are critical to addressing the impacts of climate change. While mitigation aims to reduce the magnitude of future climate change, adaptation aims to reduce vulnerability to current and future impacts of climate change.

1.2 Climatological profile of and climate change in Rajasthan

As per the climatic classification, Rajasthan traditionally has had a dry climate, with the most of the areas receiving low rainfall and featuring high temperatures due to its geography and topography. Given the size of the state, the climate also varies significantly in the state (India Meteorological Department 2010). West Rajasthan is a tropical desert with a hot and arid climate (BWh). The districts neighbouring Madhya Pradesh exhibit a climate type that subtly transitions between two distinct categories: Tropical Savanna (hot with a seasonally dry characteristic (Aw)) and Interior Mediterranean (featuring mild winters and dry, hot summers (Csa)). Additionally, Subtropical Monsoon climate, characterised by mild, dry winters and hot summers (Cwa), also prevails in some parts of the state.

However, due to climate change, the traditional climate profile of Rajasthan is changing rapidly. According to CEEW analysis using Indian Meteorological Department (IMD) data, the annual mean temperatures in the state show a significant increase over the state in the last 50 years (1971–2020) by nearly 0.3–0.6°C across all of its districts (Figure 1). Further, most of the districts in Rajasthan are showing an increasing trend in monsoon rainfall (Figure 2). Rajasthan is one of the most water-deficient states in the country, and groundwater availability is highly variable depending on hydrogeological conditions. The groundwater quality is poor in deeper aquifers. Further, the limited groundwater resources in Rajasthan are increasingly being exploited for irrigation, industrial, and domestic uses. Thus, groundwater is overexploited, whereas surface water resources are over-appropriated in most districts in the state.

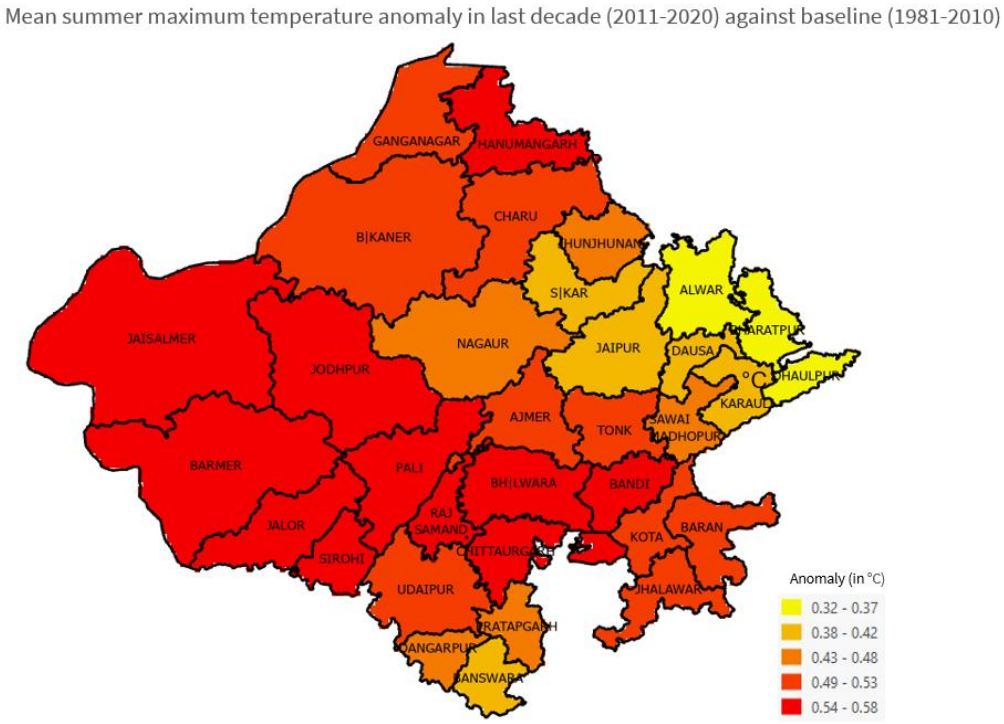


Figure 1: Summer maximum temperatures have increased by 0.3–0.5°C across Rajasthan

Source: Authors' analysis

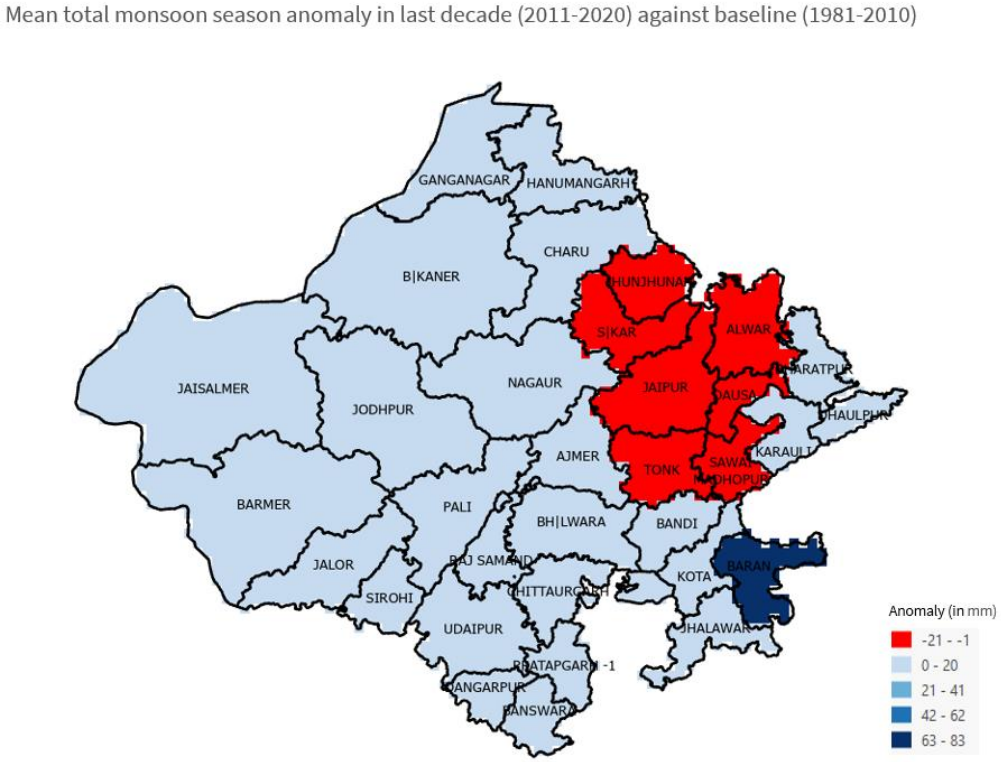


Figure 2: Majority of Rajasthan districts are seeing an increasing trend in monsoon rainfall

Source: Authors' analysis

These rapidly changing patterns in rainfall and temperature have led to an increase in the frequency of extreme events in the state as well as erratic swapping trends. This can be further substantiated by the fact that there has been a six-fold increase in the frequency and intensity of extreme drought events since 2000 and a four-fold increase in the frequency and intensity of extreme flood events since 2010 (Mohanty and Wadhawan 2021). As per the CEEW state-level ranking on the climate vulnerability index (CVI), which is based on the vulnerability scores calculated for each district in India (2011 census data), Rajasthan ranks seventh. Around 88 per cent of districts in Rajasthan, which are home to 68.6 million people, are vulnerable to drought or drought-like conditions (Figure 3). Moreover, 10 per cent of the most vulnerable districts in India namely, Ajmer, Banswara, Barmer, Jaipur, Jaisalmer, Jalor, Jhunjhunu, Jodhpur, Nagaur, and Pali are in Rajasthan. In recent years, Rajasthan has also witnessed an increase in the frequency and intensity of extreme flood events. Increasingly, during the same season, certain districts such as Ajmer, Barmer, Bhilwara, Churu, Jaisalmer, Jodhpur, Nagaur, and Pali are simultaneously witnessing extreme droughts and flood events. While drought or drought-like conditions are affecting major districts of Rajasthan, traditionally drought-prone districts such as Nagaur, Ajmer, Barmer, Churu, Pali, Jaisalmer, Jodhpur, and Bhilwara have shown a shift towards extreme flood events in the last decade (2010–2019).

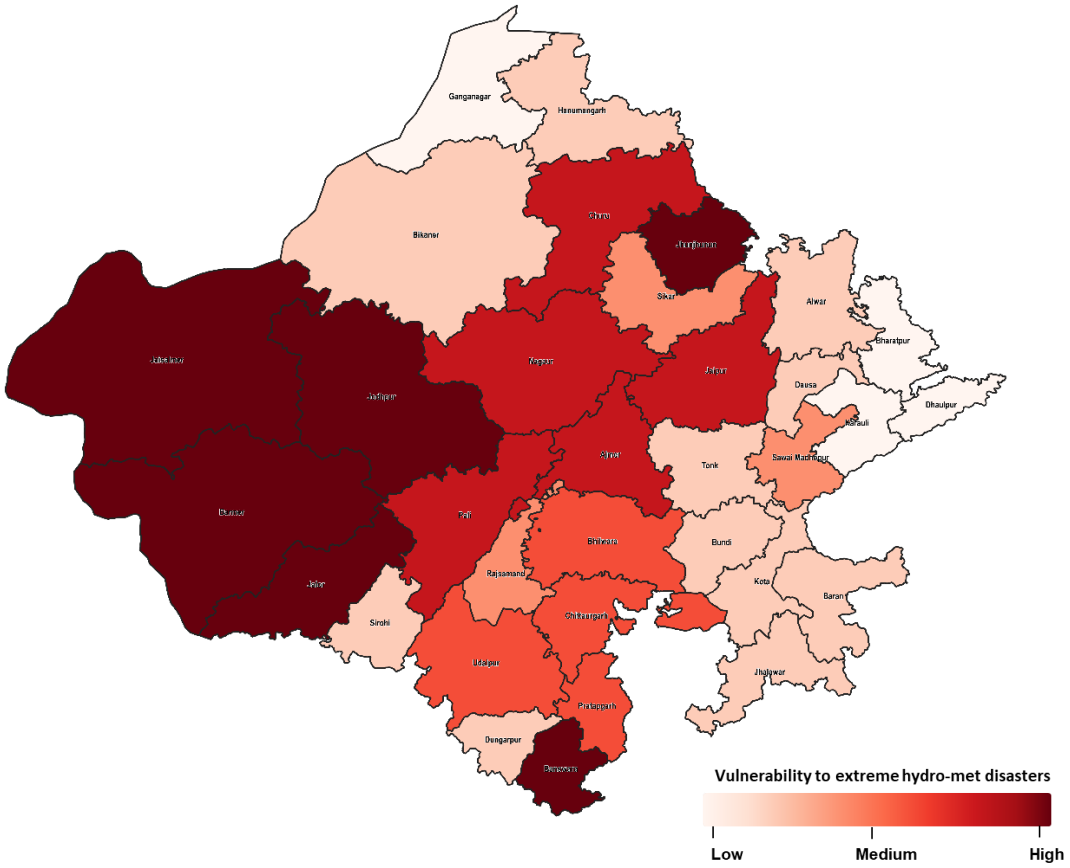


Figure 3: 88 per cent of Rajasthan's districts are vulnerable to extreme hydro-met disaster

Source: Authors' analysis

The changing climate is a matter of concern for Rajasthan, which is primarily an agrarian economy with vast dependence on the agriculture and water sectors, both projected to be impacted the most by climate change. Agriculture and allied activities make up for 24 per cent of Rajasthan's GDP, with 62 per cent of the total working population of the state dependent on this for livelihood (Rajasthan Foundation 2021). Around 83 per cent of Rajasthan's total surface water and groundwater is used for agricultural and allied activities, leading to a high water-use intensity and contributes about 174.3 litres/INR to the gross state domestic product (GSDP) (S. Misra 2017). Further, a significant portion, 56 per cent, of Rajasthan's net sown area relies on rainfall for irrigation. This poses a challenge as the state faces severe water scarcity, having only 1 per cent of India's total water resources and receiving an average annual rainfall of 572 mm compared to India's average of 1,100 mm. Furthermore, the current agricultural practices in Rajasthan contribute to soil degradation and exacerbate water scarcity. Due to lack of rainfall, the agriculture practices in the state are highly irrigation dependent, which can erode the topsoil, depleting fertility due to nutrient leaching. For example, popular crops like wheat require five to six irrigations per season. As a result, between 2008–2009 and 2012–2013, over 82 per cent of the state experienced water-level depletion. As competition for water resources intensifies, this presents challenges not only for crops but also for livestock. Rajasthan is home to over 11 per cent of India's total livestock population.

The State's Action Plan on Climate Change (SAPCC) states that Rajasthan is witnessing a concerning trend in groundwater levels in the north-eastern districts, namely Jaipur, Dasra, Alwar, and Sikar. Further, the plan states that there is a significant decrease in groundwater, indicating rapid depletion as the situation worsened further between 2017 and 2020. During this period, groundwater extraction in Jaipur increased from 98 per cent (considered critical) to 118 per cent (overexploited), while in Sikar, it went from 79 per cent (semi-critical) to 91 per cent (critical) (Dynamic Ground Water Resources Assessment of India 2021). As stated earlier in the analysis by CEEW and reiterated by Rajasthan's SAPCC, given the arid and semi-arid nature of the region, Rajasthan is highly prone to droughts. While water availability is expected to increase in the south-eastern part of the state, the rest of Rajasthan shows either no change or a decrease in water availability. This regional water scarcity issue will likely worsen in the future due to overexploitation of groundwater. Projections for future temperature anomalies indicate that the western dry regions of Rajasthan could experience temperature changes ranging from 1.63°C to 4.6°C.

Moreover, climate change has had significant impacts on urban areas in the state as its adverse effects make cities in this region more susceptible to heat waves and droughts, further impacting water availability (Vishnoi et al. 2015). The state has

witnessed a rapid increase in urbanisation, leading to a surge in population. This has put immense pressure on already scarce resources, particularly water supply, exacerbating the water crisis. The heat waves also have a detrimental effect on public health, infrastructure, and overall quality of life. In response, following the National Disaster Management Authority (NDMA) guidelines, Heat Action Plans (HAPs), which provide a framework for dealing with extreme heat and response mechanisms, have been implemented to mitigate the impacts. Furthermore, urban areas in Rajasthan continue to face challenges such as increased air pollution, inadequate waste management, and insufficient urban planning that can magnify the impact of climate change.

The above-discussed climate change impacts are only expected to intensify further given the average temperatures of Rajasthan are projected to rise by approximately 1.8°C to 2.1°C by 2035 (Rajasthan State Action Plan on Climate Change 2012). Therefore, Rajasthan is in need of accelerated and extensive climate adaptation efforts. At the same time, the state's business-as-usual (BAU) economic growth is expected to actively contribute to the above-mentioned warming of the climate. An analysis by CEEW (executed using Global Change Assessment Model (GCAM) modelling, to develop the background analysis for Rajasthan's Urja Niti 2023), finds that there will be a two-fold increase in the emissions driven by the power sector in BAU scenarios by 2070 as compared to 2020 baseline. Power generation is the largest contributor to the total carbon emissions, fuelled by coal power generation, which is estimated to increase in the future to cater to Rajasthan's electricity demand. Carbon emissions from all energy-consuming sectors would increase by 1.8–2.5 times that of 2020 levels by 2070. Therefore, the state also needs to adopt economy-wide climate mitigation efforts, actively contributing to national commitments. Interestingly, as per the CEEW analysis, in the scenario where Rajasthan achieves net zero by 2070, emissions are expected to peak around the year 2040 at ~180 $MtCO_2$ and decline thereafter until the year 2070, which is in line with the all-India trend as highlighted by different studies and experts. In summary, all of the various above challenges make it imperative for the state to ensure a comprehensive and effective climate action, incorporating both adaptation and mitigation strategies.

1.3 The cost of climate inaction

A report by the UN estimates that the direct costs of India's lack of disaster preparedness in the last two decades amounted to INR 13.14 lakh crore (USD 179.5 billion). Extreme climate events, in particular, have cost India over INR 8.3 lakh crore (USD 99 billion) in the last 50 years (UN 2020). A Carbon Disclosure Project (CDP) analysis suggests that such events will likely cost India INR 7 lakh crore (USD 100 billion) and Indian banks over INR 6 lakh crore (USD 84 billion) in the next five

years (2021-2025) (CDP 2022). Studies also suggest that each dollar invested in adaptation will offer benefits worth two dollars, while the cost of inaction could be in the range of USD 1 trillion between 2020 and 2030. Further, the International Labour Organization (ILO) projects that inaction in the face of slow-onset events like heat waves will cost India 34 million jobs by 2030.

Climate change can have significant adverse effects on agriculture, including crop failures, reduced yields, and increased vulnerability to pests and diseases. These impacts can lead to economic losses and food security challenges. According to a report by the Indian Council of Agricultural Research (ICAR) in 2019, extreme weather events, such as droughts and floods, caused an average annual loss of around INR 91,500 crore (approximately USD 12.3 billion) to the Indian agricultural sector between 2003 and 2013. Another study examined the economic impact of climate change on major crops in India, including rice, wheat, and maize. The study projected potential yield losses of up to 18 per cent for rice and wheat and 9 per cent for maize by 2050, leading to significant economic losses for farmers and the agricultural sector as a whole (Feng and Kobayashi 2009; Jaggard et al. 2010).

Furthermore, in June 2023, cyclone Biparjoy wreaked havoc in Rajasthan, days after making landfall in Gujarat. While Gujarat did not experience much damage due to the cyclone, heavy rain led to flood-like situations in many parts of Rajasthan. Many districts, including Barmer, Sirohi, Banswara, Udaipur, Rajsamand, Pali, Ajmer, and Kota, have been affected by the cyclone. Some areas of these districts have received 10 to 13 inches of rain, causing water retention and inundation in these districts leading to floods and tremendous impacts on the infrastructure and communities.

1.4 Why is climate action needed, and what impedes it?

Climate action has been defined within the bounds of Sustainable Development Goal (SDG) 13—take urgent action to combat climate change and its impacts. Three of its targets have been used for scoping—SDG 13.1 (Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries), SDG 13.2 (Integrate climate change measures into national policies, strategies, and planning), and SDG 13.3 (Improve education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning).

Managing climate risks requires a nuanced understanding of the underlying drivers of hazards; the exposure of regions and populations; the sensitivity of regions and their resulting vulnerability; and the interactions between these components, as highlighted

by the IPCC. While exposure to extreme events is linear, the impacts are non-linear, depending on the sensitivity and adaptive capacity of the affected systems. For some, it may entail adjustments and readjustments in livelihood options, but for others, the impacts can be catastrophic, compounding beyond the existing vulnerability thresholds. Thus, adapting to the impacts of climate change through investing in climate-resilient infrastructure and building capacity is imperative to managing climate risks.

Similarly, reducing climate footprint requires concerted efforts and involves taking concrete steps to reduce greenhouse gas emissions and promote sustainable development, such as transitioning to renewable energy sources, increasing energy efficiency, promoting sustainable land-use practices, and reducing waste. Moreover, effective climate action requires a comprehensive approach that delves into multiple dimensions. Firstly, understanding the drivers behind carbon emissions, water footprints, biodiversity risks, and more is crucial. This knowledge enables us to identify the root causes and formulate targeted mitigation strategies. Secondly, we must explore and evaluate abatement opportunities, assessing their effectiveness in reducing environmental impacts. Finally, recognising the systemic interactions between various aspects, such as energy, agriculture, and transportation, is essential. These interconnected systems can amplify or mitigate climate-related challenges, emphasising the need for holistic solutions that consider the intricate web of environmental factors at play. And, as highlighted above, climate change is a complex and urgent global issue that requires concerted, coherent, and sustained efforts in multiple sectors by the governments, businesses, civil society, and individuals. Addressing climate change necessitates targeted strategies that are tailored to specific contexts, acknowledging the unique behaviours of each district. Furthermore, it demands responsive and timely interventions, as climate-related events become increasingly frequent and unpredictable.

Within such climate change and variability, effective institutions are required to generate robust evidence and plans, and deliver effective coordination and implementation of climate policies. An analysis of the Indian policies across three periods (pre-2007; 2007 to 2009, and 2010 to mid-2014) suggests several limitations, such as the formation of ad hoc climate institutions, lack of continuity, uneven coordination among government agencies, lack of consistent strategic thinking on climate change, and finally capacity shortfalls within individual governmental organisations (Dubash and Joseph 2016).

In parallel, at the sub-national level in India, states lack the institutional capacity to generate technical information, develop climate action strategies, and effectively synchronise their efforts with national institutions. Systemic weaknesses such as

failure to build sufficient implementation capacity, inability to break departmental silos, non-participatory processes, and absence of analytical frameworks for mainstreaming climate risks has led to weak climate response at the state level.

Therefore, a cogent response to climate risks in Rajasthan requires 'recalibrating' institutions and enabling them to understand climate implications in the medium and long term and to take initiatives to build resilience and respond to climate challenges and variability. The recalibration of climate institutions calls for understanding the evolving climate risk landscape so that they can map, plan, and adapt. Given Rajasthan's exposure to compounding impacts of climate extremities, it becomes imperative to draw data and evidence-based synchronisation and prioritisation across targeted line departments to climate-proof critical economic sectors like agriculture, water resources, environment and forests, among others. Collective and cohesive recalibrated climate actions can be fast-tracked through decentralised and participatory planning among relevant stakeholders by ideating short-, mid-, and long-term plans integrated through the Rajasthan Action Plan on Climate Change and Disaster Management Plans. Further, this will have a ripple effect on district disaster management plans, ensuring a forward-thinking climate action agenda aligned with the targeted line departments' mandates. The approach of mainstreaming an agile and responsive climate-proofing of critical sectors can enhance community resilience and avert the extent of loss and damage.

Given these complexities, the Chief Minister's Rajasthan Economic Transformation Advisory Council (CMRETAC), under the chairmanship of the chief minister, commissioned the Council on Energy, Environment and Water (CEEW) to execute the following:

- Identifying *which* institutions need to be recalibrated: Map present organisations and institutions and those that need to be involved in the planning and implementing of climate action programmes at the state level.
- Identifying *what* recalibration is required: Assess their capacity to advance climate goals, identify gaps, and prioritise opportunities/interventions for enabling state institutions to drive large-scale climate action.
- Identifying *how* recalibration needs to happen: Develop an actionable road map for building institutional capacities of the existing institutions for managing climate change risks in short, medium, and long term.

2 METHODOLOGY

2.1 Theory of change

State capacity can be viewed from various perspectives. In literature (Hanson and Sigman 2019), it covers the entire spectrum from the general capacity of the state to accomplish its goal to the very specific and physical capacity of the state, for example, to build infrastructure.

Broadly, there are two-fold approaches in understanding capacity:

- **Outcome-based approach—** The state's capacity is generally viewed as its ability to achieve certain economic, social, and political outcomes. In this context, capacity would be defined as the state's ability to perform certain tasks to achieve the said outcomes (Akbar and Ostermann 2015). This might lead to tautological argument, where a state is deemed to be highly capacitated if the said outcomes are achieved and the tasks are performed well and vice-versa (Lindvall and Teorell 2016).
- **Causal relationship-based approach—** In this theoretical framework, state capacity is viewed as the strength of the causal relationship between the policies that the state adopts and the outcomes it intends to achieve (Lindvall and Teorell 2016) as shown in Figure 4.

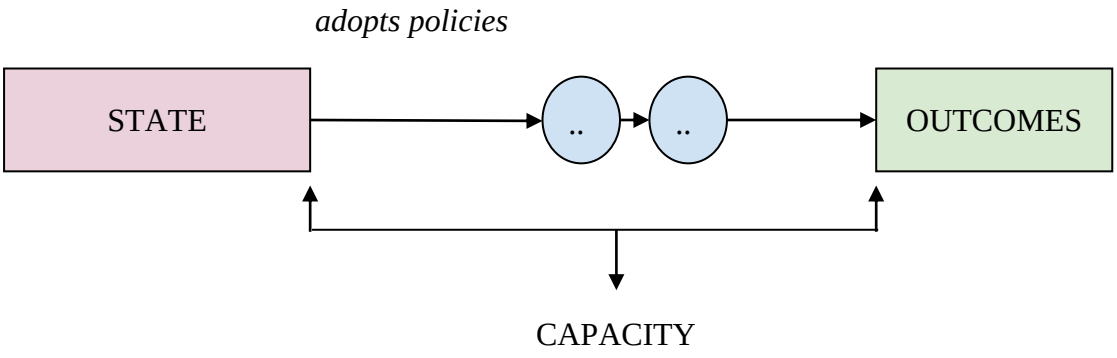


Figure 4: State capacity as a causal relationship-based approach

Source: Authors' synthesis

Within this paradigm, we can decouple the outcomes and only look at the state's role in achieving those outcomes through adopting policies. This also encompasses the state's ability to conceptualise, compare, and adopt policies that are targeted towards a relevant outcome. In addition to this, the state should also be capacitated to monitor these policies and evaluate the success in achieving the outcomes through effective implementation, monitoring, and evaluation.

However, the causal relationship-based approach poses one problem. Crucially, the framework suggests that state capacity cannot be measured. Therefore, to evaluate the strength of the causal relationships, we measure the 'inputs' used by the state to increase the capacity. These inputs include collecting qualitative and quantitative data on indicators like finance, HR capacity, quality of bureaucracy, etc. State capacity can be measured as a function of these inputs.

In this study, we have defined state capacity using a causal relationship-based approach. By measuring the 'inputs', we attempt to understand the key capacities required to advance climate action. These capacities are then evaluated across various relevant departments to identify the key gaps and challenges. The core premise underlying this study's methodology is that understanding these key capacity gaps will lead to identification of the opportunities and strategies to recalibrate the existing institutions to address these gaps. These interventions will improve the state capacity and will lead to advancing climate action.

2.2 Capacity Assessment Framework

The Capacity Assessment Framework employed in this study is inspired by two key frameworks: the United Nations Development Programme (**UNDP) framework** (UNDP Capacity Assessment Users Guide 2008) for evaluating institutional capacity and the Organisation for Economic Co-operation and Development (OECD) water governance indicator framework. The UNDP framework uses three dimensions to understand a system: (1) points of entry, (2) core issues, and (3) functional and technical issues. The entry points span from a macro to micro level: the enabling environment, organisational aspects, and individual attributes. Based on empirical findings, UNDP identifies the following four core issues as commonly encountered across different sectors: institutional arrangements, leadership, knowledge, and accountability. UNDP classified capacity into two categories: (1) Functional capacities are defined as capacities vital for formulating and managing policies, legislations, strategies, and programmes. These functional capacities include stakeholder engagement, situation assessment and vision delineation, policy and strategy formulation, budgeting, management and implementation, and evaluation. (2) Technical capacities are the technical skills and knowledge required to develop efficient solutions and may also warrant assessment.

The three-axes framework allows for a comprehensive evaluation of distinct institutions in relation to these identified dimensions. However, the framework fails to capture the performance, stability, and adaptability of the institutions. These indicators are important in the context of changing climate and unpredictable climate hazards. As this study has defined capacity as a causal relationship, therefore, capacity is considered to be dynamic and also needs to be assessed temporally.

The **OECD framework** (OECD 2018) is a self-assessment framework based on assessing the state of 12 principles, through 36 indicators, which are deemed necessary for "*efficient, effective and inclusive water governance*" (OECD 2018). It can be applied across scales (local, national, etc.) and to assess the state of policy frameworks, institutions, and governance instruments. These 12 principles are divided into three broad categories—effectiveness, efficiency and trust, and engagement. Effective water governance deals with clarity in the roles and responsibilities of various actors, appropriateness of scales within the basin system for planning, policy coherence, and capacity of stakeholders for delivering tasks at hand. Efficiency in governance deals with data and information, financing, regulatory frameworks, and innovation in governance. Trust and engagement deal with democratic legitimacy and inclusiveness of stakeholders in the areas of monitoring and evaluation, addressing trade-offs across users, areas and generations, provisions of stakeholder integrations, and mainstreaming integrity and transparency practices in governance. The framework addresses three points of concerns—what is the current state of water governance, what is the change expected over time, and what is the consensus among stakeholders on the assessment criteria. Although the OECD framework was robust, it is specific for water governance and, therefore, we attempted to extrapolate the framework to understand climate governance and capacity, agnostic of the sector.

Based on consultation with in-house experts, the two frameworks were synergised for this study. All 11 principles from the OECD framework were included excluding the principle on mainstreaming integrity and transparency practices. However, these principles were further categorised into eight indicators and 19 sub-indicators. The indicators and sub-indicators are explained in detail in Table 1.

Table 1: Synthesised Capacity Assessment Framework (CAF) with 8 indicators and 19 sub-indicators

Indicators	Sub-indicators	Explanation of sub-indicators
Perception, knowledge, and assessment	Awareness within the institution	To assess awareness in the institution on climate action. To be assessed by gauging the knowledge and awareness which the employees of the department/institution have gained/built on themes relevant to climate action.
	Information assessment capacity	To assess how effectively the knowledge on climate action gets translated into actions and activities which the department undertakes. Example: Does the department have capacity to produce technical/non-technical reports on climate action?

Indicators	Sub-indicators	Explanation of sub-indicators
Vision, mandate, and priorities	Focus and alignment	To assess the extent to which the department/institution's mandate and vision on climate action are in alignment with state and national government's vision and targets on the same such as SDGs, NDCs, etc.
	Clear roles and responsibilities within the department	To assess if tasks in the department are allotted and documented. Also, to understand if the roles and responsibilities of the departments and personnel are derived from pre-stated mandates and documents, such as policy or scheme guidelines/alignment with their skills
Planning and implementation	Participatory	To assess how participatory is the planning process for policies/programmes/ schemes in terms of diverse stakeholders being consulted, their inputs considered during planning and implementation
	Risk mitigation	To assess if the policies/programmes/schemes are designed keeping in mind the vulnerability of the resource in hand
	Innovative governance	To assess if the institution has regularly implemented/promoted innovative measures in governance w.r.t. climate action
Collaboration and coordination	Policy coherence	To assess how mutually reinforcing are policy actions *or* the consistency between policies and regulations across different state departments, agencies, and institutions in Rajasthan?
Monitoring and evaluation (M&E))	Intent	To assess how strong is the department's intent to set up M&E processes through data collection, analysis, reporting, and using data for decision-making including setting SMART targets for tracking progress. (SMART—Specific, measurable, achievable, realistic, and timely)
	Review and course correction	To assess the department's capacity to assess and ascertain if activities are going as per plan and if not, how to bring them back on track or set a new track
	Regulatory mechanism	To assess whether the M&E procedures are rightly established within the regulatory systems of the respective department?

Indicators	Sub-indicators	Explanation of sub-indicators
	Human capacity	To assess whether the department staff has the right skills, resources, and technology to implement the M&E functions?
	Transparency	To assess whether the findings of the M&E system are publicly disclosed, through what measures, and how often?
Information dissemination	Data dissemination and use	To assess the department's capacity to present data and findings in a correctly synthesised, timely, and easy manner. This may also include dimensions like generating comparable data for ease of assessment or further processing
	Data synergy	To assess department's capacity to share data and findings with other departments and learn the same from other departments to build more robust datasets (like management information system (MIS)) or avoid duplication of efforts
Financing	Finance accessibility	To understand the department's capacity to seek climate finance from diverse sources (international public finance including bilateral/multilateral, consumer or user fees, carbon taxes, specific national funds, etc.)
	Budgeting evaluation	To assess the department's capacity to evaluate its financial needs across different time frames to accommodate and deliver its vision and mandate on climate action
	Compliance and auditing	To assess whether the department has strong auditing, accounting, and compliance measures when it comes to tracking how finance is spent?
Human resource capacity	Capacity of human resource to deliver climate action	To understand the department's requirements in terms of human resources and whether they have the right skill sets? This can be addressed in two ways—by filling all the vacant positions or creating new positions. If the latter is the need, then the nature of posts (experts/generalists) required have to be assessed.

Source: Authors' compilation

Figure 5: Synthesised Capacity Assessment Framework

Source: Authors' synthesis

2.3 Learnings from other states

To source strategies for improving governance for climate action, we also identified pioneering states who have been developing innovative mechanisms for climate action. We consulted with relevant experts/officers from the states of Gujarat, Maharashtra, Odisha, Bihar, and Tamil Nadu (refer to Annexure 4) to understand how these states are addressing climate change and extract transferable learnings for Rajasthan. This study considered the following institutions/initiatives from these states:

S. No.	State	Institution/Initiative
1.	Gujarat	Climate Change Department
2.	Maharashtra	Mangrove cell
3.	Odisha	Climate change cell
4.	Bihar	Green budgeting
5.	Tamil Nadu	Tamil Nadu Green Climate Company

For each of these consultations, we focused on understanding the following key points for easy analysis and detailed discussions:

- Key features of the innovation adopted:
  - Who pioneered the innovation (government or non-government actor)?
  - What capacity gap is the innovation addressing?
  - Why is innovation successful?

- Who are the key actors driving and sustaining the innovation?
- What is the institutional structure for management?

- What is the current flow of authority, implementation, information, etc. (top-down or bottom-up?)
- Institutional structure:
  - Whether the implementing institution is a parallel structure or embedded within the existing government structures?
  - How are the non-governmental actors engaged?

2.4 Consultative process for developing the road map for governance recalibration

The study was conducted using a four-step consultation process as (refer to figure 6) to assess the capacity of the relevant departments, identify the strategies to address the capacity gaps, and prioritise the strategies to form a phased road map.

Consultation 1—This consultation was conducted in November 2022 with 32 officers from 23 departments (refer to Annexure 4) who were divided into five department-wise groups for a two-part workshop.

The first part of this consultation was focused on understanding the effectiveness of various existing climate-relevant policies (policies, schemes, or programmes are collectively referred to as policies in this section) in the agriculture, environment, and water sectors.

Policies are understood as the various kinds of governance instruments that a government deploys to deliver on the various goals and objectives that it intends to achieve. Policy effectiveness towards climate action was conceptualised, through a series of internal deliberations with in-house sectoral experts, to be a product of two parameters—**implementation and design**. The assessment of the design of a policy was conceptualised in terms of its relevance to three criteria—relevance for the achievement of India's nationally determined contributions (NDCs), relevance for the attainment of SDG goals, and relevance for reduction of climate vulnerability. Vulnerability reduction includes interventions targeted at both mitigation of climate change and adaptation to climate change.

Selection of policies

Both state policies and central policies relevant to Rajasthan were selected for the analysis. The constitutional provisions of governance classify agriculture and water broadly as state-list subjects, with some matters in both sectors being under union or concurrent list. Therefore, while the central government can formulate national

policies and issue schemes which are centrally funded, the state governments across the country have significant degrees of flexibility in operationalising the centre-issued guidelines for the schemes.

Policies implemented by the departments from the water and agriculture sectors were scanned and, as the first step, a master list of all the ongoing policies from the central and Rajasthan governments was created. The policies were considered from water sector of Rajasthan, which consists of the following state departments: Water Resources Department (WRD), State Water Resource and Planning Department (SWRPD), Watershed Development and Soil Conservation Department (WSDSC), Public Health Engineering Department (PHED), Groundwater Department (GWD), and Rural Development and Panchayati Raj Department (RDPRD). Inputs on state sewerage and waste water policy were incorporated from the state department of urban development and housing For the agriculture sector, following state departments were considered: Animal Husbandry Department (AHD), Department of Agriculture (DoA) and its two subunits (monitoring and evaluation unit and statistical cell), SDG unit from the Department of Economics and Statistics (DES), Horticulture Department, Agriculture Marketing, Rajasthan State Agriculture Marketing Board, and Gopalan Department. Overall, 26 policies were considered from the water sector, and 63 policies were considered from the agriculture sector.

A word/phrase search was done on the policy documents to select the ones relevant to climate action. At this point, a distinction was made in policies that are designed for directly delivering climate action (also called 'climate intentional') and those policies which are indirectly delivering climate action, that is, those policies whose intended activities can contribute to climate action. Criterion 1 and criterion 2, explained below, were employed to categorise the policies into the above-mentioned buckets. If a policy document did not fit in both the criteria, it was not selected for subsequent analysis.

- Criterion 1: Policies directly delivering climate action

  For a policy to fit this criterion, the below-listed key phrases must be found in the policy document's vision, mission, objectives, or aims section. These phrases could have been found written in the exact word order, or in a different word order but conveying the same meaning, or using synonyms but convey the same meaning.

  The key words/phrases for criterion 1: Climate change mitigation; Climate change adaptation; Climate proofing; Impact reduction; Early warning; Resilience to climate-related disasters; Adaptive capacity to climate-related disaster; Floods; Droughts; Greenhouse gas emission reduction; Climate variability.

- Criterion 2: Policies indirectly enabling climate action

  Policies under this criterion are indirectly enabling climate action. Climate resilience can be promoted in two ways: by reducing sensitivity and by increasing adaptive capacity. Therefore, the policies that did not meet criteria 1 but had the below-listed climate resilience related search phrases in their document's vision, mission, objectives, and aim section were shortlisted under this policy bucket. The words in the policy document could have been found in exact order, in a different order, or could have had synonyms used.

Table 2: Search words used for the selection of policies which indirectly enable climate action

Applicability to sectors	**Sensitivity**	**Adaptive capacity**
Both agriculture and water sectors	Land use, soil moisture, slope, elevation, groundwater level	Status of district disaster management plans, population density, literacy rate, *Gram Panchayat* Development Plan (GDDP), availability and accessibility critical infrastructure, availability and accessibility of shelter, and sex ratio
Agriculture sector	Soil moisture; Soil organic matter; Land-use change; Crop water efficiency; Mulching; Natural farming; Organic farming, Livestock productivity; Nutrition and food security	Water-use efficiency
Water sector	Water sector: Water productivity; Groundwater management; Groundwater augmentation; Groundwater recharge; Rainwater harvesting; Watershed development	Water sector: Sustainable/integrated/better water management; Water-use efficiency; Increasing access to clean drinking water; Increasing availability to clean drinking water; Equitable access to safe and affordable drinking water; Improve water quality/ safe water

The search phrases for the above two criteria were finalised on the basis of internal deliberations with agriculture, water, disaster management, and climate change experts.

Scoring of policies for effectiveness in delivering climate action

The stakeholders (government officials from agriculture and water sector in this case) were each asked to rank these policies on the parameters of design (relevance to SDGs, relevance to NDCs, and relevance to vulnerability reduction) and implementation. The reasons for their responses were also recorded. The responses from each official were then averaged to reflect one score from that particular sector on design parameters and implementation of the policies. The officials were asked to rank only the policies which their department is implementing.

The assessment of policy design was done on a **Likert scale of 0–3** where 0 corresponds to policy being irrelevant, 1 corresponds to somewhat relevant, 2 corresponds to relevant, and 3 corresponds to extremely relevant. Officials were asked to answer this question for each policy— "how relevant is the policy in addressing SDGs, on a scale of 0–3?" The SDGs that the policy addresses were then mapped by the stakeholders in the same format. A complete list of SDG targets relevant to climate actions in water and agriculture sectors were provided to all the stakeholders in advance (refer to Annexure 2). Relevance of the policy in addressing NDC targets and in reducing vulnerability to climate change were assessed similarly. The final design score for each official was considered as an average of the score on three design parameters.

The assessment of policy implementation of policies was also done on a **Likert scale of 0–3** where 0 corresponds to not implemented at all, 1 corresponds to barely implemented, 2 corresponds to implemented but needs improvement, and 3 corresponds to very well implemented. Officials were asked to rank each policy for the question— "how well is the policy implemented, on a scale of 0–3?" The effectiveness score was considered as a product of design score and implementation score.

The second part of this consultation was focused on the self-assessment of capacities by the relevant department officials. The capacities were assessed using a Likert scale for all 22 sub-indicators of the Capacity Assessment Framework. These self-assessment scores were used to identify the key governance capacity gaps, particularly those where there exists a general agreement among the relevant departments on the lacunae and potential willingness for collaborative solutions. Some preliminary strategies to address these capacity gaps were also identified during the consultation process.

Consultation 2—This consultation was conducted in the form of a large meeting attended by 18 high-level officials from 14 departments (refer to Annexure 4) to validate our initial findings from the first consultation, particularly the capacity gaps identified. The senior officers also commented on potential strategies to address the relevant capacity gaps.

Consultation 3—This phase of consultation was focused on conducting key informant interviews (KIIs) with the 29 key officials from 14 relevant departments (refer to Annexure 4). These departmental consultations were aimed at further developing our understanding of the key gaps identified from the previous rounds of consultation. The 'five whys' approach was used to identify the key reasons for each gap. The interventions to address the gaps were co-created during this consultation process. This phase of consultation provided us with an exhaustive list of key gaps, their drivers, and 21, 25, and 9 key recommendations for each agriculture, water, and disaster management sectors, respectively.

After the consultation, the identified gaps and recommendations were categorised into relevant capacity assessment indicators for each sector. Further, via brainstorming, common ideas recurring across different sectors within this categorised list of recommendations were extracted and framed as state-level interventions.

Consultation 4—This two-part workshop was conducted in March 2023 attended by 21 officials from 17 departments (refer to Annexure 4). This two-part workshop was aimed at prioritisation among the exhaustive list of recommendations. The part one of this multi-departmental consultation was focused on scoring the state-level interventions on their temporal feasibility. The feasibility scoring asked whether the intervention in question can be implemented in 0–2 years, 3–5 years, or 6–10 years.

The second part of the workshop was focused on scoring the sectoral interventions on their impact and temporal feasibility. Impact here was defined as the extent of the target capacity gap that the intervention could cover in 0–25 per cent, 25–50 per cent, 50–75 per cent, and 75–100 per cent.

The confidence score on the impact and feasibility were calculated by evaluating the divergence in responses. For example, the impact confidence score for an intervention is calculated by dividing the number of responses with the highest mode divided by the total number of respondents.

The road map for the state and three sectors (agriculture, water, and disaster) was developed using the temporal feasibility scores for each of the identified interventions.

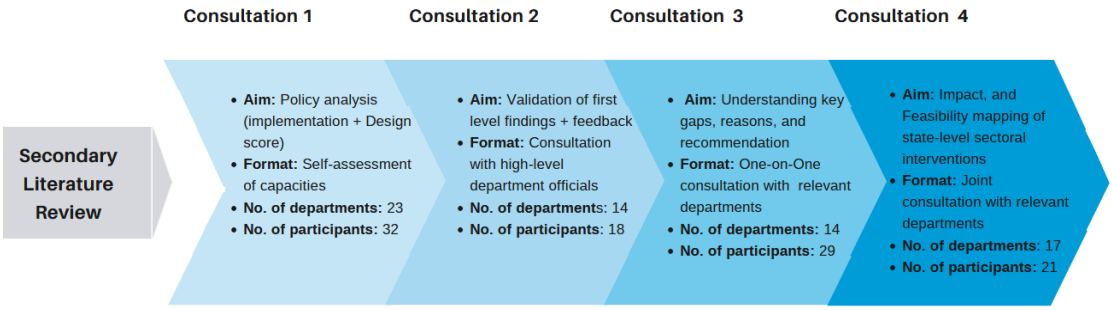


Figure 6: Consultation process for the study

Source: Authors' compilation

The above-explained four-step consultation process led to the development of high-level road maps at a sectoral or state level, covering 70+ short-, medium-, and long-term interventions. Each of the identified interventions generally requires further study and design for developing an 'implementation-ready' proposal. Given the very wide mandate of this policy study, it is not possible to come up with such proposals for each intervention. However, we have attempted to dive deep into one of the opportunity areas ('Recalibrating Government Support to Agriculture') to showcase the process towards developing more detailed proposals for the identified interventions. This opportunity area was selected for the deep-dive because of high interest from the government stakeholders towards this and its potential to unlock large-scale climate action. The deep-dive was attempted via a co-creative workshop conducted on 13 June 2023 with 17 officers from 10 government departments (refer Annexure 4).

3 EFFECTIVENESS OF THE EXISTING POLICIES IN DELIVERING CLIMATE ACTION

Governance instruments are reflective of the government's intent, priorities, commitments, and the approach to delivering on them. In the context of climate action, social and public policies play a crucial role in the achievement of all SDGs in general and SDG 13 in particular (IPCC 2023; World Bank 2010).

As part of consultation 1 in December 2022, an assessment of the effectiveness of the selected policies in delivering climate action was done in consultation with the government officials from the departments in the water and agriculture sector. On the basis of criteria mentioned under consultation 1 in section 2.4 above, 14 policies were shortlisted from the water sector and 47 policies from the agriculture sector for ranking by the officials for their effectiveness in delivering on climate action.

Like capacity assessment, policy effectiveness assessment is also a **reflection of self-assessment** by the Government of Rajasthan stakeholders on the design and implementation of various policies they are delivering to ensure climate action. Again, these self-assessment scores were used to identify the key successes and gaps in policy design and implementation, particularly where there exists a general agreement among the relevant departments on the lacunae/opportunity and potential willingness for finding a collaborative solution.

3.1 Agriculture-sector policies

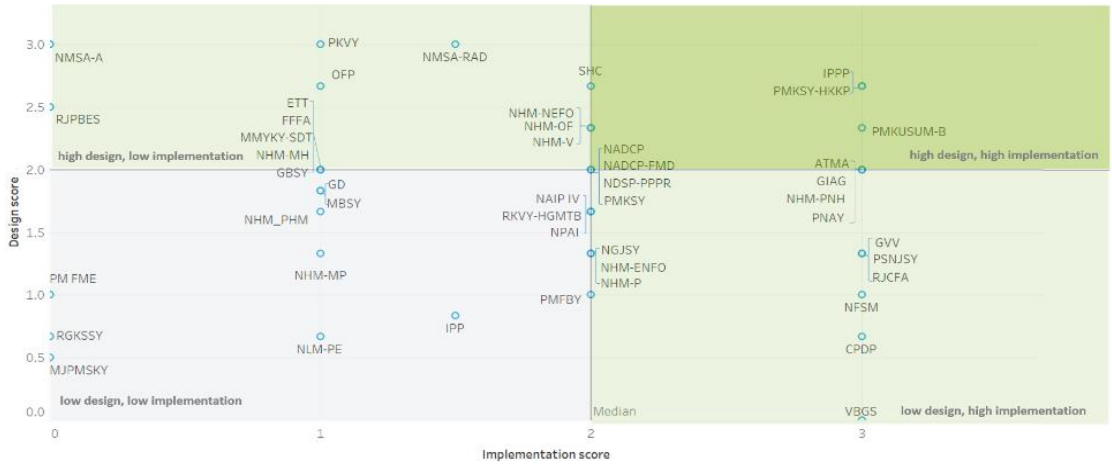


Figure 7: Cluster classification on the effectiveness of agriculture and allied policy implementation, and design scores received through stakeholder consultations

Source: Authors' synthesis

Figure 7 shows how stakeholders have ranked 47 agriculture policies based on their implementation and design scores. The policies were then categorised into four clusters based on their scores' proximity to the median.

Policies such as the *Innovative Poultry Productivity Project* (IPPP), aimed at improving broiler rearing and implementing bird rearing with low-input technology, and *Pradhan Mantri Krishi Sinchai Yojana* (PMKSY), focused on extending the coverage of irrigation and enhancing water-use efficiency through end-to-end solutions on source creation, distribution, management, field application, and extension activities, emerge as shining examples with high design and implementation scores. The officials remarked that IPPP was well implemented in around eight districts in Rajasthan, including districts with high tribal population. The project positively impacted the livelihoods and nutrition in the targeted regions by providing context-specific interventions to improve poultry productivity.

Policies such as the *National Mission on Sustainable Agriculture—Agroforestry* (NMSA—agroforestry), aiming to expand tree coverage on farmland in a complementary manner with crops, and *Paramaparagat Krishi Vikash Yojana Training* (PKVY), designed to promote commercial organic production through certified organic farming, guarantee pesticide residue-free produce, improve consumer health, raise farmers' income, and create potential markets for traders, achieved high design scores but lower implementation scores. The reason is that PKVY was only implemented in five districts and the annual budget allocated for the scheme for the year 2023–24 is INR 43 crore, which is 1.1 per cent of the entire state

agriculture budget.[1] Similarly, budget allocation for NMSA—agroforestry was only INR 15 lakh in 2020–21 which was slashed to INR 6,000 in 2023–24 (Government of Rajasthan 2023). These policies hold tremendous potential for climate action, given their high relevance, if the necessary steps are taken to bridge the implementation gap.

The *National Food Security Mission* (NFSM), which strives to increase the production of rice, wheat, and pulses through area expansion and productivity enhancement, restore soil fertility and productivity, create employment opportunities, and enhance farm-level economy, received high implementation scores. This is so because NFSM is being implemented in all 33 districts of the state with NFSM—Pulses being implemented in all districts. Moreover, the area in the state under the scheme increased by 1.4 lakh hectares between 2022 and 2023. The budget allocated to the scheme has increased from INR 395 crore in 2022–23 to INR 430 crore in 2023–24 (Government of Rajasthan 2022, 2023). Since NFSM is a demand-based scheme, the increase in its budget indicates that the scheme is well implemented on ground in the state. But NFSM with high implementation scores lacks climate-intentional design through its large focus on improving productivity through mechanisation and chemical use. This has created some systemic lock-ins and are negatively impacting the environment and climate. This mandates a need to develop some guidelines to align every policy with the SDG and Intended Nationally Determined Contribution (INDC) goals.

In conclusion, the findings underscore the diverse landscape of policy effectiveness, showcasing success stories as well as areas for improvement. We have selected two policies for further discussion. The *Mukhyamantri Beej Swavlamban Yojna* was identified as an important policy to enable 'adaptation' towards climate variability. The *Pradhan Mantri Fasal Beema Yojna* was selected because of Rajasthan's success in implementation of the scheme covering the highest number of farmers in the country.

Mukhyamantri Beej Swavlamban Yojana

Mukhyamantri Beej Swavlamban Yojana is being implemented in Rajasthan across all districts from 2018–19 by the Department of Agriculture. The aim of the scheme is to enable on-farm production of and free distribution of high-quality seeds and providing farmers the seeds of jowar, soyabean, groundnut, moong, moth, and urad crops for the Kharif season and wheat and gram seeds for the Rabi season. Under the scheme, farmers are provided one-day training three times to inform them about the seed production process and a direct benefit transfer is provided to seed-producing farmers for rouging. It is implemented by selecting 30–50 farmers who are interested in growing a particular crop and from these two to four farmers among them are chosen to be seed producers. The policy recommends a community-owned seed production pathway, which makes it 'participatory' in nature. The scheme scores 1.8 and 1 on

[1] https://jankalyanfile.rajasthan.gov.in//Content/UploadFolder/DepartmentMaster/1149/2023/Feb/ 31406/154035.pdf

design and implementation, respectively. A closer to 2 design score means that it is generally relevant for climate action but falters on some aspects. One issue, as highlighted in one of the consultations with an expert,[2] is the provision of *moongfali* (groundnut) seeds, which is a water-intensive crop for dry season due to high irrigation cycles. Free provision of these seeds incentivises their uptake in western Rajasthan, which is largely rainfed and drought-prone, therefore exacerbating some environmental risks.

The implementation score of 1 is the result of not being able to achieve the target of covering 50,000 beneficiaries as announced in the budget speech 2022–23. The current number of beneficiaries stands at 6,081 farmers across 26 districts.[3]

Pradhan Mantri Fasal Bima Yojana (PMFBY)

Pradhan Mantri Fasal Beema Yojana is a central government scheme with a budget sharing of 50:50 between the state and the centre. The main objective of the scheme is to insure farmers against crop loss due to unforeseen events. Under the scheme, the farmer has to pay only 2, 1.5, and 5 per cent of the premium costs for Kharif, Rabi and horticulture crops, respectively. The scheme gets a scoring of 1 for its design and a scoring of 2 for its implementation in Rajasthan. The guidelines of the scheme state that the farmers will only be compensated if the average yield of the entire cropped area in one gram panchayat in the current year falls below the average yield of the last five to seven years. This means that if an individual farmer's yield falls below the average yield, limited options are available for compensation. Moreover, discussions with stakeholders revealed that due to low human resource capacity, only 16 crop-cutting experiments are prescribed to be conducted in one gram panchayat, which is too small a sample size for calculating current year's average yield. The lack of provision for farm-level assessment highlights a lack of risk mitigation capacity as it does not take into account the vulnerability of the beneficiaries.

On the other hand, Rajasthan is one of the best-performing states when it comes to farmer coverage, area coverage, and settlement of claims. With 3.44 crore registered beneficiaries, Rajasthan has the highest number of farmers covered[4]. Moreover, area covered under the scheme is 106 lakh hectare as of 2021–22, which is the second largest in the country[5]. The state also has a claim settlement rate of more than 99 per cent as of end of FY 2019–20 (MoAFW 2021).[6] This shows high implementation capacity of the state on this front.

Limitations of our policy analysis

[2] During the meeting at Jaipur.

[3] https://dipr.rajasthan.gov.in/scheme/detail/319

[4] Lok Sabha, Unstarred question 3275, 2023.

[5] Lok Sabha, Unstarred question 194, 2023.

[6] https://pmfby.gov.in/compendium/General/2021%20-%20Pradhan%20Mantri%20Fasal%20Bima%20Yojana_Parliamentary%20Committee%20Report%20-%2029th%20Report.pdf

Because the policies covered in our policy analyses were identified based on what agriculture and water sector departments were implementing, some policies of high importance did not emerge in the process and conversations during consultation 1. For example, the power subsidy, to which approximately INR 18,571 crore has been allocated for the financial year 2023–24, is provided to farmers via state Discoms. Neither the water nor agricultural sector departments implement it. However, given their importance, such policies were included in the analyses during later consultations.

3.2 Water-sector policies

The results of the policy effectiveness for 14 analyses are presented in Figure 8.

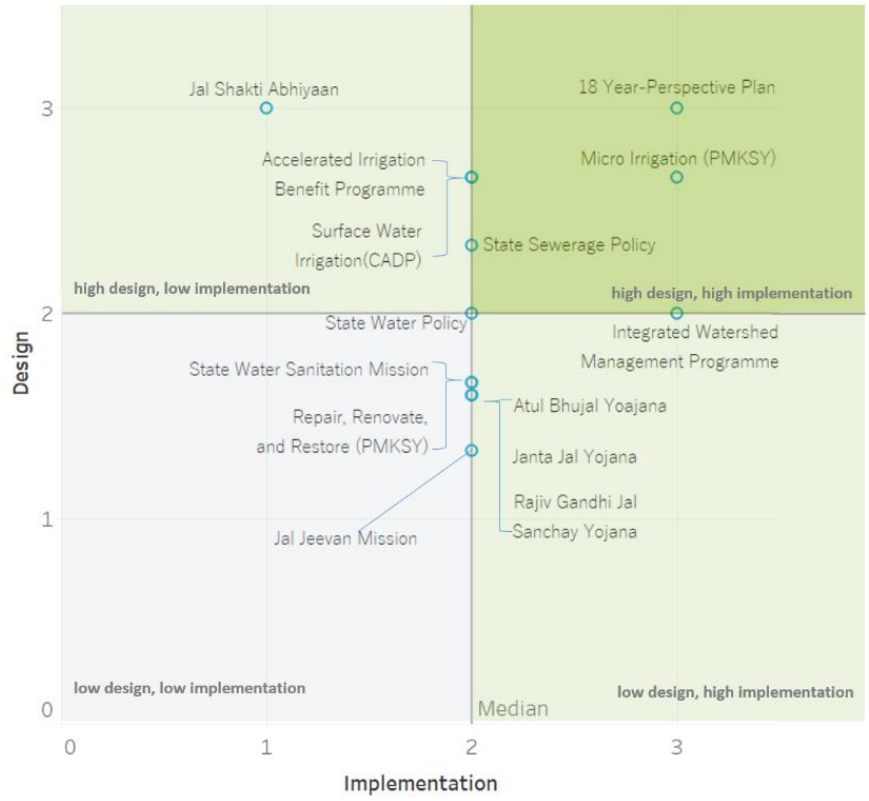


Figure 8: Cluster classification on effectiveness of water sector policy implementation, and design scores received through stakeholder consultations

Source: Authors' synthesis

These policies then were allocated to four buckets based upon their distances from the median implementation and design score. Most policies have a score of equal to or greater than 1.5 on both design and implementation scale, with the exception of *Jal Jeevan Mission* (JJM) and *Jal Shakti Abhiyan* (JSA). The 18-year perspective plan is the only policy having a score of 3 on both design and implementation parameters. Some policies that lie on the extreme end of design or implementation score or that were specially highlighted by the officials of the water sector are discussed below.

- The perspective and strategic plan for the development of rainfed and watershed areas in Rajasthan for 18 years, also called the '18-year perspective plan' (18YPP), achieved the highest score on design and implementation—a score of 3 on both parameters. The 18YPP was conceived in 2010 by the Commissionerate of Watershed Development and Soil Conservation as a long-term (15 years) perspective plan for holistic development of rainfed areas and watersheds in Rajasthan. It aims to promote socio-economic development of village communities through an optimum utilisation of natural resources of watershed and convergence of existing and new schemes for enhanced productivity, employment, and livelihoods (Department of Rural Development & Panchayati Raj 2010). A score of 3 on design corresponds to being extremely relevant for climate action and a score of 3 on implementation corresponds to being very well implemented. It is a prospective plan made for all districts and blocks of Rajasthan. Activities under this plan are operational in 56 lakh hectares of the state (16 per cent of total geographical area of the state), as was revealed in the consultation. It was highlighted by the officials that the scheme relies on geographical information systems (GIS) and remote sensing (RS) for identifying priority areas and for understanding scheme impacts. They said that the programmes being implemented have substantially brought down tanker requirements in the operational region by more than 50 per cent. National remote sensing data has corroborated the reversal of land degradation in the command areas where this scheme is operational. But the number of tubewells has increased by more than 40 per cent due to groundwater augmentation. The officials hence pointed the importance of behavioural change for climate action on two fronts—within the government system for increased adoption of GIS and RS technologies for more effective development and delivery of schemes, and within the community for encouraging water conservation behaviours so as to ensure a sustainable impact of schemes.

- *Jal Jeevan Mission*, which aims to give a functional household tap connection to supply at least 55 litres per capita per day (lpcd) of drinking water of acceptable quality to every rural household in the country by 2024 (Ministry of Jal Shakti 2019a), has been given a score of 1.7 on design (since this score is an average of three criteria, it is not a whole number) and a score of 2 on implementation. The mission is implemented by the Public Health and Engineering Department (PHED) of Rajasthan. The design score is low because of two reasons—first, lower relevance of the mission to NDCs and, second, it was highlighted in the consultations that groundwater is being used as a source of drinking water under JJM. Given that groundwater is

overexploited in most parts of the state, this can have detrimental consequences for groundwater levels in the state, and hence, the relevance of this scheme to achieving SDGs also has a low score, thus impacting the overall design score. Implementation of the mission has scope for much improvement. As per JJM dashboard, as of 1 June 2023, only 39 per cent of households in the state have tap water supply (Ministry of Jal Shakti 2019b). Two implementation challenges were highlighted by the officials—first is getting approval for the projects from the centre to let the state use rainwater harvesting systems or surface water as a source of supplying drinking water, thereby decreasing the pressure on state groundwater resources. This emphasises the need for better centre–state coordination, which is also discussed in detail in the section on capacity assessment. Second is the low willingness in communities to contribute user fee payments by households towards meeting the operation and maintenance cost.

- Jal Shakti Abhiyan: Catch the Rain (JSA:CTR) is a recurring annual national campaign of the Government of India aimed at promoting water conservation in the country through rainwater harvesting, renovation of traditional and other water bodies, reuse and recharge of bore wells, watershed development, and intensive afforestation (Press Information Bureau 2022). Officials gave it a score of 3 on design since it is very relevant to achieving NDCs and SDGs and reducing vulnerability to climate change. However, the campaign has no dedicated funds of its own and the stakeholders revealed that the campaign has been facing fund crunch. Hence, the implementation score given is 'barely implemented'.

An important insight to highlight here is that officials felt that implementation potential of JSA: CTR, JJM, and works under 18YPP can be harnessed more by taking actions to promote and implement rainwater harvesting more rigorously in the state.

- Further, in terms of implementation scores, 10 policies, both national level and state level, have the same scores—score of 2. This is reflective of the state's general understanding and of its forthcomingness in acknowledging the need to improve the implementation of both national and state-level policies.

In the one-on-one discussions during consultation 3 with each department, a few other policies were repeatedly mentioned. They are briefly discussed below:

- **State Water Policy**

The current state water policy of Rajasthan was revised in 2010 from its 1999 version. There were draft versions tabled in 2005 and 2008 before the water policy was passed in its current form in 2010. The policy in its current form has "a long genealogical history and is a product of multiple iterations of model bills from the central government and input from multiple development donor agencies, academic experts, and International and Indian NGOs" (Birkenholtz 2012). The policy has been formed by the State Water Resource Planning Department based on principles of integrated water resource management. This is a good example of convergence in planning for the water sector in Rajasthan. The policy recognises river basins as units of planning and acknowledges the importance of moving away from engineering-based solutions to community-based solutions. In the discussion with the departments of water resources sector, the state water policy has been given a score of 2 on both design and implementation criteria for relevance to climate action. The government officials stated that while the policy is implemented, it needs improvement. The specific improvement suggestion came in laying down and institutionalising a timely and routine information-sharing mechanism between departments. This directly corroborates the capacity gap of 'information dissemination' being used in CAF in this report. Also, the policy in its current version does not specify formation of river basin organisations (RBOs), unlike its draft version of 2008, which envisaged RBOs to be an interface between water user groups and state. Similarly, aquifer-based management systems for groundwater management has not followed suit from draft 2008 to the 2010 version (Birkenholtz 2012). The latter exacerbates the 'vision, mandate, and priority' gap of the Groundwater Department whereby the department has restricted mandate and power to regulate groundwater and hence deliver climate action.

- ***Atal Bhujal Yojana***

Atal Bhujal Yojana is a central sector scheme which became operational in 2020 in seven states of India, including Rajasthan, with the objective of arresting decline in groundwater through community participation and demand side management. As was revealed in the consultations, Rajasthan has a groundwater extraction rate of about 150 per cent. The nodal department for the scheme in Rajasthan is the Groundwater Department, and the state interdepartmental committee headed by Chief Secretary of Rajasthan has representation from various other ministries including agriculture, energy, panchayati raj, forest, horticulture, water resources, PHED, and WSDSC. The financial structure of the scheme (in which INR 3,000 crore is World Bank's share and an equal amount is the share of the Government of India) is tied to disbursement-linked indicators, which are verified based on indicators developed on areas of 'institutional strengthening and capacity building' and 'incentive component'. The

officials revealed that because convergence and participatory management are tied to release of finances and a third party agency is engaged in verification, the scheme encourages them to empower the local-level institutions (financially, politically, in decision-making). Water security plans based on water budgeting have been made in 1,139 gram panchayats (100 per cent) of Rajasthan. These are a consultative process output, which require the GPs to prioritise the interventions they need for arresting decline in groundwater and meet their current and future water needs. Also, representation of 33 per cent for women in village and water and sanitation committees is mandatory. The scheme also identifies and trains *bhujal jankars* in every panchayat, who facilitate the collection of data on groundwater, rainfall, and water quality in their region. Additionally, the scheme converges with Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and PMKSY for funds.

The scheme hence has the potential to fill in capacity challenges on converging for planning, converging for monitoring and evaluation (data synergy), and for participatory planning. However, as was pointed out in the consultations, behaviour change in the community is a challenging area for the officials. Hence, capacity of the departments and community awareness need to be strengthened for effective implementation.

- **Eastern Rajasthan canal project**

The eastern Rajasthan canal project (ERCP) is a project for interlinking of river and tributaries of Chambal basin (the basin has surplus water during monsoon) to 13 districts of Rajasthan (Jhalawar, Baran, Kota, Bundi, Sawai Madhopur, Ajmer, Tonk, Jaipur, Karauli, Alwar, Bharatpur, Dausa, and Dholpur), which face a scarcity of drinking and irrigation water (*The Hindu*, 2022). It aims to harvest surplus water available during the rainy season in rivers in southern Rajasthan such as Chambal and its tributaries (Kunnu, Parvati, or Kalisindh), and use this water in south-eastern districts of the state.

It was highlighted during consultation that the state government has requested the central government to declare this a national project and allow its design considering the 50 per cent dependable water yield against the national stipulated standard of 75 per cent dependable yield. The project cost is INR 40,000 crore, 90 per cent of which can be granted by the centre if ERCP is declared a national project (the state has set aside a budget of INR 9,600 crore for the Navnera-Bisalpur-Isarda link under the project (ibid.)). The problem at hand amplifies the need to build capability to navigate centre–state coordination under collaboration and coordination indicator of CAF.

CASE STUDY

Leveraging data and technology for better water management

The state is using technological advancements in the field of geographic information system (GIS) and remote sensing (RS) to solve different challenges that they face in watershed and water resource management.

- The state Watershed and Soil Conservation Department (WSSC) is leveraging data-sharing policy of the Government of India and has obtained spatial data of 40 cm resolution from the State Remote Sensing Centre (SRSC) at no cost for 13 districts of Rajasthan. The department, which has been running a GIS lab since the early 1990s, has now started generating its own datasets at 5 cm resolution using drone technology, which it is sharing with SRSC for the collective benefit of the state. By further incorporating geo-tagging of the structures being made in watersheds, ground truthing of the GIS and RS data being generated, and hydrological modelling, the department is able to perform scientific micro-planning for delivering climate action. Additionally, the prioritisation of watersheds is done on a scientific basis and put up on the website, thereby setting the stage for more transparency, data synergy, and collaboration and coordination between all stakeholders of a watershed.
- Rajasthan has become the first state in the country to adopt the setting up of a State Water Informatics Centre (SWIC) in August 2022. It is led by the Water Resources Department and 12 departments in the state that are crucial for developing modules/datasets for water resources initially and to set up a real-time decision support system finally have been identified. Still in nascent stages, the centre is currently seeking data from groundwater, agriculture, PHED, WSDSC, and Department of Panchayati Raj and Rural Development (DoPR&RD) to develop modules for reservoir water-level monitoring, water pollution, and canal water and agri-planning. Similar to its national counterpart, a dashboard is being built to host historical datasets (the massive exercise of digitisation of historical data is underway), real data, and future projections. An application is being developed by the centre to promote more efficient water-use practices by farmers by sharing with them the data on water level in the dams, in canals (under testing), and the time and quantity of water allocated to farmers for water use (being tested in Ganganagar district). The state has received recognition from the central government for this initiative. The setting up of SWIC can promote data synergy, and collaboration and coordination for water resource management.

4 CAPACITY ASSESSMENT FOR DELIVERING ON CLIMATE ACTION AND SUGGESTED INTERVENTIONS

4.1 Agriculture sector

Figure 9 shows the major capacity gaps in agriculture sector governance towards climate action, as identified from the self-assessment of the officials in six departments.

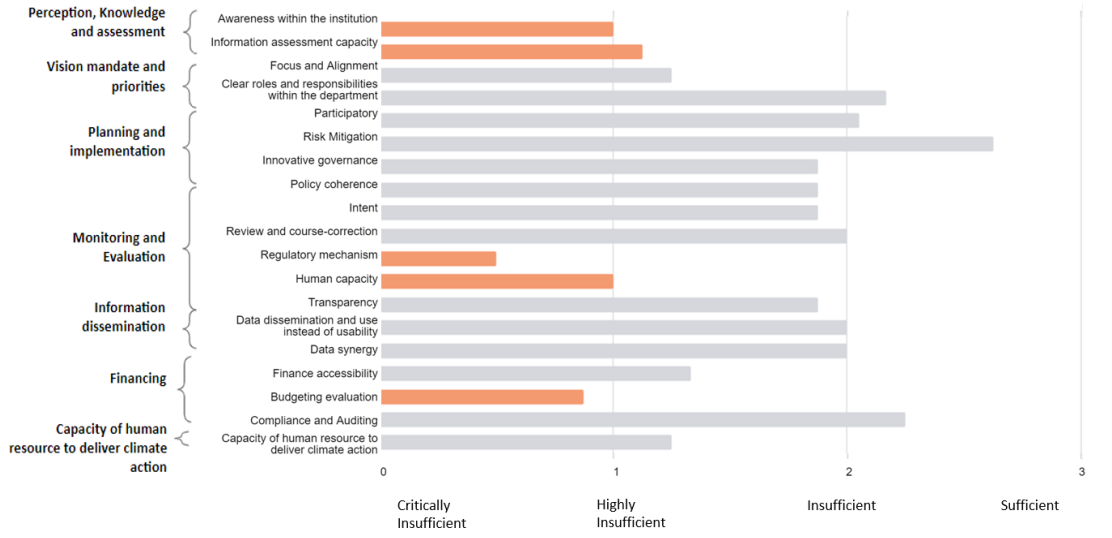


Figure 9: Key gaps that emerged after round 1 of consultations with six departments of the agriculture sector of the Government of Rajasthan

Source: Authors' compilation

The key capacity gaps identified for the agriculture sector are the following:

1. **Awareness within the institution:** The officials highlighted that the awareness about climate change was highly insufficient. This lack of awareness has a cascading impact on the department's capacity to deliver on climate action. For instance, the lack of awareness results in de-prioritisation of the climate intentional and relevant interventions. As the impact of climate change on agriculture is expected to amplify in the near future, the departments require a more thorough understanding of climate change and build awareness within the department officials.

2. **Information assessment capacity:** Officials noted that the department lacks the capacity to translate even the existing knowledge regarding climate change into effective climate action. The officials also informed that climate-relevant information collection and dissemination has not been formalised, thereby limiting any decision and action on them.

3. **Regulatory mechanism:** The officials recorded the regulatory mechanism capacity to be almost critically insufficient, which impacts the monitoring and evaluation capacity. They highlighted that there is a lack of monitoring and evaluation of data collection, collection of data on limited indicators with very low resolution, which is not sufficient to carry out proper monitoring and evaluation. For example, data on farmer practices is not collected under any scheme or institutions. The department collects data on area, production, and yield only for major crops from kharif and rabi. This lack of data makes it difficult to employ context-specific interventions to advance climate action and impedes the departments' capacity to assess the effectiveness of any implemented policy.

4. **Budgeting evaluation:** The stakeholders identified budgeting evaluation capacity to be highly insufficient. Sustainable agriculture receives less than 1 per cent of the total agriculture budget. The officials remarked that the budget estimates are based on older data/trends leading to very allocation towards climate-relevant activities.

5. **Capacity of human resource to deliver climate action:** The stakeholders identified that human resource capacity was also insufficient to deliver on climate action. The officials highlighted that multiple institutional and legal challenges hiring of sufficient and suitable human capital in timely manner. Some legal challenges include contesting the results from the government hiring in the state court, which has led to a 'stay order' from the court till the matter is resolved.

The synthesised list of key gaps, reasons, and recommendations identified from consultations 2 and 3 have been summarised in Table 3. The impact and feasibility scores and the associated confidence score have also been highlighted to enable the prioritisation of interventions. Figure 10 shows the mapping of the impact and feasibility scores for agriculture-specific interventions.

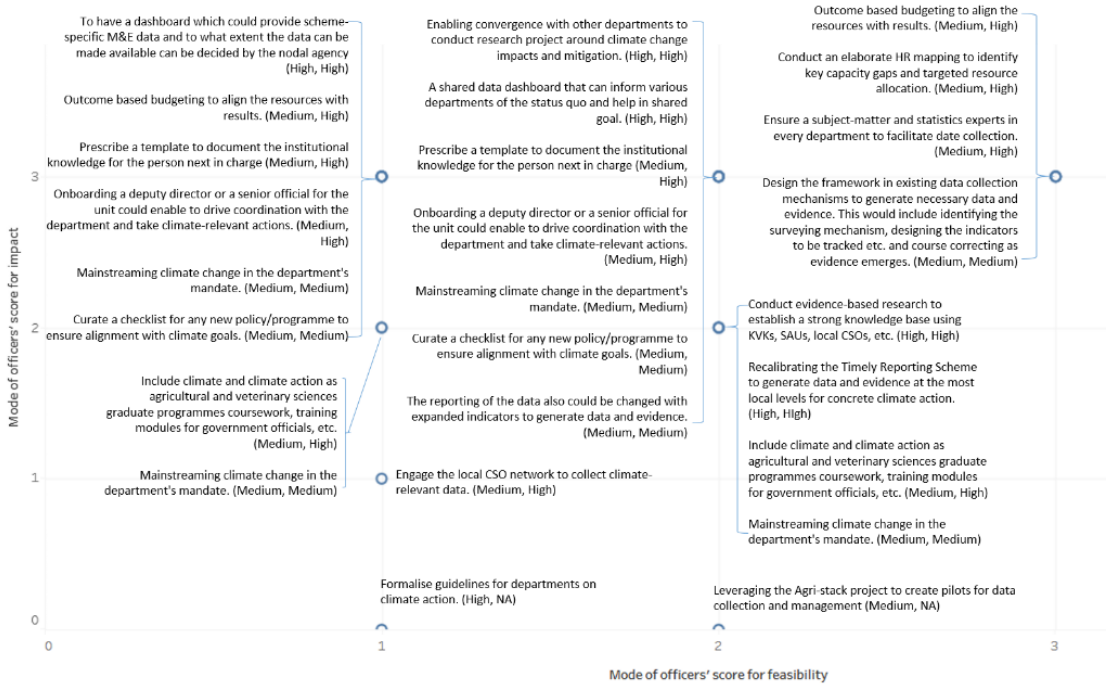


Figure 10: Impact and feasibility mapping of the identified agriculture-specific interventions

Source: Authors' compilation

Interpreting the chart:

- Feasibility scoring: 0 = Not feasible, 1 = Feasible within 2 years (including 2 years), 2 = Feasible in 3–5 years, 3 = Feasible in 6–10 years
- Impact scoring: Measured as % of the target capacity gap addressed; 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above
- Confidence level of the feasibility and impact assessment of each intervention, assessed based on variation observed among officers' scoring, is noted within brackets after every intervention as: (confidence level of feasibility scores: confidence level of impact scores)

Table 3: Synthesised capacity gaps, reasons for the gaps, and the suggested sectoral intervention through the consultation framework

Thematic area	**Institutional capacity gap**	**Reasons for the gap**	**Sectoral intervention**	**Departments where intervention is applicable**	**Feasibility** 1 (Short term): Feasible within 2 years (including 2) 2 (Medium term): Feasible in 3–5 years, 3 (Long term): Feasible in 6–10 years		**Impact** Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
					Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
Perception, knowledge, and assessment	Awareness regarding climate change is very low and there are no formal guidelines on how to deliver on climate action	1. Absence of climate action in the training curriculum. 2. Research on climate action is still evolving at State Agricultural Universities	Include climate change and climate action in agricultural and veterinary science graduate programmes' coursework, training modules for government officials, etc.	AHD, DoA	**1,2**	Medium	**2**	High
			Conduct/support evidence-based research to establish a	**2**	**2**	High	**2**	High

		(SAUs). 3. The departments are focused on productivity based livelihood enhancement.	strong knowledge base using Krishi Vigyan Kendra (KVK)s, SAUs, local civil society organisations (CSOs), etc.					
			Formalise guidelines and toolkits for departments on climate action.	**1**	**1**	High		
Vision, mandate, and priorities	The department has no agency to work towards climate action and lacks the resources to conduct research on the same.	1. The formal vision, mission, objectives, and relevant key performance indicators (KPIs) of the department do not include climate action.	Mainstreaming climate change in the department's mandate.	AHD	**1,2**	Medium	**2,3**	Medium
			Enabling convergence with other departments and capitalising on their capacity to conduct research projects around climate change impacts and mitigation.	**2**	**2**	High	**3**	High
	There is a loss of institutional knowledge,	1. There are no formalised channels for	Institute a template and procedure to document the	DoECC	**1,2**	Medium	**3**	High

	including on climate action, with changing officials.	institutional knowledge handover to incoming officials. 2. In absence of standard procedures, the department officials remain primarily reactive in nature to climate-relevant issues.	institutional knowledge for the person next in charge.					
			Develop and document the design and implementation standard operating procedures (SOPs) for the department. This will enable quick alignment with the past and the future activities of the department.	**2**	**2**			
			Curate and institute a 'climate-sensitivity checklist' for screening any new policy/programme to ensure alignment with climate goals.	**1,2**	**1,2**	Medium	**3**	Medium
Collaboration and coordination	Several plans (Gram Panchayat Development Plan (GPDP),	1. Convergence (lateral) across various government departments at	A shared data dashboard that brings together relevant data from multiple departments in a	DoA	**2**	High	**3**	High

	Water Security Plans, etc.) exist without enough convergence among them.	the local level is missing.	suitable format to inform various departments of the status quo and help in discovering/achieving shared goals.					
Information dissemination	Evidence and data on the resilience of farmers is lacking. This lack of data creates challenges for designing context-specific and targeted interventions depending on vulnerability and resilience.	1. No existing data collection process captures this data. 2. Data collection is a resource-intensive process, and the state does not have the infrastructure to collect such complex data points.	Design the framework in existing data collection mechanisms to generate necessary data and evidence. This would include identifying the surveying mechanism, designing the indicators to be included and tracked, and course correcting as evidence emerges.	DoA	**3**	Medium	**3**	Medium
			Engage the local CSO network to gather climate-relevant data that they are already generating.	**1**	**1**	Medium	**1**	High
			Leveraging the	**2**	**2**	Medium		

			Aagristack (enabling different layers of farmer-relevant digital data and digital interventions, such as e-girdawari, digital extension, etc.) projects in the state to create pilots for resilience data collection and management					
	Data collected is not made publicly available and only sometimes shared among departments.	1. The data is collected for implementation evaluation purposes only. 2. Lack of formalised channels and processes for data sharing.	1. To have a dashboard which can provide scheme-specific M&E data and can allow nodal agency's control over the extent and conditionalities of data sharing	DoA—M&E unit	**1**	High	**3**	High
Monitoring	There is a lack	1. No existing	Recalibrating the	DoA	**2**	High	**2**	High

and evaluation	of climate-relevant monitoring and evaluation data collected (for example, data on sustainable farmer practices is not collected), and the resolution and the scale of the data is not sufficient to carry out proper monitoring and evaluation	structure captures this data. 2. Data collection is a resource-intensive process.	Timely Reporting Scheme[7] to generate data at the most local levels for concrete climate action. Currently, it only covers area, production, and yield for major crops, aggregated at a district level. This component is being implemented in 16 land record states and also union territories of Delhi and Puducherry, but the resolution can be improved.					
			The reporting of the Timely Reporting Scheme (TRS) data also could be improved with an expanded set of indicators to include	DoA	**2**	Medium	**3**	Medium

[7] Timely Reporting Scheme is a centrally sponsored scheme that collects estimates of area under principal crops in each season, with the breakup of area under irrigated/unirrigated and traditional /high-yielding varieties of the crops on the basis of a random sample of 20 per cent of villages by a specific date.

			indicators like farmer practices, etc. to improve climate-relevant M&E.					
Human resource capacity to deliver on climate action	There is a lack of skilled human capital to deliver climate action	1. Issues like legal objections to state's recruitment process results, slow recruitment process, etc. impede timely and sufficient recruitment. 2. Some departments lack appropriately skilled people to identify, collect, and manage the right data indicators required for	Conduct a department-wide elaborate HR and workload mapping to identify key HR capacity gaps and efficiently allocate resources.		**3**	Medium	**3**	High
			Ensure relevant subject-matter experts and statistics experts in every department to facilitate data collection and management.	**3**	**3**	Medium	**3**	High

		collation and assessing SDG targets						
	The M&E unit lacks senior officials' leadership to drive climate-relevant actions.	1. The Department of Agriculture has not yet approved the position of deputy director due to administrative challenges.	1. Onboarding a skilled deputy director or a senior official for the M&E unit could enable coordination with the Department of Agriculture and take climate-relevant actions.	**1,2**	**1,2**	Medium	**3**	High
Financing	Insufficient budget allocation for the climate-relevant activities of the departments.	1. The budget estimates are based on older trends, and there is a lack of timely revision.	1. Outcome--based budgeting to align the resources with results. Outcome-based budgeting refers to a method of budgeting that measures the progress of each department and	AHD, DoA	**1,3**	Medium	**3**	High

			what outcomes they have achieved with its allocated budget.					

4.2 Water sector

For the water sector, six departments of the Government of Rajasthan were invited for the first round of consultation: Water Resources Department, State Water Resource and Planning Department, Watershed Development and Soil Conservation, Public Health Engineering Department, Groundwater Department, and Rural Development and Panchayati Raj Department. Through a self-assessment questionnaire (based on the CAF framework discussed above), the departments identified the major capacity gaps as shown in Figure 11.

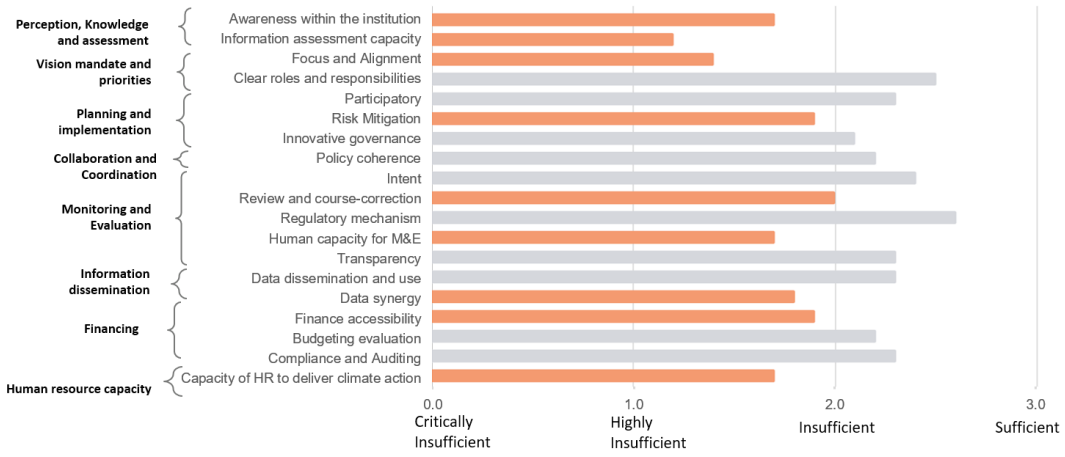


Figure 11: Key gaps that emerged after round 1 of consultations with six departments of water sector of the Government of Rajasthan

Source: Authors' compilation

Figure 11 shows key capacity gaps for the water sector as identified during this round of consultation as orange-coloured bars. For no sub-indicator (a total of 19) across 8 indicators, the water sector has a collective score below 1. For 9 out of these 19 indicators, collective scores are between 1 and 2, that is, highly insufficient and insufficient, respectively. The identified gaps in capability to deliver climate action are detailed below.

1. **Perception, knowledge, and assessment**

- **Awareness within the institution:** All departments and ministries in the water sector acknowledge climate change and the vulnerability of water resources in Rajasthan to this phenomenon, but they do it with varied degrees of confidence. There is a scope to strengthen the existing technical knowledge on the nature and extent of vulnerability of water resources as agreed by the departments in the discussion.
- **Information assessment capacity:** The capacity of the water sector to translate the awareness and knowledge they have to effective climate action and data management is insufficient. It was pointed out that while climate

change as a concept is understood, what actions constitute 'climate action' is an area of low understanding. This is the sub-indicator in which the sector has scored itself the lowest.

2. Vision, mandate, and priorities

- **Focus and alignment:** It was pointed out that climate change has been a part of some project-related training that the officials have been imparted in the past, but delivering on climate action is not a priority for any of the departments. This is so because the mandate of climate action has not been institutionalised in the department's mission/objectives to the extent of aligning to deliver India's larger vision on SDGs and NDC goals.

3. Planning and implementation

- **Risk mitigation:** While planning to mitigate risks to water resources and its uses is incorporated by departments in their projects, it was agreed that the quality of such planning is an area that needs improvement. Improvement can be sought in robustness of such planning in terms of geographical area and population covered, incorporation of local contexts, and using data better representative of local realities.

4. Monitoring and evaluation

- **Review and course correction:** The sector has an average score of 2 in their capability to identify if activities are executed as per plan, and if not, then to correct them.
- **Human capacity for monitoring and evaluation:** This is an area of low score for this sector because the department's officials felt that their current human resources have insufficient capacity to monitor the environmental and socio-economic impacts from the policies. This was in terms of technical know-how and technological equipment being lesser than what the departments deem necessary. While training and platforms exist for imparting this skill, the quality of such training can be improved.

5. Information dissemination

- **Data synergy:** The instances of departments collaborating to produce data—be it for monitoring and evaluation or for impact evaluation—were reported to be very few. Hence, the low score in this area. The Panchayati Raj Department ranked itself higher than other departments because it was sharing information of different schemes with different departments at the gram panchayat level.

6. Financing

- **Finance accessibility:** Departments rank themselves differently on the capability to access finance from diverse sources like international public finance including bilateral/multilateral, consumer or user fees, carbon taxes, specific national funds, etc. The Groundwater Department has ranked itself as highly insufficient in this regard. Other departments have ranked themself between 2 and 2.5. For example, Panchayati Raj Department has ranked its capability as sufficient since it is accessing funds from corporate social responsibility or development fund of the state.

7. Capacity of human resource to deliver on climate action

- Groundwater Department has ranked its capacity as insufficient in this regard. The maximum vacant posts in the water sector are currently in groundwater as was revealed during consultation with experts outside of the government system of Rajasthan. This is crucial as groundwater is overexploited in most of the blocks in the state and needs better management. All other departments have ranked themselves between 2 and 3, in terms of filling vacant posts and improving various kinds of capacity of current staff to deliver on climate action.

A collective synthesis of the above-identified capacity challenges was made for the water and agriculture sector and presented in a meeting to high-level representatives of these departments of the Government of Rajasthan and the CMRETAC team. After incorporating suggestions obtained from the government, a one-on-one consultation was done with each department in the water sector. On an average, three officials attended these one-on-one consultations from each department, ranging from department/policy head to mid-level representatives. Care was taken to maintain continuity in terms of inclusion of the same set of officials who participated in the previous consultative process, and to invite more people from the department so as to get diverse and representative insights. In one-on-one consultations, a deep-dive into these capacity gaps and policy insights was made to understand their nuances and possible solutions to mitigate them. In consultation round 4, impact and feasibility scores were taken.

The results of these consultations are presented in Figure 12 and Table 4. This table shows interventions to address key capacity gaps for all departments of the water sector, and their impact and feasibility.

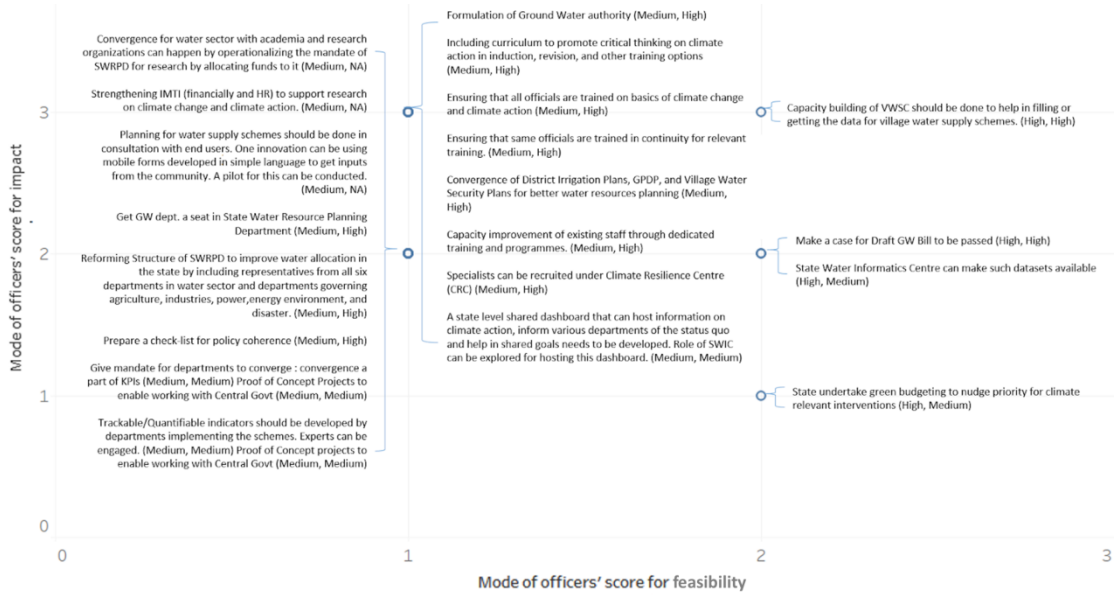


Figure 12: Impact and feasibility assessment scores of the identified water-sector interventions

Source: Authors' compilation

Interpreting the chart:

- Feasibility scoring: 0 = Not feasible, 1 = Feasible within 2 years (including 2), 2 = Feasible in 3–5 years, 3 = Feasible in 6–10 years
- Impact scoring: Measured as % of the target capacity gap addressed; 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above
- Confidence level of the feasibility and impact assessment of each intervention, assessed based on variation observed among officers' scoring, is noted within brackets after every intervention as: (confidence level of feasibility scores: confidence level of impact scores)

Table 4: Key gaps and interventions for water sector of the Government of Rajasthan

Thematic area	**Institutional capacity gap**	**Reasons for the gap**	**Sectoral intervention**	**Departments where intervention is applicable**	**Feasibility** 1 (Short term): Feasible within 2 years (including 2) 2 (Medium term): Feasible in 3–5 years, 3 (Long term): Feasible in 6–10 years		**Impact** Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
					Mode	**Confidence score**	**Mode**	**Confidence score**
Vision, mandate, and priorities	Responsibility of Groundwater Department is restrictive in nature, and hence they lack the agency to carry out climate-intentional actions	1. No GW Act to regulate 2. Presently GW Dept does not have a nominee in State Water Resource Planning Department (SWRPD)	Make a case for Draft GW Bill to be passed	Groundwater Department	2	High	2	High
			Formulation of Ground Water Authority	Groundwater Department	1	High	3	High
			Get GW department a seat in SWRPD	Groundwater Department	1	High	2	High
Perception, knowledge, and assessment	Low capacity to gauge actionables in response to	Climate change is a part of the curriculum used in induction	Including curriculum to promote critical thinking on climate action in induction, revision, and other	All departments (GWD, SWRPD, WRD,	1	High	3	High

	climate change	training or some programme-specific training as well and so is the need for climate action. But development of critical thinking skills on climate action are not fully supported. Toolkits to come up with climate action activities are lacking.	training options	PHED, WSDSC, and DoRD&PR)				
			Ensuring that all officials are trained on the basics of climate change and climate action	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	3	High
			Ensuring that same officials are trained in continuity for relevant training.	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	3	High
			Convergence for water sector with academia and research organisations can be achieved by operationalising the mandate of SWRPD for research by allocating funds to it	SWRPD	1	High	2,3	

			Strengthening Irrigation Management and Training Institute (IMTI) (financially and HR) to support research on climate change and climate action.	WRD	1	High	2,3	
Collaboration and coordination	Lack of incorporating the requirements of various sectors in water allocation policy, hindering effective water allocation in the state.	Integrated Water Resource Planning does not engage all stakeholders sufficiently	Reforming the structure of SWRPD to improve water allocation in the state by including representatives from all six departments in water sector and departments governing agriculture, industries, power, energy environment, and disaster.	All departments. Led by SWRPD. Abided by GWD, WRD, PHED, WSDSC, and DoRD&PR	1	High	2	High
			Convergence of District Irrigation Plans, GPDP, and Village Water Security Plans (VWSCs) for better water resources planning	WRD, DoA&FW	1	High	3	High

Information dissemination	Cross-department coordination for data collection and policy evaluation is difficult to navigate	Legacy problem	Give mandate for departments to converge: convergence a part of KPIs	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	2,3	Medium
			Prepare a checklist for policy coherence	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	2	High
Collaboration and coordination	Less flexibility in central schemes in terms of project designs and implementation, thereby hindering implementation of climate-relevant action at state or local level.	1. Local hydrological and socio-economic conditions are not sufficiently acknowledged in the design of such schemes. 2. Ineffective communication between centre and state.	State Water Informatics Centre can make such datasets available	Led by SWIC.	2	High	2,3	Medium
			Proof-of-concept projects to enable working with central government	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	Medium	2,3	Medium

Planning and implementation	Low willingness in community for O&M of water supply schemes, thereby having negative consequences for sustainability of schemes.	Planning is not truly participatory in nature	Planning for water supply schemes should be done in consultation with end users. One innovation can be using mobile forms developed in simple language to get inputs from the community. A pilot for this can be conducted.	PHED	1	High	2	
			Capacity building of VWSC should be done to help in filling or getting the data for village water supply schemes.	PHED and DoPR&RD	2	High	2	High
Monitoring and evaluation	Data quantity and quality need improvement for scientific decision making	Progress of the scheme is not sufficiently tracked.	Trackable/quantifiable indicators should be developed by departments implementing the schemes. Experts can be engaged.	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	2,3	Medium
			A state-level shared dashboard that can host information on climate action, inform	All departments (GWD, SWRPD,	1	High	3	Medium

			various departments of the status quo, and help in shared goals needs to be developed. Role of SWIC can be explored for hosting this dashboard.	WRD, PHED, WSDSC, and DoRD&PR) including IT (information and technology) department of the state				
Human resource capacity	Existing posts are vacant and the functioning staff has low capacity to deliver climate action.	Lack of budget	Capacity improvement of existing staff through dedicated training and programmes.	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1	High	3	High
			Specialists can be recruited under Climate Resilience Centre (CRC)	Cross-sectoral (water and agriculture sector)	1	High	3	High
Financing/collaboration and coordination	Policy and scheme mandates cannot be delivered due to lack of	1.Agreement on the design of the scheme between centre and state is difficult to	State to undertake green budgeting to nudge priority for climate-relevant interventions	All departments (GWD, SWRPD, WRD, PHED,	2	High	1,2	Medium

	sufficient funds.	establish 2. Fund-utilisation structures are rigid		WSDSC, and DoRD&PR)				
			Proof-of-concept projects to enable working with central government	All departments (GWD, SWRPD, WRD, PHED, WSDSC, and DoRD&PR)	1		2	

4.3 Disaster management departments

During the initial phase of consultation, a comprehensive effort was made to involve all 18 relevant departments in the process of identifying gaps and assessing the current state of affairs. Among these departments, the State Disaster Management Authority (SDMA) played a pivotal role in recognising the challenges faced in addressing climate- and disaster-related issues. The consultation process comprised four distinct rounds, wherein representatives from these departments convened to discuss and analyse the identified gaps. The primary objective of these consultations was to propose precise and targeted interventions that would effectively address the identified gaps and contribute to overcoming them.

Through the consultation process, the aim was to understand the gaps and challenges faced by the departments themselves. The focus of the consultations was on interacting with mid- to junior-level officers as they are a major part of the implementation process and well versed with the state policies. Further, they provided the team with deep insights on the capacity of the department in planning, designing, and implementing the schemes and policies in the state. Furthermore, the consultations helped identify the disconnect between the design and implementation of the policy and other stakeholders who can be included in the process of policy implementation other than the department agencies.

After the first round of consultations, the most relevant gaps for the State Disaster Management Authority (SDMA) were identified through the application of the Capacity Assessment Framework (CAF). Figure 13 represents the key gaps faced by the Disaster Management Authority (highlighted in red).

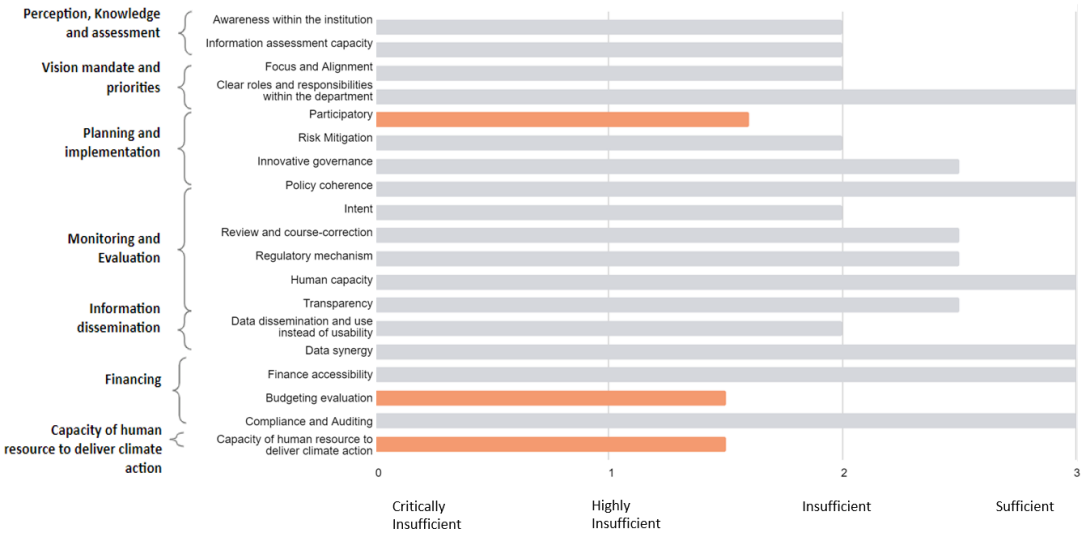


Figure 13: Key gaps that emerged after round 1 of consultations with SDMA, Rajasthan

Based on Figure 13 that presents the information and scores obtained during the first round of consultations, four key gaps were identified, which have been explained below:

1. **Capacity of human resource to deliver on climate action:** The department representatives rank the capacity of human resources to deliver on climate action as insufficient. The lack of capacity within the human resources of the Disaster Management Authority in Rajasthan poses significant challenges in effectively delivering on climate action. With increasing frequency and intensity of climate-related disasters, such as floods, droughts, and heatwaves, it is crucial to have skilled and adequately trained workforce capable of handling these emergencies. However, the existing human resource capacity in the authority falls short in terms of numbers, expertise, and resources. Insufficient training programmes and limited funding hinder their ability to respond efficiently to climate-related emergencies, compromising the overall effectiveness of disaster management efforts.
2. **Lack of planning and vision for conducting a budgetary evaluation:** Effective budgetary evaluation is essential for ensuring that resources are allocated efficiently and effectively to address the needs of disaster management initiatives. However, the authority's current approach lacks a comprehensive plan and a clear vision for evaluating the budgetary aspects of their operations. This lack of foresight hampers their ability to assess their financial performance, identify areas of improvement, and make informed decisions regarding resource allocation. Without a well-defined framework for budgetary evaluation, there is a risk of misallocation of funds, inefficiencies, and missed opportunities for enhancing disaster management capabilities.
3. **Lack of a participatory approach by the community in designing and planning disaster management plans:** Engaging the community in the decision-making process is crucial for ensuring that disaster management plans are tailored to local needs and effectively address vulnerabilities. However, the authority's current approach often overlooks the valuable knowledge, experiences, and perspectives of the communities directly affected by disasters. This exclusionary practice limits the authority's ability to fully understand the unique challenges faced by different communities and to implement context-specific and sustainable solutions.
4. **Lack of software and technical infrastructure to process spatial data collected, which is crucial for disaster risk reduction information:** The lack of software and technical infrastructure necessary to process spatial data collected is a critical issue affecting disaster risk reduction information within the Disaster Management Authority in Rajasthan. Spatial data plays a vital role in understanding and mitigating disaster risks by providing valuable

insights into hazard patterns, vulnerability assessments, and infrastructure planning. However, without the appropriate software tools and technical infrastructure like GIS software like ArcGIS, which is essential for mapping disaster-affected areas, analysing spatial data, and optimising resource allocation during emergencies, and remote sensing software and satellite imagery analysis tools that help in monitoring disaster events, assessing damage, and tracking environmental changes over time in place, the authority faces significant challenges in effectively processing and analysing the collected spatial data. The absence of adequate software hampers their ability to extract meaningful information, generate accurate risk assessments, and develop informed strategies for disaster prevention and preparedness.

After identifying the key gaps in the first two rounds of consultations, another round of consultation was conducted with the department to understand why such gaps arise, identify their root causes, and explore/enlist potential interventions to address the same. In subsequent round of consultations and workshops, high- and mid-level officials from the department and representatives from external organisations were invited to gauge the feasibility and potential impact of these interventions and co-create a road map. The key interventions for each identified gap have been elaborated in detail in Table 5 and a brief snapshot of sectoral interventions is captured in Figure 14.

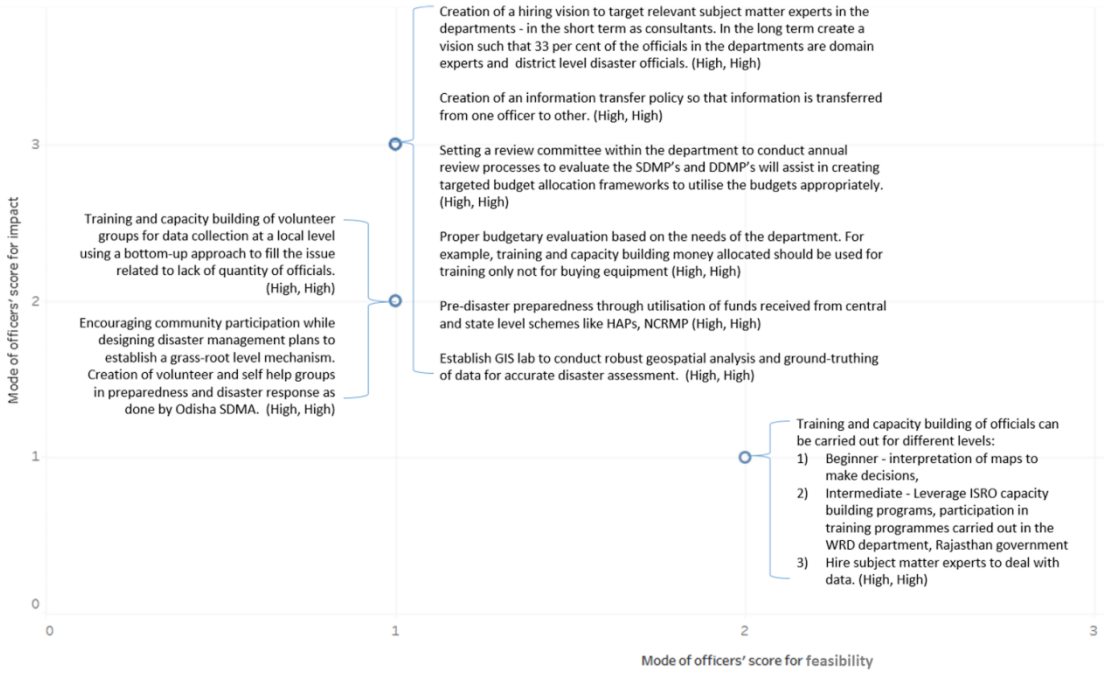


Figure 14: Impact and feasibility assessment scores of the identified disaster management sector interventions

Source: Authors' compilation

Interpreting the chart:

- Feasibility scoring: 0 = Not feasible, 1 = Feasible within 2 years (including 2 years), 2 = Feasible in 3–5 years, 3 = Feasible in 6–10 years
- Impact scoring: Measured as % of the target capacity gap addressed; 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above
- Confidence level of the feasibility and impact assessment of each intervention, assessed based on variation observed among officers' scoring, is noted within brackets after every intervention as: (confidence level of feasibility scores, confidence level of impact scores)

Table 5: Key gaps and interventions for State Disaster Management Department, Rajasthan

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
Capacity of human resources to deliver on climate action	Lack of human resources in both capacity and expertise	1. Lack of hiring vision, leading to lack of both technical quality and quantity in the department. Lack of subject-matter experts and operational officers to collect, collate, and share	Training and capacity building of volunteer groups for data collection at a local level using a bottom-up approach to fill the issue related to lack of quantity of officials.	1	High	2	High
			Creation of a hiring vision to target relevant subject-matter experts in the departments—in the short term as consultants.	1	High	3	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
		ground-level data.	In the long term create a vision such that 33 per cent of the officials in the departments are domain experts and district-level disaster officials.				
		2. Frequent transfer of officers leads to a lack of focus and alignment in the department.	Creation of an information transfer policy so that information is transferred from one officer to other.	1	High	3	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
Planning and implementation	Lack of community-level participation in disaster management	Community involvement is missing while designing disaster management plans. There is a need to engage with grassroots-level people to build capacity.	Encouraging community participation while designing disaster management plans to establish a grassroot-level mechanism. Creation of volunteer and self-help groups in preparedness and disaster response as done by Odisha SDMA.	1	High	2	High
Monitoring and evaluation	Lack of planning and implementation	1. Robust monitoring and evaluation	Setting a review committee within the department to conduct	1	High	3	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
	of budgetary allocation	mechanism for reviewing budgetary allocation is missing as state and district-level disaster management plans are not updated.	annual review processes to evaluate the state disaster management plans (SDMPs) and district disaster management plans (DDMPs) will assist in creating targeted budget allocation frameworks to utilise the budgets appropriately.				
		2. Focus of the department is currently on	Proper budgetary evaluation based on the needs of the department.	1	High	3	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
		disaster response over disaster preparedness	For example, training and capacity building funds allocated should be used for training only not for buying equipment				
		3. Funds allocated for training purposes are used for buying equipment	Pre-disaster preparedness through utilisation of funds received from central and state-level schemes like heat action plans (HAPs), National Cyclone Risk Mitigation Project (NCRMP)	1	High	3	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
Information dissemination	Lack of software and technical infrastructure missing to process spatial data collected, which is crucial for disaster risk reduction information	Lack of forward thinking and in-depth knowledge of emerging geospatial technologies to assist with traditional forms of data analysis (Excel)	Establish GIS lab to conduct robust geospatial analysis and ground truthing of data for accurate disaster assessment.	1	High	3	High
			Training and capacity building of officials can be carried out for different levels: (1) Beginner—interpretation of maps to make decisions, (2)	2	High	1	High

Thematic area	Institutional capacity gap	Reasons for the gap	Sectoral intervention	Feasibility 1 (Short term): Feasible within 2 years (including 2 years) 2 (Medium term): Feasible in 3–5 years 3 (Long term): Feasible in 6–10 years		Impact Measured as % of capacity gap addressed: 0= 0–25%, 1= 25–50%, 2= 50–75%, and 3= 75% and above	
				Mode of scores provided by participants	**Confidence score**	**Mode of scores provided by participants**	**Confidence score**
			Intermediate—Leverage ISRO capacity building programmes, participation in training programmes carried out in the WRD department, Rajasthan government, and (3) hire subject-matter experts to analyse data.				

5 STATE-WIDE INTERVENTIONS FOR RECALIBRATING GOVERNANCE FOR CLIMATE ACTION

Table 6 summarises the common gaps identified across multiple departments and sectors, and the corresponding interventions that have emerged from the consultation.

Table 6: State-wide interventions to address common capacity gaps identified across multiple departments and sectors, and their feasibility

Thematic area	Gap	Intervention	Feasibility scoring **0**—not feasible, **1 (Short term)**—feasible within 2 years (including 2 years) **2 (Medium term)**—feasible in 2–5 years, **3 (Long term)**-feasible in 5–10 years	Confidence score
Perception, knowledge, and assessment	Awareness about climate change is very low and the departments do not have guidelines on how to deliver climate action	Building a knowledge base for the department officials through training modules	2	Medium
		Developing a toolkit with detailed guidelines for department activities. This could include a 'climate-sensitivity checklist' for each department for	2	Medium

		improved policy design and implementation		
Vision, mandate, and priorities	Most departments lack sufficient agency to carry out climate-intentional actions and some departments do not have any mandate related to them	Mainstreaming climate change and action in the department's mandate	2	Medium
	Lack of targeted interventions and absence of effective long-term and short-term planning	Institutionalising outcome-based planning and including timed outputs and milestones within the department's vision and road maps	2	Medium
		Ensuring a formal channel to impart institutional knowledge to new appointees. These should include: policy design SOP and an implementation SOP	1	Medium
Collaboration and coordination, and planning and implementation	Lack of convergence: – Inter-department – Intra-department – Department and academic and CSO actors – Centre–state	Instituting a Programme Management Unit (PMU) for climate change and climate action, having representation from and influence on all the relevant departments, should be formed under the chairmanship of top leadership (e.g. Chief Minister or Chief Secretary).	1	High
		Ensuring a seat for all stakeholders on convergence platforms	1	High
		Including collaboration and coordination as appraisal KPIs for government officers	1	High
		Building officers' capacity for convergence	1	High
		Data on convergence indicators to be a part of climate action data	2	High
		Convergence for research	1	High

		'Climate-sensitivity checklist' for new policy development to enabling policy coherence towards climate action	1	High
	Inadequate community participation	Capacity building of the government to address.	1	High
		More robust bottom-up planning (e.g. GPDP to District Development Plan (DDP)) by capitalising on technology, enabling data democratisation, etc.	2	High
Information assessment capacity, and monitoring and evaluation	Lack of data synergy and sharing within the departments as well as with external stakeholders	Creating a state-level climate-action data dashboard, which will act as a infrastructural framework for data collection, sharing, analytics, and data-driven decision support	1	High
	Resolution and scale of data for carrying out monitoring and evaluation, and various data-driven decisions is not sufficient	Stepping up accessibility of data to actors outside the department and/or government while differentiating between types of data for managing access and transparency (i) Analytical data: Free sharing between government agencies; sharing with external stakeholders through fast memorandum of understanding (MoU) and non-disclosure agreement (NDA) procedures. (ii) M & E data: proprietary access to the owning department. Can be shared with others on request.	1	High
	Insufficient tracking of progress of schemes and M&E	Reforming M & E process based on three dimensions: (i) Recalibration of indicators from output-based to outcome-based (ii) Tracking on M & E progress via creation of	1	High

		review committees (iii) Creation of M & E framework and indicators for departments currently excluded from SAPCC		
Financing and human resource capacity to deliver on climate action	Lack of human resources in both quantity and expertise	Ensuring that the department always has three levels of capacity: technical experts, statistics experts, and administrative experts. This will also require recalibrating the mechanisms for managing transfers to ensure effective continuity of departmental activities. A 'Governance Continuity Policy' may be instituted to enable above outcomes.	3	High
		Extensive HR capacity and workload mapping for every department to highlight the unperceived capacity gaps for better resource allocation.	1	High
		Leveraging the on-ground support system and capacity of CSOs to support ground-level data collection to develop simple data-democratising dashboards and develop superior local governance plans, such as Gram Panchayat Development plans and Water Security Plans.	1	High
	Policy and scheme mandates cannot be delivered due to lack of sufficient funds.	Alignment of the state-level policy design with central guidelines and improving centre–state coordination	3	High
	Insufficient budget allocation	Outcome-based budgeting to recalibrate the resource allocation towards priority outcomes and outputs driving them	1	Medium
		Adopting green budgeting to nudge prioritisation of climate-relevant interventions.	2	Medium

In Table 6, 23 interventions are listed in total, out of which 13 interventions have been ranked as being feasible within 2 years from the start of 2023. Strengthening of most capacity areas necessary for solving challenges in collaboration and coordination; planning and implementation; information assessment capacity; and monitoring and evaluation can happen in the short term. Most interventions that target vision, mandate, and priorities; perception and knowledge; human resource improvement; and finances, seem to require a period of 3–5 years for implementation. Strengthening collaboration and coordination with the centre has been assessed to be feasible only in the long term (6—10 years).

During the policy study, there also emerged an opportunity for the study team to provide a budgetary recommendation for FY 2023-24. At that occasion, we brought together the interim findings and developed a budgetary proposal for establishing a Centre for Climate Resilience (refer to Annexure 5). We recommend that such a Centre for Climate Resilience can become the nodal institution for driving the above listed state level recommendations for recalibrating institutions for climate action

Given the wide mandate of this scoping study, it is not possible to come up with 'implementation-ready' proposals for each intervention like we did for Centre for Climate Resilience. Therefore, we have attempted in the next section a deep-dive into one of the intervention set—'Recalibrating Government Support[8] to Agriculture' to showcase the process towards developing more detailed proposals for the identified interventions and painting some broad strokes of the way ahead. This intervention set was of particular interest to the government stakeholders because the access and availability of finance for climate action was identified as a key capacity challenge, and recalibrating agriculture and water-related subsidies has been demonstrated in literature as a promising way to unlock the budgets currently locked in the policies that aggravate climate change.

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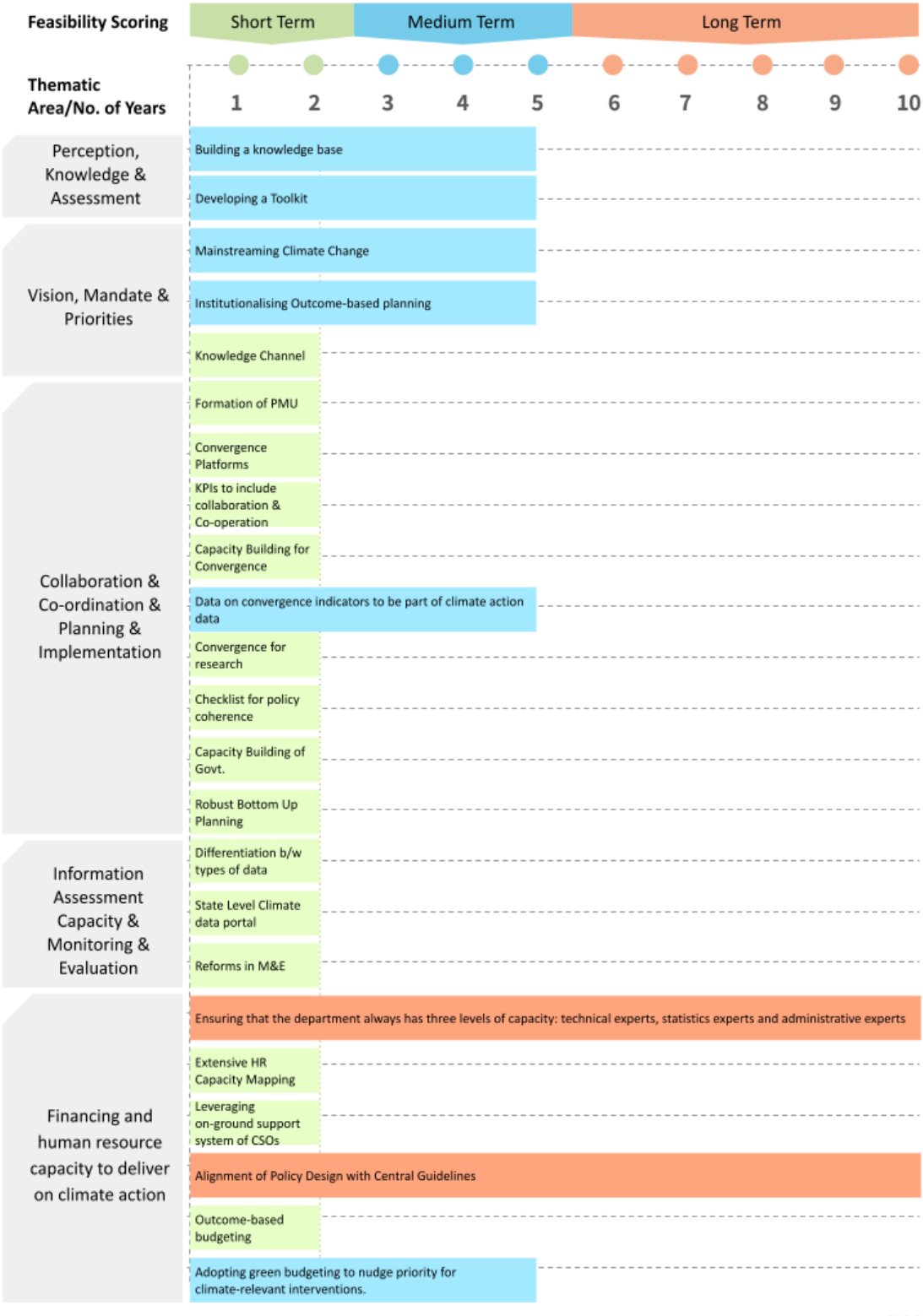
[8] For example, power subsidy to farmers, fertiliser subsidy, minimum support prices, etc.


Feasibility Scoring
Short Term
Medium Term
Long Term
Thematic Area/No. of Years
1
2
3
4
5
6
7
8
9
10
Perception, Knowledge & Assessment
Building a knowledge base
Developing a Toolkit
Vision, Mandate & Priorities
Mainstreaming Climate Change
Institutionalising Outcome-based planning
Collaboration & Co-ordination & Planning & Implementation
Knowledge Channel
Formation of PMU
Convergence Platforms
KPIs to include collaboration & Co-operation
Capacity Building for Convergence
Data on convergence indicators to be part of climate action data
Convergence for research
Checklist for policy coherence
Capacity Building of Govt.
Robust Bottom Up Planning
Information Assessment Capacity & Monitoring & Evaluation
Differentiation b/w types of data
State Level Climate data portal
Reforms in M&E
Financing and human resource capacity to deliver on climate action
Ensuring that the department always has three levels of capacity: technical experts, statistics experts and administrative experts
Extensive HR Capacity Mapping
Leveraging on-ground support system of CSOs
Alignment of Policy Design with Central Guidelines
Outcome-based budgeting
Adopting green budgeting to nudge priority for climate-relevant interventions.

6 RECALIBRATING GOVERNMENT SUPPORT TO AGRICULTURE IN RAJASTHAN — A DEEP-DIVE INTO A KEY OPPORTUNITY AREA FOR IMPROVING POLICY COHERENCE AND UNLOCKING FINANCE FOR CLIMATE ACTION

Many studies in the literature highlight the general issues with respect to the current government subsidies and other support provided to agriculture globally (Ding et al. 2021; FAO 2021; Searchinger et al. 2020). In particular, input subsidies for synthetic fertilisers and electricity[9] are criticised for not delivering the intended benefits of improving smallholders' incomes, agricultural production, and profitability. Market mechanisms like the minimum support prices (MSP), backed by open-ended procurement, are highly skewed towards rice and wheat in a few regions or states. Evidence from several cases nationwide strongly emphasises that MSP, implemented in its current form, has created a perverse effect on the environment and agronomy.[10] These subsidies, introduced on a large scale in the late 1960s and early 1970s, have continued without any large-scale reforms, failing to adjust in response to today's emerging threats including climate change and resource depletion. In summary, the subsidies and other government support to agriculture still remain **inefficient, ill-targeted, and incoherent** with climate action.

While one of the key institutional capacity gaps that emerged in the consultations was the insufficiency of budget allocations towards climate action, interestingly, significant funds can be unlocked by recalibrating the government subsidies. For instance, the cost of power subsidisation in Rajasthan, currently INR 18,571 crore per annum (approximately 20.8 per cent of the state's total krishi budget 2023–24), is the biggest state expenditure on agriculture. A significant part of final electricity sales (about 41.6 per cent) are directed towards agricultural consumers[11] (in 2021–22), 70 per cent of irrigation is groundwater-dependent, and the on-farm irrigation efficiency is low—approximately 27 per cent—in a state where surface water availability is already limited and water in most river basins is over-appropriated.[12] The subsidy booked by the DISCOMs (electricity distribution companies) at the end of financial

[9] Payment transfers that are directly provided to farmers to support the purchase of certain farm inputs (fertilisers, seeds, etc.) or provisioning of inputs (including water, electricity, machinery) at a subsidised rate.

[10] https://assets.researchsquare.com/files/rs-1766947/v1/6c232525-615d-4929-8347-bc4615d53b35.pdf?c=1658337089

[11] Petition No. RERC 2066/2022, 2067/2022, 2068/2022.

[12] Department of Water Resources. Water Resources Vision 2045. Government of Rajasthan; NA. Available from: https://water.rajasthan.gov.in/content/water/en/waterresourcesdepartment/rulespoliciesandacts/vision2045.html .

year 2021–22 was approximately 88 per cent[13] of the total revenue earned through the electricity supplied to agricultural consumers, thus contributing to a huge subsidy bill for the state. Further, it leads to overexploitation of groundwater. The annual groundwater extraction for irrigation alone was 130 per cent of the total annual extractable resource in 2020.

Therefore, given that sub-national governments face difficulties in raising additional finance, one promising way to finance climate action seems to be via unlocking the budgets currently locked in the policies that aggravate climate change. A variety of recommendations have been made by experts towards recalibrating the government support to agriculture, such as the following:

- Incentivise efficient use of water via a system based on water permits per farmer wherein if a farmer consumes less than the allocated quota, then that farmer gets an incentive (e.g. by selling the permits or gets paid by the government proportional to water saving). If a farmer uses more water than the allocated quota, then the farmer is either to be disincentivised (e.g. needs to buy more permits) or just be non-incentivised (i.e. no additional payment by the government).
- Differentiate and target the delivery of various subsidies to the beneficiaries based on criteria like the socio-economic status of the cultivator, the crop choices (whether the crop is suitable to agro-climatic conditions, nutrition-sensitive, or low in environmental footprint), the season, and other factors.
- Merge all the subsidies and convert them into a direct benefit transfer (DBT) to the farmers, and let the farmer have the agency to decide and shape the utilisation of funds in the farm. Various experts recommend that such DBT to be differentiated and targeted (as explained in the previous point).
- Institute an agri-climate zone-based MSP or procurement support for regionally suitable, nutritionally sensitive crops.

While multiple recommendations have been made already with regard to subsidies, limited action has been taken by various governments. Therefore, we attempted in this deep-dive to answer what will it take to move the needle here and, to enable the change, what is some broad-stroke guidance for shaping the way ahead.

[13] Jodhpur Vidhyut Vitran Nigam Limited (JdVVNL) Report Q1–Q4 cumulative (2021–22), Ajmer Vidhyut Vitran Nigam Limited (AVVNL) Report Q1–Q4 cumulative 2021–22, Jaipur Vidhyut Vitran Nigam Limited (JVVNL) Report Q1–Q4 cumulative 2022–23.

6.1 Methodology

A three-step process was followed to identify the immediate next steps to enable the recalibration of government support to agriculture:

1. Selection of the policies for recalibration
    I. The top 15 agricultural policies in terms of size of budget allocation were filtered (approximately 50 per cent of Rajasthan's total agriculture budget 2023–24)
    II. Out of them, policies under three themes were shortlisted for deeper consultations on the basis of (a) their direct relevance to the goals of climate change mitigation and adaptation, nutrition and food security, livelihoods, and resource efficiency and (b) scope of recalibration as noted in the literature:
        (i) Power and irrigation subsidy
        (ii) Fertiliser subsidy
        (iii) MSP and public distribution system
2. Reviewing and sourcing the existing recommendations relevant to the selected policies: A cumulative list of 39 existing recommendations was prepared based on three themes identified above.
3. Screening of recommendations and identification of immediate next steps:
    It was imperative to consult experts and government officers to assess the viability of various recommendations in the context of Rajasthan and co-creatively identify the next steps for the key recommendations. For this purpose, a brainstorming workshop was conducted with 17 officers from 10 government departments and 12 external experts. Participants worked in three thematic groups, with each group deliberating on the existing recommendations on one of the three themes.

6.2 Co-creative brainstorming for identifying immediately actionable ideas to move the needle

The deep-dive, including the brainstorming workshop, highlighted several factors impeding the implementation of the existing solutions. First, there is a general lack of consensus on many recommendations and their implementation strategy, given the multifaceted nature of the issues involved. Furthermore, the recommendations lack necessary contextualisation for Rajasthan, resulting in ambiguity around their applicability to the state. Additionally, the absence of concrete proof-of-concept compounds the problem, as most of the existing recommendations remain as untested proposals with limited/no relevant pilots to back their efficacy. Lastly, the multiplicity of existing recommendations and the fragmented nature of the conversations around them has led to a dearth of coherent, clear, and actionable road maps for the policymakers.

Tables 7–9 summarise the ideas that emerged in the brainstorming workshop to be considered in shaping the way ahead for the state towards recalibrating some of the key subsidies in agriculture and water domains:

Table 7: Ideas for shaping the way ahead for recalibration of power subsidy to agriculture

<table>
<tr><td colspan="2"><u>Recommendations considered for the power sector</u>
Targeted subsidy delivery
Creating electricity quotas for farmers based on socio-economic and ecological parameters to promote efficient use of groundwater and ensure equitable distribution of subsidy.
● Usage/consumption within the quota can be rewarded by facilitating the monetisation of the unused allocation; OR
● Usage/consumption exceeding the quota can be charged at the cost of production – thus penalising and discouraging excess usage; OR
● The unused quotas can be made tradable, leading to efficient use of water/energy by farmers</td></tr>
<tr><td>Enablers (activities that can assist but are not happening currently)
Robust data collection and aggregation mechanisms:
- Data on power demand in each agro-climatic zones (ACZ)
- Thorough monitoring mechanisms (e.g. water pump-set metering)
Planning/analysis methodologies
- Developing regional crop production plans in line with the regional agroecology and (ground)water availability
- Developing methodologies to determine the power amd water quotas and subsidies per farmer based on crop choices, landholding, soil type, groundwater levels, etc.
Project implementation strategies
- Calculating power usage quota and accordingly control the provision of electricity for feeders from the substations
- Formation of farmer enterprises to act as a cooperative for</td><td>Opportunity for state (activities happening in the state that can be harnessed to implement these recommendations)
Data collection and aggregation mechanisms:
- Metered power connections have been provided to 3.9 lakh farmers in Rajasthan.
- Feeder segregation is done in the state under Deen Dayal Gram Jyoti Yojana.
- An agristack database on encompassing data on crop sown, land registry, and farmers’ details is being created in Kota
- Girdawari system working in many districts (providing landholding and crop cultivation data at the farm level)
Methods of implementation
- Existence of water security plans at the GP level under Atal Bhujal Yojna can help in identifying the sustainable groundwater withdrawal limit and thus deciding on the quota of free electricity for irrigation per hectare.
- Rajasthan’s solar irrigation pump</td></tr>
</table>

promoting solar pumps and feeding electricity into feeders	promotion under PM-KUSUM. **Existing lighthouses** - Learning from water- and power-saving schemes from other states (for instance, *Paani Bachao Paisa Kamao* in Punjab)
Next steps Conduct **a pilot** in two phases with the objective of creating electricity quotas to incentivise farmers to adopt water- and energy-efficient practices. **Phase I:** To establish electricity quotas (for irrigation) based on cropping systems and practices and (ground)water availability. **Phase II:** To expand the scope to switching to solar-based electricity consumption	
Guiding principles for selecting areas - High rates of groundwater extraction (Example: - Dausa, Karauli, Jaipur, etc.) - GPs/ districts that are covered under *Atal Bhujal Yojana* as it promotes participatory decision making (Dholpur, Baran, Dausa, Dhaulpur, Jaipur, etc.) - Presence of digitised land records (Example: Bharatpur, Ganganagar, etc.) - High density of metered and grid connected pumps - High density of solar-powered pumps - Significant presence of SHGs/CSOs (Baran, Karauli, Dhaulpur, etc.)	
Incentives for the farmer - Farmers can thus be **incentivised** to save electricity beyond the established power quota through DBT. - Farmers can earn additional income by feeding electricity into the grid, which can act as an incentive for shifting towards renewable sources of energy.	

Table 8: Ideas for shaping the way ahead for implementing Price Deficiency Payments Scheme for agro-climatic crops

Recommendations considered for ensuring income security for farmers

Complimenting Price Support System with Price Deficiency Payments Scheme to ensure remunerative prices for farmers and to save on the state's storage, transportation, and incidental costs and allocating the savings for making deficiency payments

Enablers

Design improvements

- Logical explanation for determining the time period for which selling price data must be collected to calculate modal price
- Controlling malpractices by buyers who would deliberately pay less to farmers

Data needs

- Loss incurred by farmers on crops that have an MSP but were not sold at MSP

Opportunity for the state

Data Utilisation

- APMCs have the data on daily selling price. This data can be used to calculating the modal price.
- Girdawari system used by farmers to report crop choices, land size, etc. can be used.

Existing lighthouses

- Learning from experiences of other states (e.g. Bhavantar in Madhya Pradesh and Haryana)

Next steps

A **study** needs to be done to bring about a consensus on how this scheme can be implemented in Rajasthan and address possible bottlenecks.

Study objective

- To assess the financial viability of implementing the scheme
- To develop a detailed and actionable strategy for incentivising farmers for producing crops that are agro-ecologically suitable
- To recommend a pilot design for testing and developing a viable action plan

Key components of the study

- Identification of crops that are agro-ecologically suitable and are usually sold at prices less than the MSP in the selected areas
- Identifying areas where significant sales do not happen at MSP
- Estimating the expected expenditure for implementing the scheme
- Learnings from other states that have implemented the scheme
- Controlling malpractices that lead to market price crash

Table 9: Ideas for shaping the way ahead for discouraging overutilisation of chemical fertilisers

<table>
<tr><td colspan="2"><u>Recommendation considered for fertiliser subsidy</u>
Creating quotas for the usage of fertiliser per farmer and incentivise farmers for optimal/balanced chemical fertiliser use and/or shift to alternatives under the Prime Minister’s Programme for Restoration, Awareness, Nourishment, and Amelioration of Mother Earth (PM-PRANAM)</td></tr>
<tr><td>Enablers
Data needs
- Farm-level data on:
  - Crop type
  - Soil type
  - Land size
Design strategies
- Developing the logic of how the above parameters affect fertiliser utilisation
- Estimating the amount of incentive that can be transferred to farmers</td><td>Opportunity for state
Data collection and aggregation mechanisms
- An agristack database encompassing data on crop sown, land registry, and farmers’ details is being created in Kota
- E-Girdawari system and digitisation of land records is getting implemented across the state
Design strategies
- PM-PRANAM scheme launched this year provides for transferring a monetary incentive to states that reduce their fertiliser consumption</td></tr>
<tr><td colspan="2">Next steps
To conduct a study to bring about a consensus on details of how this scheme can be implemented in Rajasthan and address possible bottlenecks</td></tr>
<tr><td colspan="2">Study objective
To assess the suitability of a quota-based reward system that incentivises farmers to shift from chemical fertilisers to bio-fertilisers and/or optimise fertiliser consumption</td></tr>
<tr><td colspan="2">Parameters of the study
- Developing a methodology of creating quotas and how different variables (soil, crop, water availability, etc.) together affect fertiliser consumption
- Developing a methodology for calculating the amount of incentive
- Feasibility analysis of transferring PM-PRANAM funds to beneficiaries
- Formulating guiding principles for the identification of districts suitable for planning this intervention
- Designing a pilot strategy</td></tr>
</table>

In all the above recommendations, budgetary support is either being retargeted to better alternatives, allocated to policies that enable climate action, or the mode of providing support is more efficient. In all of these scenarios, the finance locked in the policies that create societal and environmental risks is being freed up, which can ultimately fill the gap of financial insufficiency that the institutions currently face.

7 WAY FORWARD

The immediate next step for the state is to develop an actionable plan for the individual interventions identified in this scoping study. The deep-dive workshop on 'recalibrating agriculture support to climate action' demonstrated that that the plans to pursue the recalibration interventions should focus on one of the below-listed three purposes, based on the intervention characteristics, such as the expected lead time to implement, risk associated/investment required in the implementation, level of consensus among the stakeholders on the effectiveness of the intervention, and level of clarity on the Rajasthan-appropriate design of intervention:

1. Developing the state-wide or sector-wide intervention design/implementation plan
2. Designing and planning for a 'considered' pilot to enable scale-up with iterative course correction
3. Conducting a study to establish the level of effectiveness of intervention and to build a consensus around a Rajasthan-appropriate pilot intervention

Table 10 presents the recommended focus of the action plans for different interventions, taking a few example interventions that were deliberated during the deep-dive discussions.

Table 10: Key focus of action plans to take ahead the different kinds of recalibration interventions

Intervention characteristics				Example intervention	Recommended focus of the action plan
A	B	C	D		
Short term	Low	High	Low / high	Creating and mainstreaming a 'climate-sensitivity checklist' to be used by departments to enable coherent policymaking or Enabling decision-support data dashboards that provide reliable data from water, agriculture, and environment departments in suitable formats at one place with one click at state, district, block, and GP levels to enable not just effective state-level policy action but also the development of informed GP Development Plans	Developing the state-wide or sector-wide intervention design/implementation plan
Mid- / long-term	High	High	Low/ high	Implementing an improved version of the *Paani Bachao Paisa Kamao* scheme of Punjab in Rajasthan	Designing and planning for a considered pilot to enable scale-up with iterative course correction
Mid- /long-term	High	Low	Low	Promoting procurement of millets by generating demand through public distribution channels like public distribution system (PDS), mid-day meal, integrated child development scheme (ICDS), etc. and improving value chains by establishing processing units and food processing units (FPOs) that process, procure, store, and market millets	Conducting a study to establish and build consensus on the level of effectiveness of intervention and design a Rajasthan-appropriate intervention

A = Expected lead time to implement

B = Risk associated / investment required in the implementation

C = Consensus on the effectiveness of the intervention

D = Clarity on the Rajasthan-appropriate design of intervention

This scoping study comes at an opportune time. As the Government of Rajasthan starts the five-year term in 2024, Rajasthan must embark on this ambitious and pioneering effort of recalibrating governance for responsive, targeted, and coherent climate action and set an inspiring model of transformation for other states.

ANNEXURES

Annexure 1: Agriculture and allied sector policies evaluated during the stakeholder consultation

Policy code	Policy name
ATMA	Agricultural Technology Management Agency
CPDP	Camel Protection and Development Policy
ETT	Embryo Transfer Technology
FFFA	Fertigation, Foliar Fertilisation And Automation
GBSY	Gaushala Biogas Sahbhagita Yojna
GD	Gypsum Distribution
GIAG	Grant-In-Aid To Gaushalas
GVV	Gaushala Vikas Yojna
IPP	Irrigation Pipeline Program
IPPP	Innovative Poultry Productivity Project
MBSY	Mukhyamantri Beej Swavlamban Yojana
MJPMSKY	Mahatma Jyotiba Phoole Mandi Shramik Kalyan Yojana
MMYKY-SDT	Mukhyamantri Yuva Kaushal Yojna-Skill Development Tech
NADCP	National Animal Disease Control Programme
NADCP-FMD	National Animal Disease Control Programme-Foot and mouth disease and Brucellosis
NAIP IV	National Artificial Insemination Programme
NDSP-PPPR	National Dairy Support Programme-Pest Preventive Pest Restriction
NFSM	National Food Security Mission
NGJSY	Nandi Gaushala Jan Sahbhagita Yojna
NHM_PHM	National Horticulture Mission-Post Harvest Management
NHM-ENFO	National Horticulture Mission-Establishment Of New Flower Orchard
NHM-MH	National Horticulture Mission-Mechanisation in Horticulture
NHM-MP	National Horticulture Mission-Mushroom Production
NHM-NEFO	National Horticulture Mission-New Establishment Of Fruit Orchards

NHM-OF	National Horticulture Mission—Organic farming
NHM-P	National Horticulture Mission—Production
NHM-PNH	National Horticulture-Polyhouses and Net Houses
NHM-V	National Horticulture Mission—Vermicompost
NLM-PE	National Livestock Mission-Poultry Entrepreneurship
NMSA-A	National Mission for Sustainable Agriculture—Agroforestry
NMSA-RAD	National Mission for Sustainable Agriculture—Rainfed Area Development
NPAI	National Programme on AI
OFP	Organic Farming Policy
PKVY	Paramparagat Krishi Vikas Yojana
PM FME	Pradhan Mantri Formalisation of Micro food processing Enterprises
PMFBY	Pradhan Mantri Fasal Bima Yojana
PMKSY	Pradhan Mantri Krishi Sinchayee Yojna
PMKSY-HKKP	Pradhan Mantri Krishi Sinchayee Yojana-Har Khet Ko Pani
PMKUSUM-B	Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan-Component B
PNAY	Pashudhan Nishulk Aarogya Yojana
PSNJSY	Panchayat Samiti Nandishala Jan Sahbhagita Yojana
RGKSSY	Rajiv Gandhi Krishak Sathi Sahayata Yojana
RJCFA	Rajasthan State Cattle Fairs Act
RJPBES	Rajasthan Agro-Processing, Agri-Business And Agri Export Promotion Scheme 2019
RKVY-HGMTB	Rashtriya Krishi Vikas Yojana-High Genetic Merit Tharparkar Bulls
SHC	Soil Health Card
VBGS	Vadh se bachaye govansh ko sahayata

Annexure 2: Supporting Documents shared with officials for rating of policy effectiveness in delivering climate action in consultation round 1

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
Agriculture: ENGLISH	• To reduce Emissions Intensity of its GDP by 45 per cent by 2030, from 2005 level • To achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 • To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030 • To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources,	GOAL 1: No Poverty GOAL 2: Zero Hunger GOAL 3: Good Health and Well-being GOAL 4: Quality Education GOAL 5: Gender Equality GOAL 6: Clean Water and Sanitation GOAL 7: Affordable and Clean Energy GOAL 8: Decent Work and Economic Growth GOAL 9: Industry, Innovation and Infrastructure GOAL 10: Reduced Inequality GOAL 11: Sustainable Cities and Communities GOAL 12: Responsible Consumption and Production GOAL 13: Climate Action GOAL 14: Life Below Water	**Reducing sensitivity:** Soil moisture; Soil organic matter, Land-use change; Groundwater availability; Rainfed agriculture; Cross-breed livestock population **Increasing adaptive capacity:** Crop-based diversification; Water saving techniques; Livestock & Poultry; Soil nutrient management; Mulching; Natural farming Organic Farming; Renewable energy sources Increase irrigated area

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
	Himalayan region, coastal regions, health and disaster management.	GOAL 15: Life on Land GOAL 16: Peace and Justice Strong Institutions GOAL 17: Partnerships to achieve the Goal	
Agriculture: HINDI	• 2030 तक अपने सकल घरेलू उत्पाद की उत्सर्जन तीव्रता को 45 प्रतिशत तक कम करना 2005 का स्तर • लगभग 50 प्रतिशत संचयी विद्युत शक्ति स्थापित करने के लिए 2030 तक गैर-जीवाश्म ईंधन आधारित ऊर्जा संसाधनों से क्षमता • 2.5 से 3 बिलियन टन CO2 का अतिरिक्त कार्बन सिंक बनाने के लिए 2030 तक अतिरिक्त वन और वृक्ष	**लक्ष्य -1:** गरीबी की पूर्णतः समाप्ति **लक्ष्य -2:** भुखमरी की समाप्ति **लक्ष्य -3:** अच्छा स्वास्थ्य और जीवनस्तर **लक्ष्य -4:** गुणवत्तापूर्ण शिक्षा **लक्ष्य -5:** लैंगिक समानता **लक्ष्य -6:** साफ पानी और स्वच्छता **लक्ष्य -7:** सस्ती और स्वच्छ ऊर्जा **लक्ष्य -8:** अच्छा काम और आर्थिक विकास **लक्ष्य -9:** उद्योग,	**Reducing sensitivity:** • **मृदा नमी** • **मृदा कार्बनिक पदार्थ** • **भूमि उपयोग परिवर्तन** • **भूजल उपलब्धता** • **वर्षा आधारित कृषि** • **क्रॉस-ब्रीड पशुधन आबादी** **Increasing adaptive capacity:** • **फसल आधारित विविधीकरण** • **पानी बचाने की तकनीक** • **पशुधन और मुर्गी पालन** • **मृदा पोषक तत्व प्रबंधन** • **पलवार**

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
	आच्छादन के माध्यम से समतुल्य • जलवायु परिवर्तन के प्रति संवेदनशील क्षेत्रों, विशेष रूप से कृषि, जल संसाधन, हिमालयी क्षेत्र, तटीय क्षेत्रों, स्वास्थ्य और आपदा प्रबंधन में विकास कार्यक्रमों में निवेश बढ़ाकर जलवायु परिवर्तन को बेहतर ढंग से अपनाने के लिए।	नवाचार और बुनियादी ढांचा का विकास **लक्ष्य -10:** असमानता में कमी **लक्ष्य -11:** टिकाऊ शहरी और सामुदायिक विकास **लक्ष्य -12:** जिम्मेदारी के साथ उपभोग और उत्पादन **लक्ष्य -13:** जलवायु परिवर्तन **लक्ष्य -14:**पानी में जीवन **लक्ष्य -15:** भूमि पर जीवन **लक्ष्य -16:** शांति और न्याय के लिए संस्थान **लक्ष्य -17:** लक्ष्य प्राप्ति में सामूहिक साझेदारी	• **प्राकृतिक खेती** • **जैविक खेती** • **पुनःप्राप्य उर्जा स्रोत** • **सिंचित क्षेत्र में वृद्धि**

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
Water English	● NDC 1- To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change ● NDC 3—To reduce Emissions Intensity of its GDP by 45 per cent by 2030, from 2005 level ● NDC 4—To achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 ● NDC 5—To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest	GOAL 1: No Poverty GOAL 2: Zero Hunger GOAL 3: Good Health and Well-Being GOAL 5: Gender Equality GOAL 6: Clean Water and Sanitation GOAL 11: Sustainable Cities and Communities GOAL 12: Responsible Consumption and Production GOAL 13: Climate Action GOAL 15: Life on Land	**Reducing sensitivity:** ● Water productivity; ● Groundwater management; ● Groundwater augmentation; ● Groundwater recharge**;** ● Rainwater harvesting; ● Watershed development **Increasing adaptive capacity:** ● Sustainable/integrated/better water management ; increasing access to clean drinking water ● Increasing availability to clean drinking water ● Equitable access to safe and affordable drinking water ● Improve water quality/ safe water ● Water-use efficiency

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
	and tree cover by 2030 ● NDC 6—To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.		
Water: Hindi	● 2030 तक अपने सकल घरेलू उत्पाद की उत्सर्जन तीव्रता को 45 प्रतिशत तक कम करना 2005 का स्तर ● लगभग 50 प्रतिशत संचयी विद्युत शक्ति स्थापित करने के लिए 2030 तक गैर-जीवाश्म ईंधन आधारित ऊर्जा संसाधनों से	**लक्ष्य -1:** गरीबी की पूर्णतः समाप्ति **लक्ष्य -2:** भुखमरी की समाप्ति **लक्ष्य -5:** लैंगिक समानता **लक्ष्य -6:** साफ पानी और स्वच्छता **लक्ष्य -11:** टिकाऊ शहरी और सामुदायिक विकास	**Reducing sensitivity:** ● जल दक्षता ● भू-जल प्रबंधन ● भू-जल वृद्धि ● भू-जल पुनर्भरण ● वर्षा जल संचयन ● जल संभरण प्रबंधन **Increasing adaptive capacity:** ● सतत जल प्रबंधन ● स्वच्छ पेय जल की पहुँच को बढ़ाना ● स्वच्छ पेय जल

Sector	CONTRIBUTION TO NDC	SDG relevant	Reduces vulnerability to climate change (either by reducing sensitivity/increasing adaptive capacity)
	क्षमता • 2.5 से 3 बिलियन टन CO2 का अतिरिक्त कार्बन सिंक बनाने के लिए 2030 तक अतिरिक्त वन और वृक्ष आच्छादन के माध्यम से समतुल्य • जलवायु परिवर्तन के प्रति संवेदनशील क्षेत्रों, विशेष रूप से कृषि, जल संसाधन, हिमालयी क्षेत्र, तटीय क्षेत्रों, स्वास्थ्य और आपदा प्रबंधन में विकास कार्यक्रमों में निवेश बढ़ाकर जलवायु परिवर्तन को बेहतर ढंग से अपनाने के लिए।	**लक्ष्य -12:** जिम्मेदारी के साथ उपभोग और उत्पादन **लक्ष्य -13:** जलवायु परिवर्तन **लक्ष्य -15:** भूमि पर जीवन	की उपलब्धता को बढ़ाना • सुरक्षित स्वच्छ और किफायती पेयजल की पहुँच को न्यायसांगत ढंग से बढ़ाना • जल गुणवत्ता में सुधार करना • जल उपयोग दक्षता

Annexure 3: Scores for Institutional Capacity Assessment by Water Sector and Agriculture Sector Officials

(A) Water Sector

Indicators	Sub-indicators	GWD	WRD	SWRPD	Panchayati Raj	WSDSC	PHED	Average Score for water sector
		1 person	3 persons	2 persons	2 persons	1 person	1 person	
Perception, Knowledge, & Assessment	Awareness within the institution	2	2.0	2	0	2	2	1.67
	Information assessment capacity	1	1.0	1	0	2	2	1.17
Vision, Mandate, & Priorities	Focus and Alignment	1	1.3	2	0	1	3	1.39
	Clear roles and responsibilities within the department	2	3.0	3	2	2	3	2.50
Planning and Implementation	Participatory	1	1.7	2	3	3	3	2.28
	Risk Mitigation	1	2.3	3	1	1	3	1.89
	Innovative governance	1	2.3	2	2	2	3	2.06
Collaboration and Coordination	Policy coherence	2	2.0	2	2	2	3	2.17

Indicators	Sub-indicators	GWD	WRD	SWRPD	Panchayati Raj	WSDSC	PHED	Average Score for water sector
		1 person	3 persons	2 persons	2 persons	1 person	1 person	
Monitoring & Evaluation	Intent	2	2.7	3	2	2	3	2.44
	Review and course correction	1	2.0	2	3	2	2	2.00
	Regulatory mechanism	2	2.7	3	3	2	3	2.61
	Human capacity for M&E	1	2.3	2	1	2	2	1.72
	Transparency	1	3.0	3	2	2	3	2.33
Information Dissemination	Data dissemination and use	2	2.0	3	2	2	3	2.33
	Data synergy	1	2.0	2	2	2	2	1.83
Financing	Finance accessibility	1	2.0	2.5	2	2	2	1.92
	Budgeting evaluation	1	2.7	2.5	2	2	3	2.19
	Compliance and Auditing	1	2.0	2.5	3	2	3	2.25
Human Resource Capacity	Capacity of human resource to deliver climate action	1	2.0	2	1	2	3	1.83

(B) Agriculture Sector

Indicators	Sub-indicators	DoA	AHD	DoG	DoH	RSAMB	Average Score for water sector
		1 person	2 persons	1 person	2 persons	1 person	
Perception, Knowledge, & Assessment	**Awareness within the institution**	1.00	1.00	2.00	0.00	3.00	1.00
	Information assessment capacity	1.00	1.50	2.00	0.00	-	1.13
Vision, Mandate, & Priorities	**Focus and Alignment**	1.00	2.00	2.00	0.00	-	1.25
	Clear roles and responsibilities within the department		2.50	3.00	1.00	1.00	2.17
Planning and Implementation	**Participatory**	2.00	1.88	2.33	2.00	-	2.05
	Risk Mitigation	2.50	2.00	3.00	3.00	3.00	2.63

	Innovative governance	1.50	1.00	3.00	2.00	3.00	1.88
Collaboration and Coordination	**Policy coherence**	1.50	2.00	2.00	2.00	3.00	1.88
Monitoring & Evaluation	**Intent**	1.00	1.50	3.00	2.00	3.00	1.88
	Review and course correction	1.00	3.00	3.00	1.00	3.00	2.00
	Regulatory mechanism	1.00	1.00	0.00	0.00	3.00	0.50
	Human capacity for M&E	2.00	1.00	1.00	0.00	1.00	1.00
	Transparency	2.00	2.50	3.00	0.00	3.00	1.88
Information Dissemination	**Data dissemination and use**	1.50	2.50	3.00	1.00	-	2.00
	Data synergy	-	3.00	3.00	0.00	-	2.00

Financing	**Finance accessibility**	-	1.00	1.00	2.00	-	1.33
	Budgeting evaluation	1.00	1.50	1.00	0.00	-	0.88
	Compliance and Auditing	1.00	3.00	3.00	2.00	3.00	2.25
Human Resource Capacity	**Capacity of human resource to deliver climate action**	1.00	1.00	1.00	2.00	-	1.25

Annexure 4: Meeting Attendees

Meeting with CMRETAC Dated: 28th November 2022

Agenda: Recalibrating Institutions to Meet Climate Change

Name	Designation	Department
Dr. Naveen Mishra	Additional Director	Department of Dairy and Animal Husbandry
R.P. Kumawat	Additional Director	Horticulture Department
Arjun Lal	Joint Director	Department of Agriculture
Dr, Rajesh Verma	Deputy Director	Department of Dairy and Animal Husbandry
Dr. Praveen Kumar Kaushik		Directorate of Gopalan
Vijaykumar Sharma	Assistant Director	CMRETAC
Ashutosh Sharma	Assistant Director	CMRETAC
Abhishek Kumar	Founding Partner	Indicc
Akshat Mishra	Partner	Indicc
Ekansha Khanduja	Research Analyst, Sustainable Water Team	CEEW

Meeting with CMRETAC dated 28th November

Agenda: Recalibrating Institutions to Meet Climate Change

Name	Designation	Department
Dr. B. L. Kumawat	Deputy Director	Department of Agriculture
Mr. Anil Kumar	Executive Engineer	
Mr. Bajrang Lal	Senior Engineer	
Mr. Rajesh Singh	Senior Engineer	Water Resources Department
Mr. Chandra Garg	Executive Engineer	Water Resources Department
Mr. Pradeep Gupta	Senior Engineer	Public Health Engineering Department
Dr. Vinay Bhardawaj	Superintending Hydrologist	Groundwater Department
Mr. Rajendra Prasad	Joint Director	Watershed Development and Soil Conservation
Mr. K.M. Duriye		Department of Rural Development
Mr. L. L. Pahadia	Joint Director	Panchayati Raj Department

Meeting with CMRETAC dated 29 November
Agenda: Recalibrating Institutions to Meet Climate Change

Name	Designation	Department
S. K. Bisaria		JMRC
Vivek Kumar		JMRC
Kushal Pal Yadav		
Rajeev Kumar		ATC
Rajendra Tandon		PWD
Akshaya Kumar Jain	Senior Engineer	PWD
Anish Bhatia	Executive Engineer	PWD
Ravi Soni	Engineer	

Meeting with CMRETAC dated 29 November
Agenda: Recalibrating Institutions to Meet Climate Change

Name	Designation	Department
Prema Lal	ACEE	Rajasthan Pollution Control Board
Birbal Meena	OSD	Disaster Management
Makkhan Lal	S. O.	DMRD
Pankaj Kumar	Executive Engineer	Urban Development and Housing
Vijay Kumar Sharma	Assistant Director	CMRETAC
Shanal Pradhan	Programme Associate	CEEW
Ekansha Khanduja	Programme Associate	CEEW
Apoorve Khandelwal	Senior Programme Lead	CEEW
Sijo Abraham	Programme Associate	CEEW
Saiba Gupta	Programme Associate	CEEW
Shreya Wadhawan	Programme Associate	CEEW
Nilanshu Ghosh	Research Analyst	CEEW
Kim Arora	Consultant	CEEW
Aishwarya Tiwari	Research Analyst	CEEW
Srish Prakash	Consultant	CEEW
Nitin Bassi	Senior Programme Lead	CEEW

Meeting with CMRETAC dated 30 November

Agenda: Recalibrating Institutions to Meet Climate Change

Name	**Designation**	**Department**
Shikhar Agarwal	Principal Secretary	Climate Change
Dinesh Kumar	Principal Secretary	Department of Agriculture
Vaibhav Galriya	Principal Secretary	PWD
P. Ramesh	CMD	JMRC
Sh. Pratibha Singh	Director	Panchayati Raj Department
Dr. Santosh K Sharma	General Manager	Rajasthan Co-operative and Dairy Federation
Ashok Kumar Jain	Joint Director	DoES
Birbal Meena	OSD	Disaster Management
Dali Kumar Gaur	Chief Engineer	PHED
Dr. Naveen Mishra	Additional Director	DAH
Dr. Manju Vijay	Joint Secretary	Planning Department
Sanjeev Pandey	ED (Tr. & Adm.)	RSRTC
Kishan Kumar	ATC	Transport Department
Kusum Rathore		Transport Department
Bhanwar Lal Bhairwa	Joint Secretary	CMRETAC
Vijay Kumar Sharma	Assistant Director	CMRETAC
Ashutosh Sharma	Assistant Director	CMRETAC

Meeting with CMRETAC dated 21st March

Name	Designation	Department
Dr. Malay Srivastava	Deputy Director	Department of Animal Husbandry
Vinod Choudhary		WRD
K. C. Meena	Additional Director	Horticulture Department
Arjun Lal	Joint Director	Agriculture Department
Bheema Ram	Additional Director	Agriculture Department
M S Meena	Joint Director	Agriculture Department
Devjit Mittra	Director, Programme	Socratus Foundation
Ashutosh Deshpande	Tech. Director	Department of Information Technology and Communication
M.L. Jangid		PHED
Anoop Tharej		Groundwater Department
Sanjay Agarwal		Water Resources Department
Ravi Solanki	Chief Engineer	SWRPD
Rajesh Singh	Senior Engineer	Water Resources Department
Ramprakash	Joint Secretary	PHED
Pankaj Som Chaturvedi	Advisor	Science and Technology
Praveen Kumar	SO	DES
Vijay Kumar Sharma	Assistant Director	CMRETAC
Ashustosh Sharma	Assistant Director	CMRETAC
Vivek Tejasvi	Deputy Director	ADRI, Patna
Dr. Harish Samaria	Consultant	Disaster Management
Makkhan Lal	S.O.	DMRD

Meeting with experts from other states

Name	Designation	Department
Shri Virendra Tiwari	Indian Forest Officer, Additional Principal Chief Conservator of Forests and Head	Mangrove cell, Government of Maharashtra
Vivek Tejasvi	Deputy Director	ADRI, Patna
Devjit Mittra	Director, Programme	Socratus Foundation
Shri Shwetal Shah	Technical Advisor	Climate change department, Government of Gujarat

Deep-Dive Consultation: Recalibrating Government Support to Agriculture

Name	Participant role	Designation	Department/ Organisation
Gaurav Agarwal	Discussant	Commissioner	Department of Agriculture (DoA)
Shirish Shah Sharma	Discussant	Joint Secretary (Budget)	Finance Department (DoF)
Vishwas Pareek	Discussant	ED	RSWC
Mahendra Singh	Discussant		CBGA, New Delhi
Sanjay Singh Nehra	Discussant	ACE	Jaipur Vidyut Vitran Nigam Ltd. (JVVNL)
Raj Kumar Pareek	Discussant	Deputy Director	Department of Agriculture (DoA)
B. L. Kumawat	Discussant	Deputy Director	Department of Agriculture (DoA)
Arjun Lal	Discussant	Joint Director	Department of Agriculture (DoA)
Rajendra Singh	Discussant	Joint Director	Department of Horticulture (DoH)
Sushila Yadav	Discussant	Joint Director	Watershed Development & Soil Conservation Department Jaisalmer (WDSC)

Shalu Aggarwal	Moderator	Senior Programme Lead	CEEW
Prateek Aggarwal	Moderator	Programme Lead	CEEW
Dr. Vinay Bhardwaj	Discussant		Groundwater Department (GWD)
Sh. B. L. Bairwa	Discussant	Joint Secretary	Chief Minister Rajasthan Economic Transformation Advisory Council (CMRETAC)
Vijay Kumar Sharma	Discussant	Assistant Director	Chief Minister Rajasthan Economic Transformation Advisory Council (CMRETAC)
Ashutosh Sharma	Discussant	Assistant Director	Chief Minister Rajasthan Economic Transformation Advisory Council (CMRETAC)
Akshat Mishra	Discussant	Partner	Indicc Associates
Gauri Lakshi	Discussant		Indicc Associates
Akash Sharma	Discussant	Policy Analyst	CUTS International
Sanobar Imam	Discussant	Research Associates	CUTS International
Sarada Prassana Das	Discussant	Associate Fellow	Centre for Policy Research (CPR)
Manideep Gudela	Discussant	Research Fellow	Centre for Social and Economic Progress (CSEP)
Dr. Manish Anand	Discussant	Senior Fellow	The Energy and Resources Institute (TERI)
Krishn Mathur	Discussant		Indicc Associates
Dr. Pradeep Kumar Dubey	Discussant	Program Manager	World Resources Institute (WRI) India
Nachiket Udupa	Moderator		Alliance for Sustainable and Holistic Agriculture (ASHA)

Anshul Ojha	Discussant	CEO	DRC
Auro Basu	Discussant	Regional Coordinator	RRA Network
Sirish Joshi	Moderator		
Rajendra Prasad	Discussant	Joint Director	Watershed Development & Soil Conservation Department Jaisalmer (WDSC)
Niranjan Singh	Discussant	GM	

Annexure 5: Budgetary recommendation for establishing a Centre for Climate Resilience

Problem and the Need	Rajasthan ranks 7th in CEEW's Climate Change Vulnerability Index. 10% of the most vulnerable districts in India are from Rajasthan. There has been a six-fold increase in the frequency and intensity of extreme drought events since 2000 and a four-fold increase in the frequency and intensity of extreme flood events since 2010. Further, in most of the districts, groundwater is overexploited, whereas surface water resources are over-appropriated. Given the increasing frequency and intensity of the climate risks and the impact it can have on the state's economy, there is a need for the state, particularly those economic actors and sectors who employ a significant proportion of state's population, to develop adaptive capacity to manage such events and the loss and damage, particularly to employment and livelihoods, they can cause (e.g. around 2/3 population and 25% of SGDP depends on agriculture). Building state's adaptive capacity will require capacitation on two fronts: 1) Capacitation of existing government departments and public institutions in the state (particularly environment, water, agriculture, industry, energy and mobility) towards mainstreaming climate action in their policies and programmes, 2) Capacitation of current and future executives and the workforce driving economic activity in the state. The proposal made in this note focuses on the point# 1; the proposal to address the point# 2 has been submitted to RSLDC, separately.
Solution & Proposed Process	**1. Centre for Climate Resilience (CCR)** ● The CCR will act as a think tank to the state departments and institutions and will provide technical support in mainstreaming climate action within their respective work streams. The CCR will undertake training, exposure visits within and outside states, build partnership with external institutions, commission studies, and provide a platform for dissemination and incubation of innovative ideas on climate change mitigation, adaptation and resilience. CCR will also collaborate closely with RSLDC towards shaping the strategies for upskilling state's workforce with 'Climate Smart Skills' to improve their resilience. CCR will also develop and deliver

trainings for executives of support organisations (outside the government) for enabling a support ecosystem for providing services to complement government's capacity for climate action.

- CCR can be housed in Department of Environment and Climate Change, headed by a Principal Secretary or Secretary level or equivalent officer from the department. It will employ topical experts in the climate, environment, economics and social sciences domain. It is suggested that the CCR will have an advisory board which will have representation of Secretaries from all the departments which will be chaired by the Economic Advisor to the Chief Minister. For its effective functioning, it is proposed to have a separate administration and finance staff.

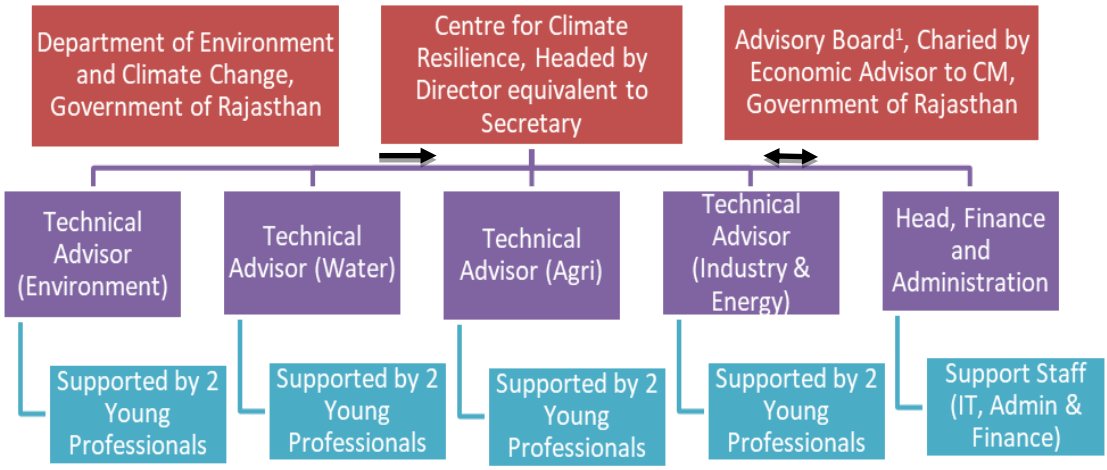
2. Budget Allocation:

- Total budgetary outlay would be to the tune of **INR 375 crores over next five years**, requiring **about 75 crores per year**. This will comprise the following:

S.N.	Budget Category	Budget/annum (in crore)	Budget for next five years (in crore)	Remarks
1	CCR Secretariat	2.5	12.5	Expenditure on account and allowance of the officers and establishment
2	Research & training	10	50	Expenditure towards the development of training modules, designing and organisation of the training programmes, etc.
3	Events and conferences	2.5	12.5	Expenditure towards organisation of national and international conferences, roundtables, consultations, etc.
4	Advisory services to other departments	50	250	Expenditure on technical advisory for mainstreaming climate action within the policies and schemes of other departments (water, agriculture, urban development, industry, transportation, energy, etc.)

		5	Grant in aid for incubation projects	5	25	Expenditure for setting up of innovation centres, supporting research on innovative climate informed solutions
		6	Exposure visits and exchange programme	5	25	Expenditure for organising national and international exposure visit and exchange programmes for the officials
			Total	**75**	**375**	

Suggested Institutional Structure and Human Resources for CCR



[1]Advisory Board: Secretary level officers from all the climate relevant departments

Suggested competency list

1. **Technical Advisors:**
   a. Masters in relevant* field with minimum of 10 years of relevant experience, or
   b. PhD in relevant* field with minimum of 6 years of relevant experience
2. **Young Professionals:**
   a. 0-5 years of experience with Masters in relevant* fields, such as development studies, public policy, environmental sciences, etc.
   b. 0-2 years of experience with PhD in relevant* fields, such as development studies, public policy, environmental sciences, etc.
3. **Admin and IT staff:**
   a. As per government guidelines

* In the continuously evolving field of climate action, the expertise areas are constantly evolving too. However, the following examples of relevant education can be used to come up with a more detailed list of education to be considered for above roles. Such a list should also be revised regularly:

- Water: MSc, MTech or PhD in Water Management or Water Resource Engineering or similar courses
- Agriculture: MSc, MTech or PhD in Agriculture Sciences, Agriculture Engineering, Agriculture Economics, or similar courses
- Environment: MSc, MTech or PhD in Environmental Sciences, Environmental Engineering, Environmental/Ecological Economics, Natural Resource Management, or similar courses
- Industry and energy: MSc, MTech or PhD in Energy Studies, Production Engineering or similar courses

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