Developing Monitoring & Evaluation Framework for UPSAPCC 2021-2030: Process Document

Environment, Forest and Climate Change Department
Government of Uttar Pradesh

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Acronyms

ACS	Average Cost of Supply
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ANM	Auxiliary Nurse Midwifery
ARR	Average Realizable Revenue
ASHA	Accredited Social Health Activist
AT&C	Aggregate Technical & Commercial
AWC	Anganwadi Centre
AWW	Anganwadi Worker
BIS	Bureau of Indian Standards
BRTS	Bus Rapid Transit System
C&D	Construction and Demolition
CAAQMS	Continuous Ambient Air Quality Monitoring Stations
CAFRI	Climate Adaptation and Finance in Rural India
CBG	Compressed Biogas
CBO	Community Based Organization
CCA	Climate Change Authority
CMP	Comprehensive Mobility Plan
CMSC	Community Managed Sanitary Complex
COPD	Chronic Obstructive Pulmonary Disease
CPCB	Central Pollution Control Board
CSO	Civil Society Organizations
CWC	Central Water Commission
DALY	Disability-Adjusted Life Year
DEMP	District Environment Management Plan
UP DoEFCC	Uttar Pradesh Department of Environment, Forest and Climate Change
DRR	Disaster Risk Reduction
ECBC	Energy Conservation Building Code
ENVIS	Environmental Information System
EV	Electric Vehicle
FAME	Faster Adoption and Manufacturing of Electric and Hybrid Vehicles
FMBAP	Flood Management and Border Areas Programme
GHG	Green House Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLOF	Glacial Lake Outburst Floods
GOBARDHAN	Galvanizing Organic Bio-Agro Resources (GOBAR - DHAN)
GPDP	Gram Panchayat Development Plan
GPRS	General Packet Radio Service
GWP	Global Warming Potential
ICAP	Integrated Cluster Action Plan
ICT	Information and Communication Technology
IDSP	Integrated Disease Surveillance Programme
IEC	International Electrotechnical Commission
IMD	India Meteorological Department

IOWtE	Innovative Industrial Organic Waste-to-Energy
ISBT	Inter State Bus Terminal
LWM	Liquid Waste Management
MBBL	Model Building Byelaws
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MLD	Millions of Liter per Day
MoEFCC	Ministry of Environment, Forest and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MoSPI	Ministry of Statistics and Programme Implementation
MSME	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
NDC	Nationally Determined Contributions
NGT	National Green Tribunal
NIF	National Indicator Framework
NIF	National Innovation Foundation
NMSKCC	National Mission on Strategic Knowledge for Climate Change
NRLM	National Rural Livelihood Mission
NRSC	National Remote Sensing Centre
NVBDCP	National Vector Borne Disease Control Programme
PM	Particulate Matter
PMAY	Pradhan Mantri Awas Yojana
PMCCC	Prime Minister's Council on Climate Change
PMGSY	Pradhan Mantri Gram Sadak Yojana
PPP	Public Private Partnership
PRIs	Panchayati Raj Institutions
PwD	Person with Disability
RDVI	Rural Development Vulnerability Index
RGSA	Rastriya Gram Swaraj Abhiyan
RHISS	Rural Housing Interest Subsidy Scheme
RWH	Rainwater Harvesting
SAPCC	State Action on Climate Change
SBM	Swachh Bharat Mission
SDG	Sustainable Development Goal
SDI MES	Skill Development Initiative Minimum Skill Set
SDM	Skill Development Mission
SGSY	Swarna-Jayanthi Grameen Swarozgar Yojana
SHG	Self Help Group
SKMCC	Strategic Knowledge Mission for Climate Change
SWM	Solid Waste Management
TAMD	Tracking Adaptation and Measuring Development
ToTs	Training of Trainers
T&D	Transmission and Distribution
TPD	Tonne Per Day
UDVI	Urban Development Vulnerability Index
ULB	Urban Local Bodies
UPPCB	Uttar Pradesh Pollution Control Board
UPSRTC	Uttar Pradesh State Road Transport Corporation
WtE	Waste-to-Energy

EXECUTIVE SUMMARY

Context

One of the most urgent problems the world is currently dealing with is climate change.

The effects of global warming are already being seen, with an increase in the frequency of extreme weather events, rising sea levels, and melting glaciers. The Paris Agreement is a legally binding international treaty on climate change, which brings 196 nations together to combat climate change and adapt to its effects. Its overarching goal is to pursue global efforts to limit the temperature increase to 1.5°C above pre-industrial levels. In response to this, governments and organizations around the world are developing climate change action plans to mitigate the impact of global warming. The 2030 Agenda for Sustainable Development and the Paris Agreement have both played a significant role in popularising the idea of sustainable development, and associated projects in the areas of environmental justice, education, governance, and planning, as well as climate finance, have all gained momentum. Being a member of the Paris Accord, the Prime Minister's Council on Climate Change (PMCCC) released the National Action Plan on Climate Change (NAPCC) of India in 2008. The central government instructed all state governments and Union Territories to create a State Action Plan on Climate Change (SAPCC) in 2009, that were in line with the NAPCC's suggested strategies. The SAPCC decentralizes NAPCC objectives into local context. Its objective is to align state priorities along the NAPCC as well as to identify state specific vulnerabilities and key priorities related to adaptation and mitigation.

Taking cognizance of the new international commitments (such as Paris Agreement of 2015) and State government priorities (UP SDG Vision 2030, UP DEMP), there was a felt need to revise the SAPCCs to better adapt to the impacts of climate change. In 2018, the MoEFCC advised all States to revise their SAPCCs, to address regional and state specific climate risks.

GIZ as part of Indo-German technical Cooperation Project, "Climate Change Adaptation in Rural Areas of India (CCA RAI)" has supported the Government of Uttar Pradesh in association with Department of Environment, Forest, and Climate Change, (DoEFCC) to revise the SAPCC (UPSAPCC 2021-2030) in 2020 and operationalize it in the state using an M&E system developed as part of Indo-German technical Cooperation Project, "Climate Adaptation and Finance in Rural India (CAFRI)".

UPSAPCC 2021-2030

The revised UPSAPCC has eight consolidated missions namely: Green UP Mission, Sustainable Agriculture Mission, Jal Mission, Human Health Mission, Enhanced Energy Efficiency and Green Energy Mission, Disaster Management Mission, Sustainable Habitat Mission, and Strategic Knowledge Mission.

Each mission has some corresponding actions to cater to it. Across all eight Missions, the revised UPSAPCC has a total of 41 strategies across its key focus areas covering 187 action points. Of these actions, 108 are adaptation actions, 57 are mitigation actions, and 22 belong to both categories. These actions are further classified into Research, Implementation, Policy and Capacity Building.

41
STRATEGIES

187
ACTION POINTS

108
Adaptation Actions

57
Mitigation Actions

22
Both Categories

Need for a M&E Framework for the revised UPSAPCC

Monitoring and evaluation (M&E) frameworks are essential for ensuring that climate change action plans are effective and achieving their intended goals.

It is crucial because it guarantees better evidence-based planning and tracking and aids in the identification of pertinent activities through the creation and operationalization of a Framework. Moreover, M&E is critical since gaps identified over time reveal mistakes, offers paths for learning and improvements, and provides opportunity to build on expertise and knowledge.

A comprehensive M&E framework also allows policymakers and implementers to identify successes and challenges and make data-driven decisions to adjust their strategies accordingly.

An M&E Framework plays a vital role in the planning and execution of the actions listed in the UPSAPCC because it clarifies the metrics to be used to track success and defines roles and responsibilities. The M&E Framework for the UPSAPCC will leverage existing monitoring systems that are being deployed by the State (such as the UP SDG Vision 2030 and UP DEMP). Moreover, it will facilitate the creation of a data collection, flow, and management system through coordinated efforts by all relevant line departments. Additionally, it will help track progress of implementation activities in achieving targets aligned with each indicator (effectiveness and accountability).

Methodology for developing M&E Framework

In January 2022, the task to develop M&E Framework for the revised UPSAPCC 2021-2030 was commissioned. The mandate was to develop a Framework comprising of output, intermediate outcome and outcome indicators that would track SAPCC activities and strategies, prioritized across the identified domains. An extensive review of various documents aligning with climate change such as the UP SDG Vision 2030, UP DEMP, NAPCC and NITI Aayog SDG Index 2020-21 was conducted. Discussions and deliberations among DoEFCC, GIZ and other stakeholders occurred between April and December of 2022.

Through these multiple rounds of discussions, we realized the following guiding principles towards developing a M&E Framework:

- **Leveraging existing data system:** A corpus of UP specific data already exists and is getting collected at state and national level through schemes, programmes, projects, policies and action plans. This needs to be leveraged.
- **Linkage:** It is difficult to retrofit existing M&E system into a new system. After thoroughly reviewing all climate relevant state and national documents, convergence of the UPSAPCC action points with these documents was identified.
- **Convergence:** M&E Framework should have the capability to allow for convergence of climate change indicators across multiple departments and catalyse them to work collectively to tackle the climate change crisis.
- **Engagement:** To ensure ownership, consultations with and engaging of implementation partners was integral to this process.

Subsequently, the M&E Framework will give way to a dynamic Management Information System (MIS) wherein data from various line departments will be collated leading to effective monitoring of the targets set for various action points in the UPSAPCC 2021-2030.

The Methodology to develop the M&E Framework for UPSAPCC 2021-2030 comprises of four steps:

- Review of relevant documents (UPSAPCC, UP DEMP, UP SDG Vision 2030, NITI Aayog SDG Index, MoSPI Documents)
- Convergence of Action Points/Strategies with SAPCC Vulnerability Indicators, Priority Areas, SDG Targets, NITI Aayog SDG Indicators
- Mapping Schemes/Programmes to Action Points/Strategies
- Aggregation of indicators at Action Point, Strategy and Mission level (remove redundancies)

- Criteria for shortlisting
  a. Shortlist intermediate and outcome indicators
  b. Identify indicators 'relevant to strategy'
  c. Identify indicators that provide a 'holistic perspective'

Step-1

Creating a comprehensive list of indicators

Step-2

Shortlisting of indicators

Step-3

Consultation with line departments

Step-4

Reviewing and finalizing Mission level indicators

(Multistakeholder engagement in a participatory approach)

- Validate the following:
  a. Data availability
  b. Relevance to strategy
  c. Data source
  d. Holistic perspective

- Criteria for finalizing
  a. Data availability
  b. Relevance to strategy
  c. Mapping to more than one strategy
  d. Holistic perspective

Each step of methodology was further carried out through a sequence of steps, which is detailed below.

STEP-1

Creating a Comprehensive List of Indicators

A score card was developed to shortlist mission level indicators. The scorecard contained some ranking criteria defined below:

The first step culminated with a comprehensive list of indicators for the eight missions. This step comprises of the following steps:

- All the relevant documents were perused to understand the repository of data, finding synergies with UPSAPCC 2021-2030, its feasibility and limitations. This step particularly helped to understand what the existing data management mechanisms are, what data has already been collected, and by whom. These documents include the UP DEMP, UP SDG Vision 2030, NITI Aayog SDG Index, MoSPI Documents.

- The convergence of each of these documents (mentioned above) was extensively explored in conjunction with the UPSAPCC 2021-2030. Each mission of the UPSAPCC has several implementable action points. While mapping the UPSAPCC 2021-2030 with the various relevant documents, the emphasis was on locating convergence with each of the missions at the action point level. During this mapping process, in case of any ambiguities, the SAPCC action point description was revisited to add context and finalize the appropriate convergence.

- The M&E Framework was created with the understanding that current monitoring and data systems should be utilized rather than constructing a separate parallel data gathering mechanism. It was determined, after discussions with DoEFCC and GIZ, that state and national plans and initiatives be investigated as it would already have a monitoring framework in place. Thereafter, all state and national schemes/programmes/ dashboards available for each mission were identified and indicators available in public domain for each of these schemes were identified.

- Moreover, the SAPCC activities from each mission was mapped to relevant schemes/programmes/ dashboards from the compendium and relevant indicators from the schemes that were mapping to the activitiess, were added to the compendium. In addition to indicators from schemes/programmes/ dashboards, indicators from state and national level documents like UP DEMP or the NITI Aayog SDG Index 2020-21 were also looked into.

- The indicators that are common across the different strategies and coming from same schemes are labelled as the 'Comprehensive List of Common Indicators'. This comprehensive list contains indicators from each scheme only once, without any repetitions.

At the end of Step 1, each SAPCC mission h ad an exhaustive list of indicators mapped to each action point obtained from schemes, programmes, projects, dashboards, MoSPI documents, and NITI Aayog SDG Index.

STEP-2 Shortlisting of Indicators

After identifying a comprehensive list of indicators for each of the eight missions, the M&E Framework approach delves into identifying and shortlisting key indicators to monitor the progress of the mission using the following steps:

- All the indicators were classified as output, intermediate outcome, and outcome, based on the periodicity of data collection and the context the activity description provided in UPSAPCC document. Only the intermediate and outcome level indicators were selected.
- Identify indicators that are relevant to Strategy: To shortlist mission relevant indicators, we focus on the strategies of the SAPCC missions. A score of "1" is recorded, if the indicator is relevant to any particular strategy of the mission and a score of "0" if the indicator is not relevant to any strategy.
- Identify indicators that provide a holistic perspective: Indicators that provide an overview of the mission, and their positive movement (progress) indicates fulfilment of the strategy and therefore health of the natural resource are considered as indicators providing a 'Holistic Perspective'. Negative movements would therefore indicate gaps in achievement of the strategy. Holistic perspective is viewed in conjunction with Relevance to Strategy. A score of "1" is noted if the indicator is able to capture the holistic perspective of the strategy it is mapped to other wise "0".

STEP-3

Consultation with line departments

A two-day consultative workshop was organized by DoEFCC on "Framework Development of a M&E system for the revised UPSAPCC" on the 8th and 9th of December 2022 in Lucknow, UP.

The objective was to garner inputs and insights to craft a relevant, practical and effective M&E framework and to highlight solutions to strengthen institutional mechanisms for implementation of the framework.

Indicators from all the eight missions, prior to deliberation, were classified with respect to different strategies. In order to obtain perspectives on each indicator, the following categories were populated during the discussion with line departments:

- Strategies mapped
- Data source of indicator
- Score card comprises of a ranking criteria used for shortlisting the indicators
- Periodicity
- Responsibility
- Notes on additional data sources

Several suggestions to buttress the M&E system were provided. The deliberations focused on the feasibility of the existing data architecture to provide periodic data and the way forward in making this M&E framework robust and implementable. The consultation involved over 20 departments to discuss each indicator of the relevant mission in detail. (Refer Table 14 for detail listing of participating departments for each mission)

STEP-4

Reviewing and Finalizing Mission Level Indicators

After the consultation with the line departments, we assimilated the feedback received and realized there were indicators across all missions which needed further follow-up. To address these gaps and finalize the mission level indicators, extensive follow-up and one-on-one discussions with relevant officials were organized on the following:

- Indicators for which data was not getting collected or collated and/or was not relevant to the strategy or mission, were removed from the list.
- Line department officials suggested to rephrase some indicators for which data was getting collected from existing data systems.
- Some suggestions were made to add new SMART indicators for which data was available, which could be a better parameter to monitor progress towards 2030 targets. Strategic Knowledge Mission had mostly new indicators which seemed more relevant to monitor progress across the Mission.

After post-discussion assessment of the indicators and a thorough clean-up of the M&E Frameworks for all missions, the indicators were applied to the score card system (explained earlier) and tested against the following criteria:

- Data Availability
- Relevance to Strategy
- Mapping to more than one strategy
- Holistic perspective

Indicators that had a total score of '3' or '4' across the four criteria mentioned above were ranked as 'High' priority, a total score of '2' was ranked as 'Medium' priority, and a score of '0' or '1' was ranked as 'Low' priority. Indicators that were categorized as 'High' priority were considered for the final list of mission level indicators. However, in some missions, the team also considered indicators that were ranked "Medium" because of a lack of 'High' priority indicators mapped to the strategies.

Way Forward

The team for the M&E Framework for climate change is aware of its limitations. There aren't many well-established, industry-standard M&E frameworks in place to track global mitigation and adaptation efforts to climate change. While many such standard ready-to-adopt frameworks and methodologies are available for the various development interventions, it is a challenge in the field of climate change.

Lack of existing M&E Frameworks, the lengthy time it takes for climate actions to have any discernible effects, the dynamic nature of schemes, and onboarding of implementation partners to implement the M&E Framework, are some significant obstacles during the Framework development process.

To address the challenges and limitations mentioned above, the M&E Framework was developed from scratch after various rounds of deliberations and consultations, both one-on-one and in group workshop format with the DoEFCC, GIZ and the implementation partners. A user-friendly MIS should be developed based on this blueprint, which could fetch data from the various implementing partners, at the periodicity defined, on the portal and subsequently provide easy access to DoEFCC. This will ensure that DoEFCC takes cognizance of the current status with respect to each action point listed in the SAPCC and further track progress towards achieving their 2030 targets.

Recommendations

The indicators presented in the M&E Framework are adopted from existing government schemes and programmes. Due to the volatile nature of schemes and the enormous time it takes for the effects of climate change to be visible, the data availability for these indicators might change in future. Hence, the Framework has been kept dynamic to ensure that new indicators that appear to be critical can be incorporated at a later stage. These indicators also need to be reviewed periodically in a consultative process. Coordination between the implementing partners regarding data sharing is of utmost importance for the framework to be operational. In the long term, the goal should be to implement a centralized data system which will eventually allow all implementing partners to exchange data hassle free.

CONTEXT

Context

The Paris Agreement 20151 and the 2030 Agenda for Sustainable Development have been instrumental in bringing the concept of Sustainable Development to the forefront. Since this, increased attention has been devoted to innovating and intensifying adaptation and mitigation actions – the former focusing on coping/ resilience to deleterious impacts of climate change, and the latter reducing Greenhouse Gas (GHG) emissions and enhancing carbon sinks. Contiguously, activities vis-à-vis environmental justice, education, governance and planning, and climate finance have also accelerated.

India is a member of the Paris Accord. After several rounds of multi-lateral negotiations with various stakeholders, the country developed a National Action Plan on Climate Change (NAPCC) in 2008. The NAPCC takes cognizance of critical ecological sustainability issues and delineates adaptation and mitigation strategies to promote sustainable development. It also tries to implement effective and cost-effective strategies for demand use management by fostering linkages through Public Private Partnerships (PPPs) and those with Civil Society Organizations (CSOs). To operationalize NAPCC at the state level, the Ministry of Environment, Forest and Climate Change (MoEFCC), which is the lead institution for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes, asked all States to prepare a State Action Plan on Climate Change (SAPCC) to deal with the challenges of climate change. In 2009, the MoEFCC directed all state governments and union territories to prepare a SAPCC, consistent with the strategy outlined in the NAPCC. The SAPCC serves as the primary policy document at the sub-national level to address vulnerabilities and increase resilience. It is an instrument aimed to map regional climate vulnerabilities, identify and highlight region specific priorities, frame actionable strategies, examine future projections, and arrive at sectoral implications.

There was a felt need to revise the SAPCCs taking cognizance of new international commitments (such as Paris Agreement 2015) and State government priorities (UP SDG Vision 2030) to reduce emissions and better adapt to the impacts of climate change. In 2018, the MoEFCC issued the "Common Framework for Revision of State Action Plans on Climate Change", and all States were advised to revise their SAPCCs, to identify, and address regional and state specific climate risks. Currently, no standard climate impact or adaptation monitoring framework exists at the national or state level in India to track SAPCC implementation or monitor the effectiveness of adaptation measures being implemented at local level.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has been supporting the Uttar Pradesh (UP) – Department of Environment, Forest, and Climate Change (DoEFCC) in the revision process of the SAPCC. The SAPCC has been laid out keeping in mind the Sustainable Development Goals (SDGs) to identify gaps and priority areas that require urgent attention keeping the UP context in mind.

1. The Paris Climate Agreement 2015 is a legally binding international treaty on climate change and adopted by 196 Parties at the UN Climate Change Conference (COP21). The goal is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

Monitoring and Evaluation (M&E) is an important part of tracking the effectiveness of strategies/approaches to address climate induced risks across domains of agriculture, water, forestry, urban & rural infrastructures, Disaster Risk Reduction (DRR), human health and energy and understanding the success of climate adaptation initiatives. However, the current UPSAPCC does not have a systematic/structured M&E system. Tremendous amount of data is being collected by the government departments under various initiatives, and hence any new M&E system should leverage existing data systems to save time, resources, and ensure swift implementation. The M&E Framework for the SAPCC will explore the possibility of leveraging existing monitoring systems that are being deployed by the State (such as the District Environment Management Plans (DEMP) and state-SDGs).

Objectives

GIZ as part of Indo-German technical Cooperation Project, "Climate Change Adaptation in Rural Areas of India (CCA RAI))" has supported the Department of Environment, Forest and Climate Change (DoEFCC), Government of Uttar Pradesh (GoUP) in revising the SAPCC based on the framework/guidelines provided by MoEFCC, GoI.Now, in order to develop and operationalize the SAPCC in the state, an M&E system that would allow for better planning, implementation, monitoring, and evaluation of the effectiveness of activities that are being implemented under the eight missions is being developed as part of Indo-German technical Cooperation Project, "Climate Adaptation and Finance in Rural India" (CAFRI).

M&E is critical to track the implementation progress of each Mission and to capture medium and long-term changes on the ground that are catalysed through adaptation and mitigations actions. However, currently UPSAPCC does not have a systematic and structured M&E system. The current assignment to develop an M&E system for the UPSAPCC involves two major tasks: a) Develop a strategy for M&E of UPSAPCC and b) Support implementation of the developed M&E strategies of UP (See Figure 1).

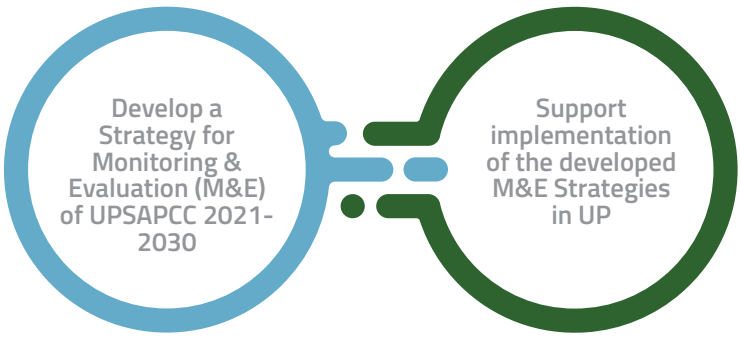
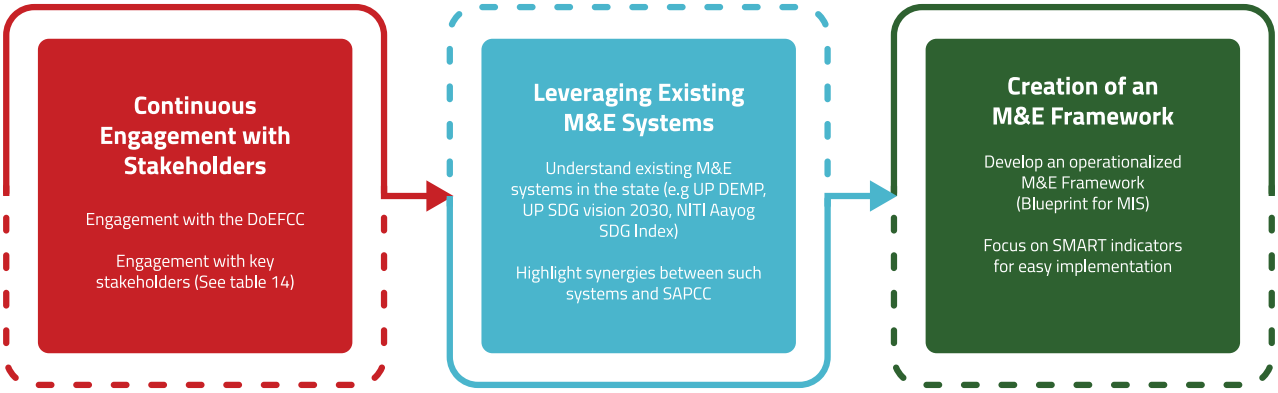


Figure 1: Major tasks of the assignment

Phase I:
MLE Strategizing



Phase II:
MLE Institutionalization

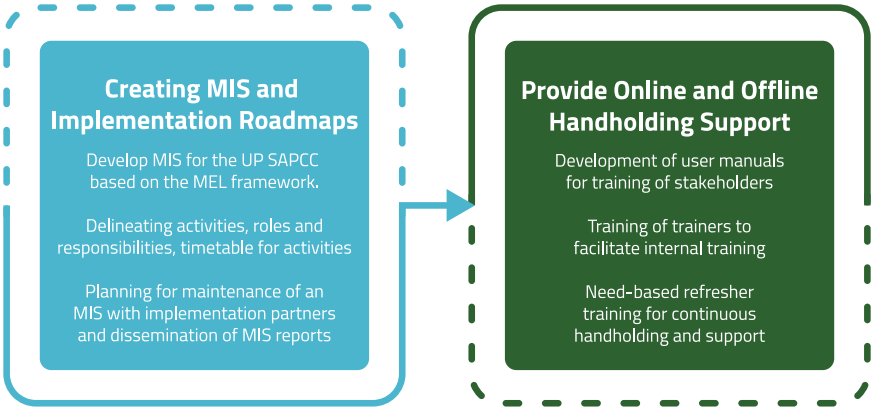


Figure 2 : Approach to Develop M&E Framework for UPSAPCC 2021-2030

Uttar Pradesh State Action Plan on Climate Change (UPSAPCC) 2021-2030

Background

Human-induced climate change is causing severe climate events in India, impacting the lives and livelihoods of millions. The Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report (AR6) highlights that the country has witnessed reduced intensity and frequency of monsoon precipitation since the mid-20th century, resulting in increased dry spells and droughts. For example, since 1997, India's drought-prone area has increased by 57%. Droughts have affected nearly two-thirds of the country from 2020-2022, with one-third of all districts experiencing more than four droughts over the last decade. The AR6 findings indicate that the dominant cause of the observed decrease in monsoon precipitation is anthropogenic aerosol forcing the suspension of fine solid particles in the air created mostly by air pollution linked to land use and land cover change and increasing urbanization. Aerosols reduce the temperature between the sea and land surface, providing a cooling effect that reduces monsoon intensity. Aside from reduced rainfall, the AR6 projects a significant increase in the already warming climate with longer, frequent, and more intense heatwaves. One of the key consequences of rising temperatures will be the increased frequency of flood events. The country has already experienced an increase in heavy precipitation events by more than 20% since 1950. The AR6 projects an increase in temperatures in the Himalayan region; for example, up to 2.6 degrees Celsius will increase the intensity of heatwaves by 2% to 12% by the 2030s. This increases the probability of flash flood events leading to large-scale landslides and loss of agriculture area (India Today, November 2022)[2].

2. India Today. (2022, November 19). Climate change to spur many extreme weather events in India: IIT Gandhinagar study. India Today. Retrieved April 11, 2023, from https://www.indiatoday.in/education today/news/story/climate-change-to-spur-many-extreme-weather-events-in-india-iit-gandhinagar- study-2299244-2022-11-19
3. IPCC (2021). Climate change 2021: The Physical Science Basis. IPCC Intergovernmental Panel on Climate Change. (n.d.). Retrieved April 11, 2023, from https://www.ipcc.ch/report/ar6/wg1/.

India is extremely vulnerable to the impact of extreme climate events such as floods, cyclones, droughts and Glacial Lake Outburst Floods (GLOF)[3]. As per the ND-GAIN Country Index, India ranks 121 in the list of 181 countries globally assessed for adaptation. The study also highlights that exacerbated by its large population, India is the 51st most vulnerable country and 79th least ready to adapt to climate crisis (ND-GAIN, 2020). Also, such risks have a disproportionate impact on vulnerable communities with low adaptive capacities, which poses a threat to the achievement of several SDGs (such as zero poverty, hunger and malnutrition, gender, water, and sanitation)[3].

The Prime Minister's Council on Climate Change (PMCCC) established the NAPCC in 2008. It outlines a comprehensive national strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path. It stresses that maintaining a high growth rate is essential for increasing living standards of the vast majority of people of India and reducing their vulnerability to the impacts of climate change. NAPCC started out with eight missions namely the National Solar Mission, the National Mission for Enhanced Energy Efficiency, the National Water Mission, the National Mission on Sustainable Habitat, the National Mission for Sustaining the Himalayan Ecosystem, the Green India Mission, the National Mission for Sustainable Agriculture, and the National Mission on Strategic Knowledge for Climate Change. Through its missions, the NAPCC hinges on the deployment of new technologies for adaptation and mitigation. Its implementation is being carried out through appropriate institutional mechanisms suited for effective delivery of each individual mission's objectives by catalysing Public Private Partnership (PPP), Local Government Units (LGUs), and civil society action. The focus is on promoting understanding of climate change, adaptation and mitigation, energy efficiency, and natural resource conservation.

Four new missions were later incorporated the National Health Mission as part of the NAPCC & Human Health, the National Mission on Waste to Energy Generation, the National Mission on India's Coastal Areas, and the National Wind Mission––mainly to cater to the needs of the rising importance of climate change (See Figure 3 below).

The NAPCC further reinforced the requirement of an SAPCC consistent with the strategies outlined in the NAPCC. The SAPCC decentralizes the NAPCC objectives into local context. The SAPCC's objective is to align state priorities with the NAPCC as well as to identify state-specific vulnerabilities and key priorities related to adaptation and mitigation. Thus, the SAPCC ensures that state-level variations in ecosystems, geographic conditions, socio-economic scenarios, and their corresponding synergies are taken into account. The document is not binding on government agencies and line departments; however, it will guide their actions and help them to plan climate resilient projects.

UP is no exception to the impacts of climate change. It is experiencing the consequences of climate change in the form of droughts, floods, potable water shortage, epidemic spread, rising pollution, decreased farming output, and impacted rivers. For example, crop response in a changing climate reflects the interplay among three main factors, namely, a) rising temperatures, b) changing water resources, and c) increasing carbon dioxide concentration.

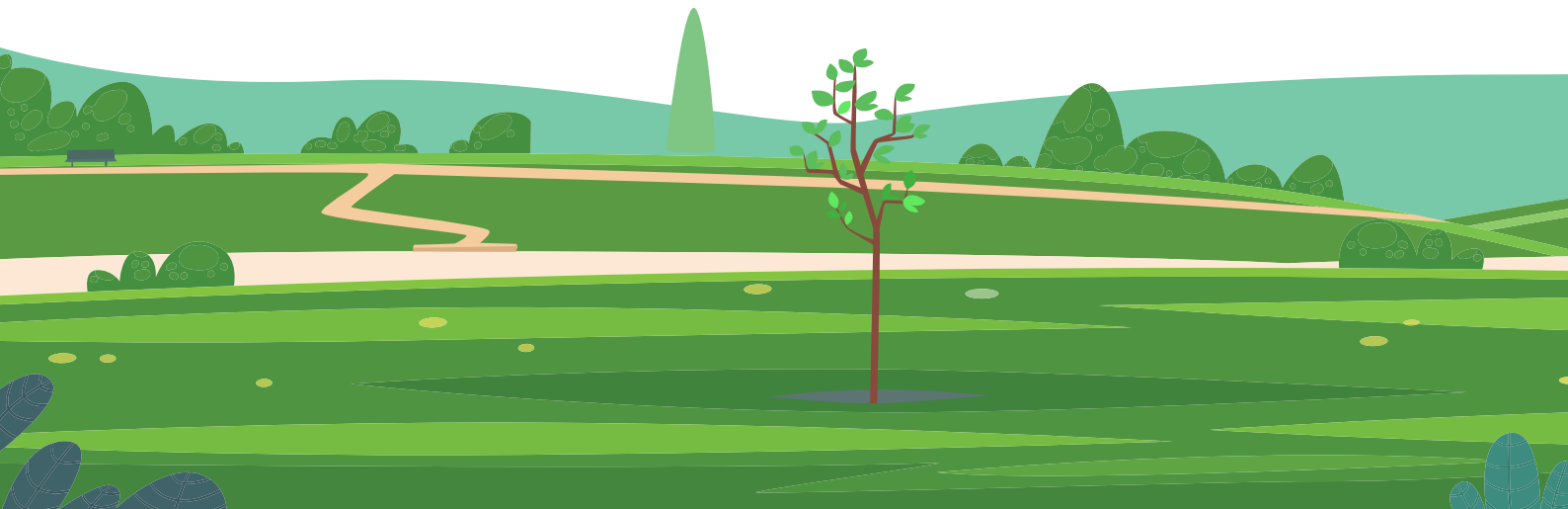


Figure 3: The NAPCC Missions

Structure of UPSAPCC 2021-2030

The first UPSAPCC was completed and launched by the DoEFCC in 2014, and the latest draft was revised in May 2022.It majorly focused on putting together mitigation and adaptation strategies based on national missions in the NAPCC, which includes the Sustainable Agriculture Mission, the Solar Energy Mission, the Enhanced Energy Efficiency Mission, the Green UP Mission, the Strategic Knowledge for Climate Change, the Jal Mission, and the Sustainable Urban Habitat.

The revised UPSAPCC takes a more comprehensive approach to account for past developments and builds on that to inform policies till 2030. It has additional missions such as the Disaster Management Mission and the Human Health Mission. The Solar Mission and Energy Efficiency Mission of NAPCC are combined under the Enhanced Energy Efficiency and Green Energy Mission in the UPSAPCC. Additionally, the Sustainable Habitat Mission has broadened its focus to include rural habitat along with urban habitat.
Each of the missions (shown in Figure 4) has several strategies under it and each strategy has some corresponding action points to cater to it. Each action point has a specific nature of action (implementation/ research/ capacity building/ policy) and a type of action (adaptation/mitigation).

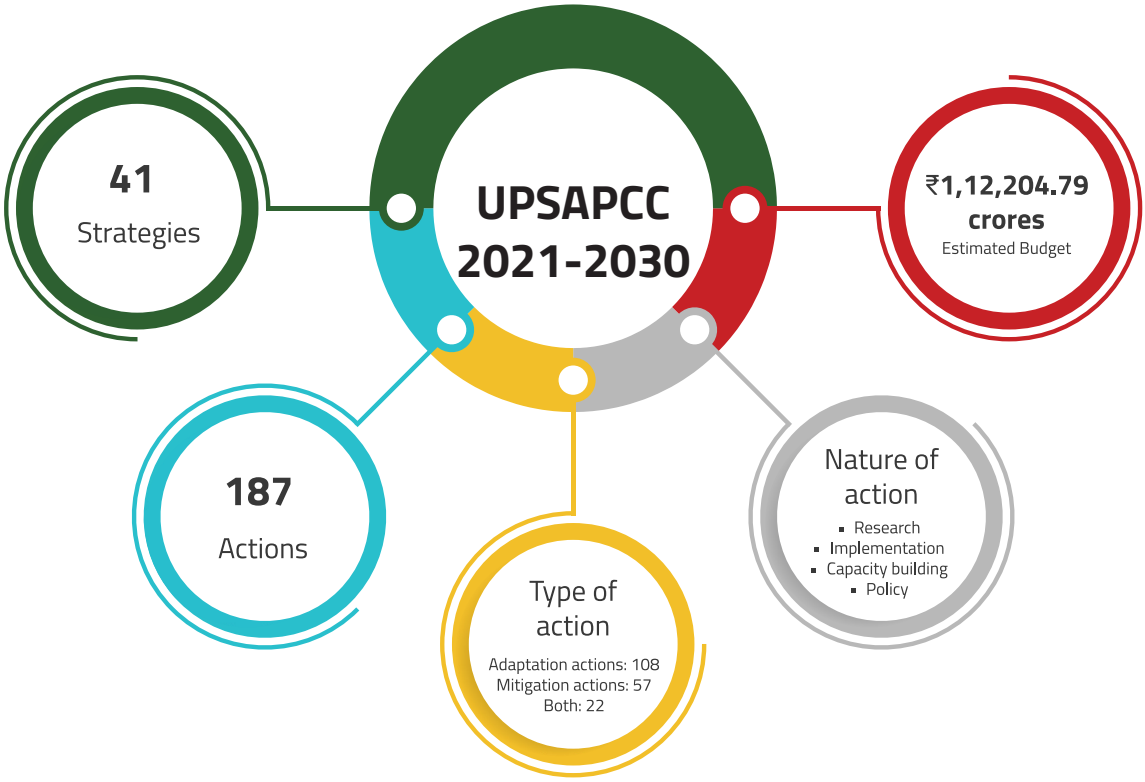


Figure 4: Nature and Type of Actions under UPSAPCC 2021-2030

Across all the missions, the UPSAPCC has developed 41 strategies across its key focus areas, covering 187 action points. Table 1 provides a distribution of these actions: 108 are adaptation actions, 57 are mitigation actions, and 22 belong to both categories.

No.	Missions	Strategies	Action of Points	Adaptation	Mitigation	Both
1	Sustainable Agriculture Mission	5	19	18	-	1
2	Jal Mission	5	25	22	-	3
3	Green UP Mission	5	20	7	10	3
4	Enhanced Energy Efficiency and Green Energy Mission	6	37	2	32	3
5	Sustainable Habitat Mission	9	35	15	9	11
6	Human Health Mission	5	31	24	6	1
7	Disaster Management Mission	2	10	10	-	-
8	Strategic Knowledge Mission	4	10	10	-	-
	Total	41	187	108	57	22

Table 1: Distribution of the Type of Actions across the Eight Missions

Each action point has an overall implementation target for 2030 and provides a break-up target for the period 2021-2025 and 2026-2030. The estimated financial requirement (in INR Cr.) has also been mentioned against each action point. The SAPCC also contains relevant state and central schemes, nodal, and implementing agency and SDG & Nationally Determined Contributions (NDC) linkages for each action point.
Table 2 provides a snapshot of one of the strategies of the Sustainable Agriculture Mission of the UPSAPCC.

No.	Actions	Nature of Action	Type of Action	Target	Target 2021-2025	Target 2026-2030	Estimated financial Requirement (in INR Cr)	Relevant Centre and State Schemes	Nodal Land Implementing Agency	SDG & NDC Linkages
1	Generate and disseminate precise weather forecasts to all farmers based on high resolution network of weather observation stations and ensure last mile delivery of agro-met services									
1.1	Establish a network of Agro-Automatic Weather Stations (AWSs) at a finer resolution of 10km x 10km grid; integrated the ones installed by IMD under its Gramin Krishi Mausam Sewa (about 200 to be installed across India)	Implementation	Adaptation	2433 AWSs across UP	Tender, procure and install all AWS	Continue maintenance	50.0 (Installation and maintenance)	Gramin Krishi Mausam Sewa	NA: Agriculture Department IA: Agriculture Universities, IMD	NDC 06 SDG 2,8,13

Table 2: Snapshot of a Strategy under Sustainable Agriculture Mission

UPSAPCC 2021-2030 Missions

The UPSAPCC 2021-2030 provides adaptation and mitigation strategies for its key focus areas for the following eight state missions:

Figure 5: Eight Missions of the UPSAPCC 2021-2030

Sustainable Agriculture Mission

The agriculture sector is the prime driver of economic growth in UP because a majority of the population relies on agriculture for its livelihood. This mission has derived its mandate from the National Mission on Sustainable Agriculture of NAPCC. This mission consists of five strategies and 19 corresponding action points. Each strategy is aligned with some SDGs and NDCs. The mission encompasses a wide range of focus areas including:

- Universalisation of access to climate risk knowledge to every farmer
- Universalisation of crop and livestock insurance
- Mainstreaming climate adaptive agricultural practices to hedge climate risks

Jal Mission

UP is one of the states rich in water resources. However, due to uneven distribution and inefficient utilization, water availability and distribution remains one of the major issues concerning the state. With an increased dependency on ground water for irrigation and drinking water, the water resources in the state are under acute stress. This mission tries to unravel and address some of these vulnerabilities. The Jal Mission has a total of five strategies and 26 action points spread across the following diverse issues:

- Augmentation of surface water
- Augmentation of groundwater
- Demand-side management across sectors to improve water usage efficiency
- Containing floods

Green UP Mission

Climate change has played a significant role in posing a threat to the flora and fauna of UP. The state has been instrumental in adopting practices that ensure conservation by utilising its land, biodiversity, wetland, and forest resources sustainably. The Vision 2030 document plays a major role in ensuring a steady increase in the forest cover in the state while supporting harvesting of goods and different ecological services from biological resources. The Green UP Mission has derived its mandate from the National Mission for Green India of the NAPCC. This mission has five strategies comprising 20 action points encompassing the following issues:

- Agro-forestry through carbon financing to enhance farmers' income
- Enriching open and medium dense forests and planting trees outside forests to improve ecosystem services and sequester more

Enhanced Energy Efficiency and Green Energy Mission

UP has seen an incremental growth in total electricity consumption, more than doubling from 43,742 consumers in 2010-11 to 91,355 consumers by 2018-19 (Ministry of Power, 2020)4. As of FY 2016-17, the state accounted for the highest primary energy consumption amongst all states in India. Despite the steady rate of growth and perennial demand, the state was still required to import about 6,232 (Gwh) of electricity in FY 2018-19 (Ministry of Power, 2020)4. While 100% villages have been electrified, less than 50% households have been electrified (Ministry of New and Renewable Energy, 2021)4. The mission has derived its mandate from the National Mission for Enhanced Energy Efficiency and the National Solar Mission of the NAPCC. The mission's priorities are spread across six strategies and broken down into 38 action points. The priority areas are:

- Augmentation of surface water
- Augmentation of groundwater
- Demand-side management across sectors to improve water usage efficiency
- Containing floods

Sustainable Habitat Mission

Anthropogenic activities contributing to climate change have seen a steady rise leading to increase in the number of extreme weather events and slow-onset events such as floods, droughts, and storms. This has taken a toll on the basic services, infrastructure, housing, human livelihoods, and the health of both urban and rural habitats. This mission tries to address these issues by identifying opportunities to provide responsive governance, ease of living, sustainable environment, rapid economic growth, and diverse livelihood opportunities for the citizens. It has a total of nine strategies with 35 action points spread across both rural and urban habitats. The strategies revolve around the following priority areas:

- Investments in the non-motorised transport sector
- Promotion of e-mobility and providing incentives
- Circularity in solid/ liquid waste
- Ensuring thermal comfort in living spaces

Department of Environment, Forest and Climate Change. (2022). Uttar Pradesh State Action Plan on Climate

Human Health Mission

Climate change has a profound impact on the health of different communities. Rising temperatures and increased frequency of extreme weather events like heat and cold waves not only result in increased mortality and morbidity but also contribute to malnutrition and increased instances of diseases. Heat waves, cold waves, and floods have been recorded in UP over the years, an increase in which could potentially be damaging for the state's population. Erratic rainfall patterns because of the changing climate can affect fresh water supply, causing water scarcity. This increases the risk of water-borne diseases like diarrhoea (National Health Portal, 2019)5. This mission has three strategies and 13 action points focusing around the following key areas:

- Integrating behavioural change amongst communities including school children for building immunity
- Developing capacities for climate-linked disease forecasting

Disaster Management Mission

Climate-induced disasters are on a rise because of varied risks, vulnerabilities, and exposures of different regions in the state. This has impacted humans immensely. India itself recorded one of the highest numbers of disaster incidences (321 events) globally, with the human impact of 14.9 million people (CRED & UNISDR, 2020)5. This mission has two strategies elaborated across ten action points. The key focus area of the mission includes:

- Preparing for unforeseen extreme climate events originating beyond state borders
- Integrating climate change in disaster management across sectors
- Taking stock of the extent of loss and damages due to current incidences of hazards and their future projections

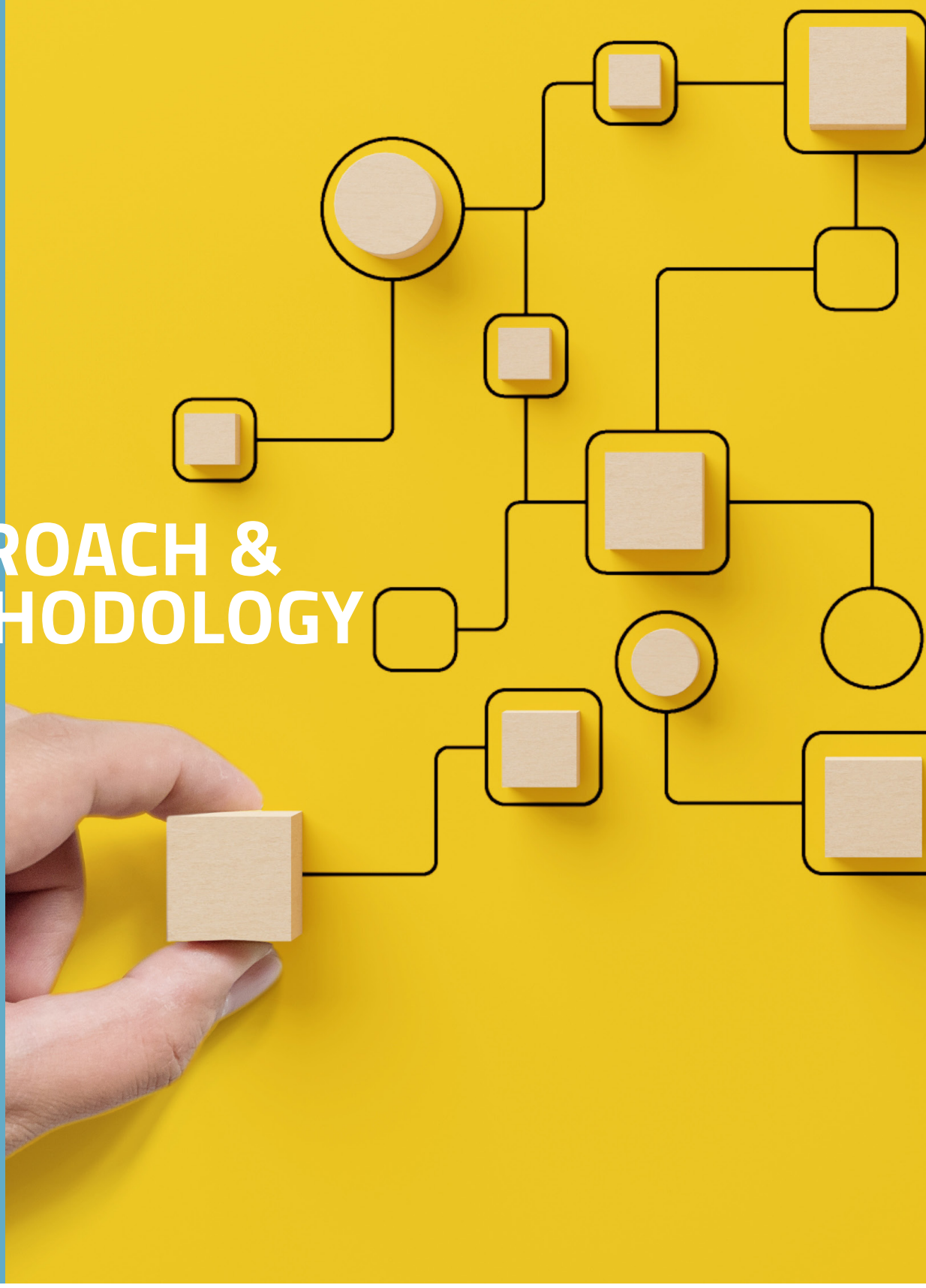
Strategic Knowledge Mission

This mission seeks to achieve a dynamic knowledge system which can help to track and inform whether the national actions are being able to address the NDCs and SDGs. It also strives to establish a strong knowledge base for identifying, formulating, planning, and implementing climate policies. The UP Strategic Knowledge Mission for Climate Change (SKMCC) derives its mandate from The National Mission on Strategic Knowledge for Climate Change (NMSKCC). The mission has four strategies that will get implemented through eight action points. The key focus areas of the mission are:

- Strengthening Climate Change Authority (CCA)
- Capacity building of Panchayati Raj Institutions (PRI) and stakeholders for climate action
- District Knowledge Centres for decentralized informed planning and implementation of climate action

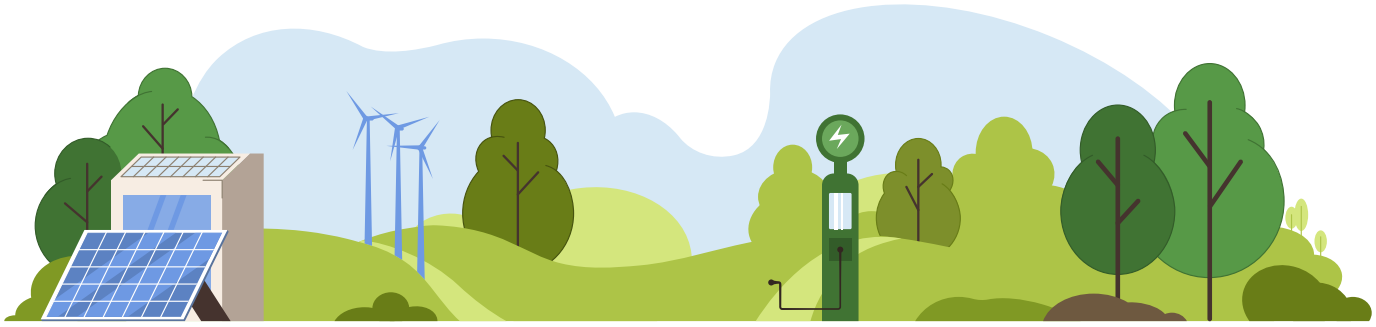
5. Department of Environment, Forest and Climate Change. (2022). Uttar Pradesh State Action Plan on Climate

APPROACH & METHODOLOGY



The assignment started in January 2022 with the objective to develop the M&E framework and the eight UPSAPCC missions and their respective strategies and action points. The mandate was to develop indicators for output, intermediate outcome, and outcome so as to address UP-specific climate vulnerabilities and risks prioritized across the identified domains. Since then, several rounds of deliberations were held to develop the approach for the M&E framework.

The debates and discussions took place from April to December 2022. As the team delved deeper, through the perusal of the various documents aligning with climate change such as UP DEMP, UP SDG Vision 2030 and NITI Aayog SDG Index 2020-21, the following guiding principles were realized:



Leveraging existing data system:

There is an existing corpus of UP-specific data that is already getting collected at the state and national level through schemes, programmes, projects, policies, and action plans. This needs to be leveraged according to the current needs of climate change to make it less resource intensive.

Linkage

It is difficult to retrofit existing M&E systems into a new system. After thoroughly reviewing all the relevant documents, we identified the convergence of the SAPCC action points with each individual document along with state and national level schemes, programmes, projects, policies, and action plans. This was a critical step towards developing the M&E system. The limitations and feasibility of using existing systems were also discussed at length. For instance, the DEMP could be leveraged since it has a mandate to monitor; however, the primary focus of the UP DEMP is on clean environment and less on climate change adaptation and mitigation. Hence, a need was felt to explore other existing systems that could be leveraged complementarily with the UP DEMP.

Convergence:

Climate change is a cross-cutting issue and needs effective collaboration among various stakeholders. Multiple government agencies are already collecting data related to critical indicators even though they might not be labelling it as climate change parameters. For instance, monitoring of progress towards 2030 targets for the Sustainable Agriculture Mission requires data convergence from the Agriculture Department, Horticulture & Food Processing, Animal Husbandry, Fisheries, Dairy Development, Minor Irrigation, Sugar Industry & Cane Development, NABARD, Remote Sensing Application Centre, PRI, and Indian Meteorological Department (IMD). The M&E framework should have the capability to allow for the convergence of climate change indicators across multiple departments and catalyse them to work collectively to tackle the climate change crisis.

Engagement:

Engaging line departments and consulting with them were identified as integral steps in the process. This was to ensure ownership of and involvement in the steps towards implementation. Subsequently, the developed M&E framework will give way to a dynamic MIS wherein data from various line departments will be collated, leading to effective monitoring of the targets set for various action points in the UP SAPCC.

The methodology to develop the M&E framework for the UPSAPCC comprised four steps (See Figure 6).

- Review of relevant documents (UPSAPCC, UP DEMP, UP SDG Vision 2030, NITI Aayog SDG Index, MoSPI Documents)
- Convergence of Action Points/Strategies with SAPCC Vulnerability Indicators, Priority Areas, SDG Targets, NITI Aayog SDG Indicators
- Mapping Schemes/Programmes to Action Points/Strategies
- Aggregation of indicators at Action Point, Strategy and Mission level (remove redundancies)

- Criteria for shortlisting
  a. Shortlist intermediate and outcome indicators
  b. Identify indicators 'relevant to strategy'
  c. Identify indicators that provide a 'holistic perspective'

(Multistakeholder engagement in a participatory approach)

- Validate the following:
  a. Data availability
  b. Relevance to strategy
  c. Data source
  d. Holistic perspective

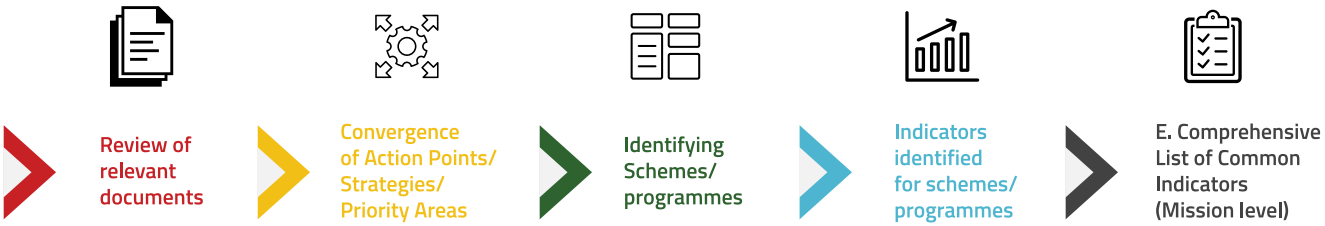
- Criteria for finalizing
  a. Data availability
  b. Relevance to strategy
  c. Mapping to more than one strategy
  d. Holistic perspective

Figure 6: Methodology for Developing the M&E Framework for UPSAPCC 2021-2030

For the methodology adopted, Chapters 4, 5, 6 and 7 provide a detailed description of Steps 1, 2, 3 and 4 respectively.

Step 1: Creating a Comprehensive List of Indicators

This chapter details the process of creating a comprehensive list of indicators for the M&E Framework. The process adopted is described below in figure 7:



- UPSAPCC 2021-2030
- UP DEMP
- UP SDG Vision 2030
- NITI Aayog SDG Index
- SAPCC Vulnerability Indicators
- MoSPI documents

- Strategies and Action Points
- Priority Areas
- SDG Targets
- NITI Aayog SDG Indicators
- SAPCC Vulnerability Indicators

Looked at current schemes, programmes and dashboards implemented at national and state level which are mapping to action points/strategies/ priority areas

- Identified for each action point
- Combined at strategy level to remove redundancies

Compilation of comprehensive list of indicators for all strategies and action points after removing redundancies

Note: Due to unavailability of relevant schemes, indicators could not be identified for some action points

Figure 7: Process for identifying comprehensive list of indicators for the M&E Framework

A. Review of relevant documents

All relevant documents (See figure 8) were extensively perused to understand assignment modalities, relevance to UPSAPCC, feasibility and limitations.

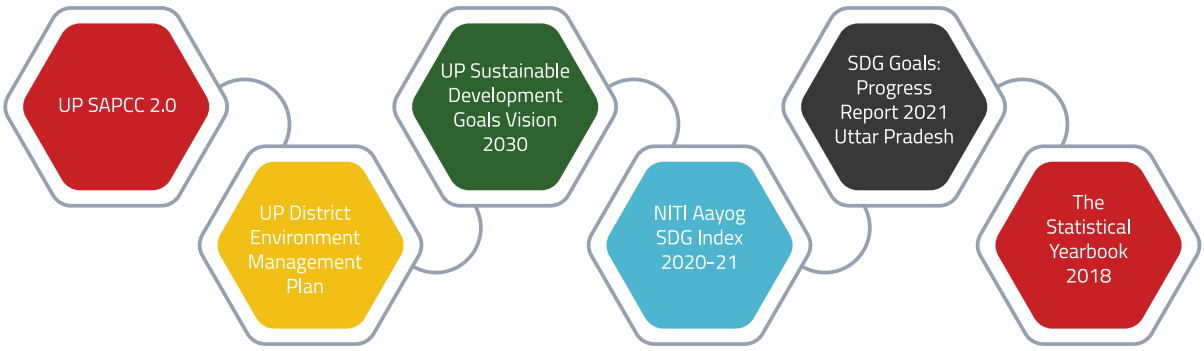


Figure 8: Documents reviewed to develop M&E Framework

1. UPSAPCC 2021-2030

The UPSAPCC 2021-2030 document was perused extensively as this was the inception point of our M&E Framework. Refer to the Chapter 'Uttar Pradesh - State Action Plan on Climate Change (UPSAPCC) 2021-2030' for a detailed description of the document.

Vulnerability Indicators:

The UPSAPCC 2021-2030 contains a chapter "Climate Vulnerability Assessment". It contains vulnerability indicators for all the missions, the rationale for selection, Sensitivity or Adaptive Capacity, Relationship with Vulnerability (Positive or Negative), and Data Source.

Table 3 provides a snapshot of vulnerability indicators of the Enhanced Energy Efficiency and Green Energy Mission.

Indicators	Rationale for selection	Sensitivity or Adaptive Capacity	Relation-ship with Vulnerabil-ity	Data Source
Access to clean cooking fuels	Use of clean fuels such as LPG or biogas has impli-cation for the health and welfare of women, as well as the entire family. Measured as the percentage of households using LPG/Electricity/Biogas for cooking	Adaptive Capacity	Negative	Census 2011
Access to electricity	Access to electricity has been known to have significant correlation with the access to mobile phones and the internet. This implies access to information, agro-met services, early warning services and relief measures or funds available to mitigate impacts of climate hazards. Measured as the percentage of villages electrified and the average number of hours of electricity provided for domestic, agricultural and commercial use.	Adaptive Capacity	Negative	Census 2011

Table 3: Vulnerability Indicators for Enhanced Energy Efficiency and Green Energy Mission of UP SAPCC 2.0

2. UP District Environment Management Plan (DEMP)

The National Green Tribunal (NGT) issued several pan-India directions relating to environment management which are required to be executed at district level covering all cities, towns and villages. For implementing the directions issued by the NGT, the UP Polution Control Board (UP PCB) developed the UP DEMP.

The NGT guides the UP DEMP to identify key areas for adaptation and mitigation that are included in the District Climate Change Mitigation and Adaptation Plan. There are a total of 93 priority actions under seven different missions.

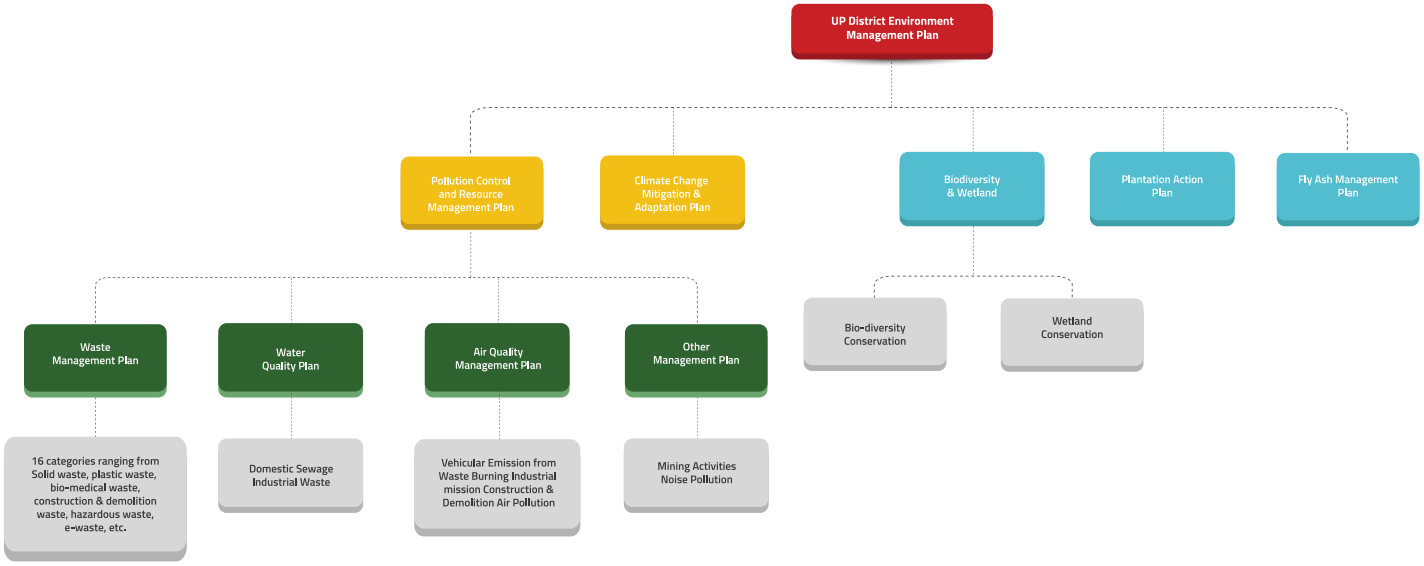


Figure 9: Structure of Management Plans in the UP DEMP

The UP DEMP largely focuses on clean environment and has significantly limited action points on Climate Change Mitigation and Adaptation Plan. While the Pollution Control and Resource Management Plan is very detailed and has been elaborated into actions against 16 categories, the former has only five action points. Each of the management plans lists some action points, (at times with a brief description of the actions), timeline and department responsible for the action. Table 4 and Table 5 provides a comparative of the action points under Climate Change Mitigation and Adaptation Plan vs. Pollution Control and Resource Management Plan.

1.2 Approach steps to be taken by concerned departments for the implementation of Adaptation Plan

Sr. No.	Action Points	Timelines	Department/ Agencies
1	Priority 1: Drinking Water Sufficiency	(i) Facilitate creation of "JJSUN" and WUAs at ward/block levels after assessment of existing and projected water requirements as well as available quantity; (ii) Establish MoUs with agencies of expertise and Financial Institutions (FIs) for provision of technical, financial and advisory support to Jal Sansthan and Zila Parishad; (iii) Apply Water Conservation Fee on industries	Departments – · District Planning Committee · Jal Sansthan Schemes/ Missions – (i) NRDWP & IWMP (ii) NURM (iii) District Water & Sanitation Mission

Table 4: Action Points in the Climate Change Mitigation & Adaptation Plan of the UP DEMP

1.1.2 Action Plan for Solid Waste Management			
Sr. No.	**Action Points**	**Timelines**	**Department/ Agencies**
1	Door to Door collection of municipal solid waste as per MSW Rules-2016 Segregation at source of solid waste Regular pest control system	Regular activity	· Nagar Nigam/ Development Authorities
2	Collection, Segregation, Transport and Disposal of Solid Waste in city	Regular activity	· Nagar Nigam/ Development Authorities/Industries
3	Segregation at source of solid waste	Regular activity	· Nagar Nigam/ Development Authorities/UPSIDC/ Waste Generator
4	Plantation of area specific types of plants to mitigate pollution; regular cleaning of drains and disposal of sludge In house disposal of MSW in industrial areas as per MSW Rules-2016	Regular activity	· Department of Industries/UPSIDC
5	Development of new MSW facility Establishment of Bio-compost RDF and waste to energy plant	Immediate	· ULBs
6.	Development of leachate collection and treatment centre at Municipal Solid Waste treatment facility Development of Buffer Zones to control odour	Immediate	· ULBs

Table 5: Action Points in the Pollution Control and Resource Management Plan (on Solid Waste Management) of the UP DEMP

3. UP Sustainable Development Goals Vision 2030

The UP SDG Vision 2030 document was prepared to implement SDGs in the state. The document contains state specific vision for each of the 17 SDGs to be achieved by 2030. Each SDG also contains specific targets (See Table 7) and corresponding strategies and action plan/activities to achieve the set targets. This document allows coordinated efforts across departments to achieve UP's Vision 2030. Table 6 displays the distribution of SAPCC strategies that could be mapped to SDG Vision 2030 document across the eight missions.

Sr. No.	Mission	No. of Strategies mapped to SDG	Total No. of Strategies
1.	Sustainable Agriculture Mission	5	5
2.	Jal Mission	4	5
3.	Green UP Mission	5	5
4.	Enhanced Energy Efficiency and Green Energy Mission	6	6
5.	Sustainable Habitat Mission	9	9
6.	Human Health Mission	3	5
7.	Disaster Management Mission	2	2
8.	Strategic Knowledge Mission	4	4

Table 6: Strategies Mapped to SDG vs Total Number of Strategies

Suggested Activities	How?
All households in GP to have 24 X 7 access to safe and adequate drinking water Ensure availability of safe drinking water in school and anganwadi centres	· Panchayat, together with VHSNC members, can map all the water points in the village along with access of household to each water point · Pradhan can take the lead and call Jal Nigam Jal Sansthan assistant engineer placed at the block-level to conduct water quality testing of all the drinking water sources in the village. Panchayat can mark the safe sources so that people can use safe water for drinking and quality affected water for other purposes · Organise campaigns or create awareness during panchayat meetings regarding the safety of water sources, procure IEC materials from block office and display it in prominent places of the panchayat, school, PDS shop etc. · If the village has piped water supply, panchayat, ward wise, can mobilise the community members to get connection and ensure that it reaches each and every household irrespective of their social status, caste or religion · Ward wise, members can take up the responsibility of ensuring timely collection of water user charges so that everybody can have uninterrupted water supply · Organise cleanliness drives in the panchayat, together with all the members/water users to make the vicinity of water sources clean · If any new scheme comes to the village, the panchayat can prepare a priority list of the area which needs to be served first (based on the situational analysis). School and anganwadi centres should always be the first priority · Keep the contact details of person in-charge of hand pump, mechanic, public in each ward and school so that people can contact as per their requirement

Table 7: Sample SDG Target and Activity from UP SDG Vision 2030

4. NITI Aayog SDG Index 2020-21

The NITI Aayog SDG Index is a national level index containing all the 17 SDGs. The states are marked as Achiever, if the score is 100; Front runner, if the score falls between 65 and 99; Performer, if the score falls between 50 and 64; and Aspirant, if the score falls between 0 and 49. Figure 10 provides a snapshot for the state of UP with a score of 61; hence, it is ranked 19 as a Performer'. This index also contains a goal-wise overall performance score. Each SDG also contains a comprehensive list of indicators list.

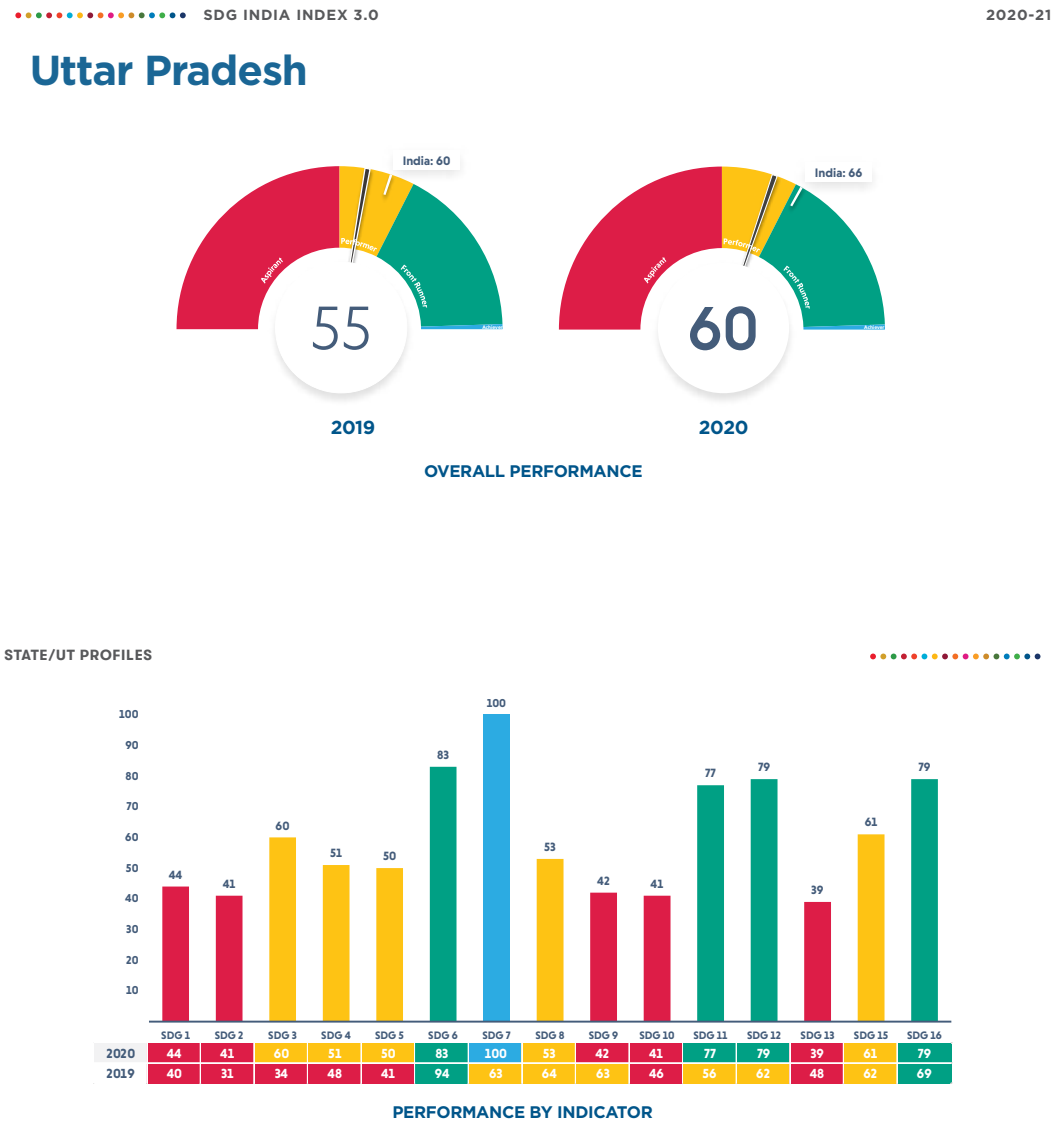


Figure 10 : Snapshot of the NITI Aayog SDG India Index 2020-21

Table 8 lists SDG 15: Life on Land indicators (in the first row) and its performance across India and UP level. It also provides the 2030 target against each indicator.

Life on Land: Indicator List								
Sl. No.	Area	Forest + Tree Cover as a Percentage of Total Geographical Area	Percentage of Area Covered under Afforestation Schemes to the Total Land	Forest cover as a Percentage of Total Geographical Area	Tree Cover as a Percentage of Total Geographical Area	Percent of degraded Land over Total Land	Number of cases under Wildlife Protection Act (1972)	Percentage Increase in Area of Desertification
1.	Target	33	2.74	-	-	5.46	0	0
2.	India	24.56	0.51	21.67	2.89	27.77	15	1.98
3.	Uttar Pradesh	9.2	0.21	6.15	3.05	11	19	-16.69

Table 8 : Indicator List: Life on Land from NITI Aayog SDG Index 2020-21

5. Relevant Documents Prepared by Ministry of Statistics and Programme Implementation (MoSPI)

The following two data sources under MoSPI were thoroughly reviewed:

a: SDG Goals: Progress Report 2021 Uttar Pradesh (Based on NIF Progress Report 2021 by MoSPI)

The SDGs National Indicator Framework (NIF) Progress Report (2021) highlights the progress made so far in the journey of SDGs monitoring/achievement at the national level and identifies gaps. It also reports on all the 17 SDGs. Each goal presents the following list of parameters:

- Number of indicators in NIF (Original)
- Number of indicators in NIF (MoSPI 3.1)
- Values available at the national level
- State value is available
- Value of the indicator at the national level (India) and state level (Uttar Pradesh)

Moreover, each indicator has the source and periodicity mentioned. A snapshot of the entire structure is present in Figure 11.

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all			
SL	NATIONAL INDICATOR	VALUE OF THE INDICATOR	
Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services			
1	7.1.1: Percentage of households electrified, 2019-20 Source: Ministry of Power / Periodicity: Annual	99.77	
2	7.1.2: Percentage of household using clean cooking fuel Source: Ministry of Petroleum and Natural Gas / Periodicity: Annual	Year	Value
		2015-16	62.83
		2016-17	74.16
		2017-18	82.49
		2018-19	97.95
		2019-20	102.11
		2020-21	100.87
Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix			
1	7.2.1: Renewable energy share in the total installed electricity generation Source: Ministry of New and Renewable Energy / Periodicity: Annual	Year	Value
		2015-16	13.4
		2016-17	15.5
		2017-18	17.7
		2018-19	19.2

Figure 11 : SDG Goals: Progress Report 2021 Uttar Pradesh

b: The Statistical Yearbook 2018

It contains various indicators under each sector. For example, under Horticulture, it contains data on the following indicators:

- Export of horticulture produce in India
- Area and production of plantations(statewise)
- Area and production of vegetables
- Area and production of fruits
- Area, production and productivity of various kinds of spices
- Area and production of flowers (statewise)
- Area and production of various horticulture crops (statewise)
- Area and production of various horticulture crops (all India)
- Area and production estimates of Horticulture crops (summary)

B. Convergence of Action Points/Strategies/Priority Areas

After perusing the documents thoroughly, the convergence of each of the above-mentioned documents was identified with the UPSAPCC. In SAPCC, each mission has several strategies, which are further broken down into implementable action points. While mapping the UPSAPCC with the relevant documents, the convergence was located at the action-point level and not at the strategy level.

1. Mapping with the UP DEMP

While identifying convergence between the UPSAPCC and the DEMP, the most relevant action points of the DEMP belonged either to the Climate Change Mitigation & Adaptation Plan, the Pollution Control and Resource Management Plan, or the Biodiversity and Wetland Conservation Plan. Relevant DEMP action points were mapped with the UPSAPCC action points. The DEMP addresses clean environment comprehensively but briefly touches upon climate change mitigation and adaptation.

The Pollution Control and Resource Management Plan has action points for several sub-domains such as Waste Management, Water Quality Management, Air Quality Management and Other Management6. The Waste Management Plan is further segregated into categories such as Solid Waste, Plastic Waste, Construction & Demolition, Biomedical, Hazardous and E-Waste. (Refer to Section A in the chapter titled Step 1: Creating a Comprehensive List of Indicators for a detailed structure of the UP DEMP)

Table 9 displays examples of the DEMP mapping with the Sustainable Habitat Mission of the UPSAPCC. Similar mapping was carried out to identify commonalities between all the eight missions of the UPSAPCC and the DEMP.

SUSTAINABLE HABITAT MISSION	
SAPCC Action Point	**DEMP: Climate Change Mitigation & Adaptation Plan**
2.5 Ensure implementation of rainwater harvesting construction norms at housing societies and institutional buildings (are more than 300 sq.m).	Approach steps to be taken by concerned departments for the implementation of the Adaptation Plan Priority 1: Promote rainwater harvesting (RWH) and groundwater recharge through incentives and laws in old and new construction
4.1 Management of solid waste through- · Setting up of waste processing facilities · Creating value chains for waste recycling and reuse (waste-to-energy and any other) · Supporting entrepreneurs for city-level waste collection and reuse · Setting up of sanitary landfills · Bio-remediation/capping of old landfills (legacy waste)	Waste Management – Solid waste management; development of leachate collection and treatment centres at municipal solid waste treatment facilities; development of buffer zones to control odour.

Table 9: Mapping of the UPSAPCC 2021-2030 with the UP DEMI

2. Mapping with the UP SDG Vision 2030

The UP SDG Vision 2030 has different targets corresponding to each SDG and each target, in turn, has several proposed activities/measures. Relevant SDG targets and corresponding activities/measures were mapped with relevant UPSAPCC 2021-2030 action points across all eight missions, wherever applicable.
Table 10 provides an example from the Green UP Mission to show the mapping of the UPSAPCC action points with the UP SDG Vision 2030 document.

6. Other management plans include the Mining Activity Management Plan and the Noise Pollution Management Plan

Table 10 provides an example from the Green UP Mission to show the mapping of the UPSAPCC action points with the UP SDG Vision 2030 document.

SUSTAINABLE HABITAT MISSION		
SAPCC Action Point	**UP SDG VISION 2030 targets**	**UP SDG VISION 2030 activities**
1.1 Enhance quality of open forest cover and ecosystem services in UP. A total of 4,081 sq.km area to be restored	Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Promotion of agroforestry by targeting planting of one crore saplings every year across the state under the National Agriculture Mission
4.1 Map, restore, conserve, and monitor all natural wetlands	Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services––in particular, forests, wetlands, mountains and dry lands, in line with obligations under international agreements	* Conservation and management, prevention of loss and restoration and sustainable use of wetlands * Planning, managing, and monitoring of wetlands * Use of wetlands in community land without changing the wetland status and ecosystem * Researching the dynamics of wetland ecosystems for preparing management strategies for mitigation of problems like uncontrolled growth of weeds and pollution and also in the restoration of wetlands. Research to also cover study of economic value and benefits of wetlands.

Table 10 : Mapping of the UPSAPCC 2021-2030 with the UP SDG Vision 2030

3. Mapping with NITI Aayog SDG Index 2020-21[7]

The NITI Aayog SDG Index Dashboard contains the state scores and subsequent performance of each state with respect to each of the 17 SDGs. This index also contains a comprehensive list of indicators under each goal. For each UPSAPCC Mission, we have identified and mapped NITI Aayog SDG Index indicators corresponding to SAPCC action points, wherever applicable. For the Green UP Mission, the following seven index indicators could be mapped with the SAPCC action points:

- Percentage of area covered under afforestation schemes to the total geographical area
- Forest cover as a percentage of total geographical area
- Tree cover as a percentage of total geographical area
- Percentage of degraded land over total land area
- Number of cases under the Wildlife Protection Act (1972)
- Percentage increase in area of desertification
- Percentage of LPG + PNG connections against number of households

We have followed the same mapping process for all the remaining seven missions.

Figure 12 provides a list of all the indicators that could be mapped with UPSAPCC missions.

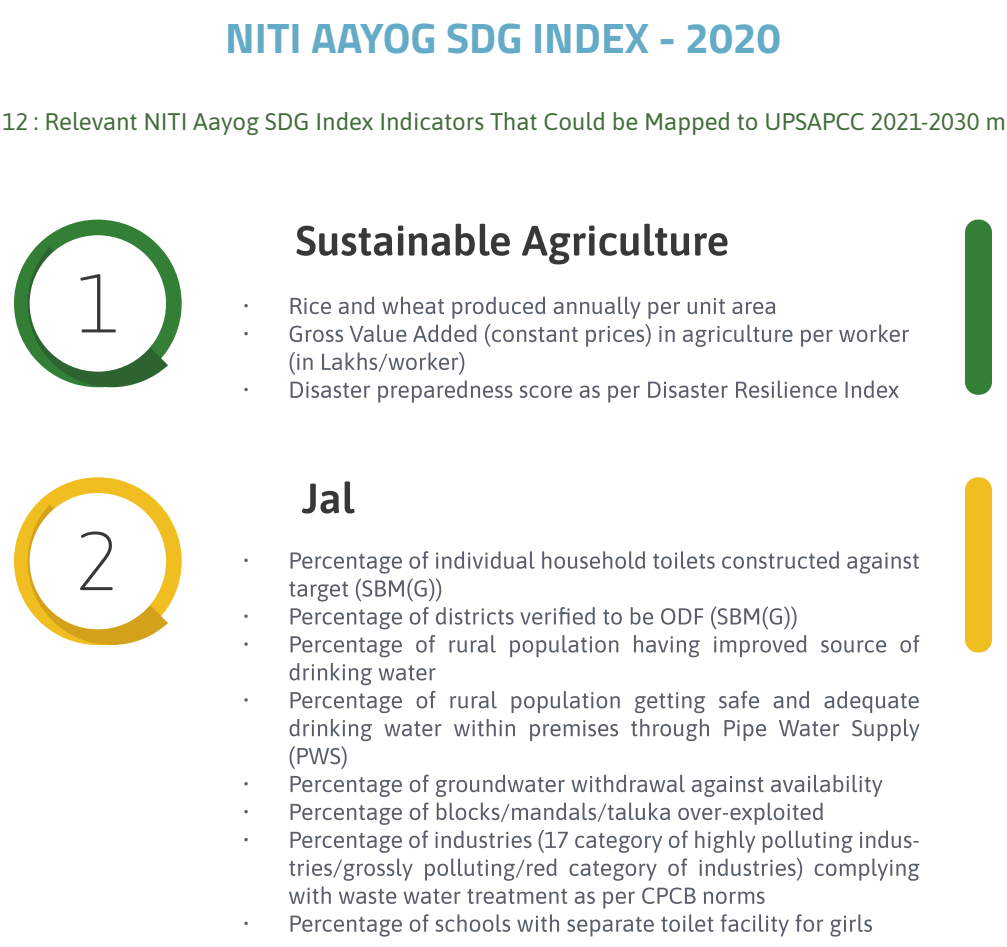


Figure 12 : Relevant NITI Aayog SDG Index Indicators That Could be Mapped to UPSAPCC 2021-2030 missions

7. https://sdgindiaindex.niti.gov.in/#/ranking

Green UP

- Forest and tree cover as a percentage of total geographical area
- Percentage of area covered under afforestation schemes to the total geographical area
- Forest cover as a percentage of total geographical area
- Tree cover as a percentage of total geographical area
- Percentage of degraded land over total land area
- Number of cases under the Wildlife Protection Act (1972)
- Percentage increase in the area of desertification
- Percentage of LPG + PNG connections against number of households

Energy

- Percentage of LPG+PNG connections against number of house-holds (Goal 7)
- Percentage of households electrified (Goal 7)

Urban Habitat

- Percentage of wards with 100% door-to-door waste collection (SBM(U)) (Goal 11)
- Percentage of individual household toilets constructed against target (SBM(U)) (Goal 11)
- Percentage of wards with 100% source segregation (SBM(U)) (Goal 11)
- Percentage of urban households living in katcha houses (Goal 11)
- Installed sewage treatment capacity as a percentage of sewage generated in urban areas (Goal 11)
- Percentage of urban households with drainage facilities (Goal 11)
- Percentage of MSW processed to the total MSW generated (SBM(U)) (Goal 11)
- Deaths due to road accidents in urban areas (Goal 11)

Health

- Percentage of children in the age group of 9-11 months fully immunized (Goal 3)
- Monthly per capita out-of-pocket expenditure on health as a share of Monthly Per capita Consumption Expenditure (MPCE) (Goal 3)
- Percentage of institutional deliveries out of the total deliveries reported (Goal 3)
- Total case notification rate of tuberculosis (Goal 3)
- HIV incidence rate (Goal 3)
- Suicide rate (Goal 3)
- Death rate due to road traffic accidents (Goal 3)
- Maternal mortality ratio (Goal 3)
- Under 5 mortality rate (Goal 3)
- Total physicians, nurses, and midwives (Goal 3)

Disaster Management

- Disaster preparedness score as per Disaster Resilience Index

4. Mapping with Vulnerability Indicators of the UPSAPCC 2021-2030

Impact of climate change depends mainly on three factors, i.e., hazard, exposure, and vulnerability. Among these three factors, governments and development agencies can address climate change by reducing vulnerability. Hence, the UPSAPCC contains a chapter titled Climate Vulnerability Assessment that describes vulnerability indicators for all the eight missions. Across the seven8 SAPCC sectors, a total of nine indices were developed––one each for seven sectors, while the habitat was sub-divided into two indices i.e., Urban Development Vulnerability Index (UDVI) and Rural Development Vulnerability Index (RDVI). Further, an index on inherent composite vulnerability was developed; the index took into consideration one indicator from each of the seven sectors. Convergences were identified and all the relevant vulnerability indicators were mapped with the revised SAPCC action points for all the missions.

For instance, the Green UP Mission has the following vulnerability indicators as per the UPSAPCC:

- Access to forest resources
- Percentage change in forest area (2017–2019)
- Forest area (in ha)/1,000 (SC/ST) rural population
- Percentage of HH using firewood for cooking

All vulnerability indicators are accessible within the respective mission booklets.

C. Identifying Schemes/Programmes

While identifying the exhaustive list of indicators for the M&E framework, existing state and national level schemes and programmes were looked into as it would already have an existing monitoring mechanism.

Through secondary research, firstly all schemes/programmes/dashboards available for each mission were identified. A compendium of schemes was created for each mission, enlisting all the indicators that were available for that particular scheme in the public domain.

Secondly, the SAPCC action points for each mission were mapped to relevant schemes/programmes/dashboards. A brief description of the schemes/programmes was also added to the mapping sheet along with its temporal and spatial details such as the time period and the cities in which the scheme is applicable. Relevant indicators from the schemes that mapped to the action points were added to the compendium as action-point–level indicators. The numbers mentioned within brackets for each indicator represent the respective scheme/programme/dashboard that the indicator belongs to. In addition to indicators from schemes/programmes/dashboards, the action-point–level indicators also contains indicators from relevant MoSPI reports, UPSAPCC vulnerability indicators, and NITI Aayog SDG Index indicators. This detail has been tabulated and is available in all the mission-specific booklets.

To access a detailed mapping sheet of indicators across the above-mentioned programmes for all missions of UPSAPCC, one can have a look at the annexure using the following QR code:

Legend

Pink indicators: For action points that could not be mapped to any schemes/dashboards/programmes, indicators were developed and included in the comprehensive list of common indicators.

Brown indicators: Indicators identified from NITI Aayog SDG Index 2020 - 21 dashboard.

Green indicators: Indicators obtained from dashboards/reports

Blue indicators: SAPCC vulnerability indicators

Table 11 provides a snapshot of the mapping process.

No. UPSAPCC Action Point	Relevant Project/ Schemes/ Dashboards	Schemes Description	Action-point–level Indicators
Strategy 1: Generate and disseminate precise weather forecasts to all farmers based on a high resolution network of weather observation stations and ensure last mile delivery of agro-met services			
1.1 Establish a network of Agro-Automatic Weather Stations (AWSs) at a finer resolution of a 10-km-by-10-km grid. Integrate the ones installed by IMD under its Gramin Krishi Mausam Sewa (about 2433 to be installed across India)	1. Gramin Krishi Mausam Sewa 2. Statistical Year book, 2018, Rural and Urban Development (MoSPI)	1. To issue crop- and location-specific weather-based agro advisories for the benefit of farming community on every Tuesday and Friday and occurrence of extreme weather. Timeline: 2015-present	* No. of District Agro-Meteorology Units (DAMUs) established (1) * Accuracy of dissemination of the district and sub-district agromet advisories (1) * No. of farmers receiving district agromet advisories (1) *Average monthly rainfall (actual and normal projected) (2) * Disaster preparedness score as per Disaster Resilience Index * Access to information and technology

Table 11 : Snapshot of the Scheme Mapping Spreadsheet

Note: Due to unavailability of relevant schemes, indicators could not be identified for some action points.

8. The Strategic Knowledge Mission does not have vulnerability indicators

This mapping process is followed for all the eight missions of the UPSAPCC. However, there are some action points that could not be mapped to any scheme.

The table below shows the percentage of action points that could not be mapped to any scheme for all the missions. For instance, the Human Health Mission has a total of three strategies with 13 action points. Of the 13 action points, 12 could be mapped to schemes/programmes. One action point could not be mapped as it was a recommendation that needed to be implemented in future. Following this mapping process, the Human Health and Sustainable Agriculture Missions have the highest mapping to schemes, with 92 and 89 per cent, respectively. The missions that had very low mapping of schemes with actions points are the Sustainable Habitat and Strategic Knowledge Missions.

Missions	No. of Strategies	No. of Action of Points	No. of Action of Points: Mapped with Schemes	Mapping (%)	Details of Unmapped Action Points
Human Health	5	13	12	92	Recommendation (1)
Sustainable Agriculture	5	19	17	89	Proposed studies (2)
Disaster Management	2	10	7	70	Recommendations (2) Proposed study/risk assessment (1)
Jal	5	26	15	58	Recommendations (8) Proposed Studies (3)
Enhanced Energy Efficiency & Green Energy	6	38	19	50	Recommendation (14) Proposed studies (3) Training and capac-ity building (2)
Green UP	5	20	10	50	Recommendations (7) Proposed studies/activities (3)
Sustainable Habitat	9	35	15	43	Recommendations (16) Develop policy (3) Proposed study/assessment (1)
Strategic Knowledge	4	8	2	25	Proposed Awareness/ Training/Capacity Building 3) Recommendations (3)

Table 12: Mapping Status of Missions - UP SAPCC 2021-2030

D. Indicators Identified for Schemes/Programmes

Indicators from schemes are mapped at the action-point level. However, within one strategy there were repetitions of schemes mapping to more than one action point. Similarly, schemes were repeated and mapped across more than one strategy. These redundancies were removed to include indicators from one scheme only once. The action-point¬level indicators for each strategy are collated and labelled as strategy-level indicators'.
For the Sustainable Agriculture Mission, we got three indicators from the Gramin Krishi Mausam Sewa Scheme. These are: the number of District Agro-Meteorology Units (DAMUs) established, accuracy of dissemination of the district and sub-district Agromet Advisories, and the number of farmers receiving district agro-met advisories. This scheme mapped with three action points (1.1, 1.2, and 3.2) across two strategies. However, instead of mentioning it twice for the two separate strategies, these indicators have been mentioned only once in the comprehensive list of indicators to remove redundancies.

E. Comprehensive List of Common Indicators (Mission Level)

The indicators that were common across the different strategies and coming from same schemes were labelled as the comprehensive list of common indicators. This comprehensive list contains indicators from each scheme only once without any repetitions.

Step 2: Shortlisting Indicators

After identifying a comprehensive list of indicators for each of the eight missions, the M&E framework approach identified and shortlisted key indicators to monitor the progress of the mission. Some parameters were developed, that were used to filter out the most relevant indicators for each mission. The shortlisting process followed a participatory approach that involved discussions with relevant implementing partners.

Figure 13 elaborates on the shortlisting process followed.

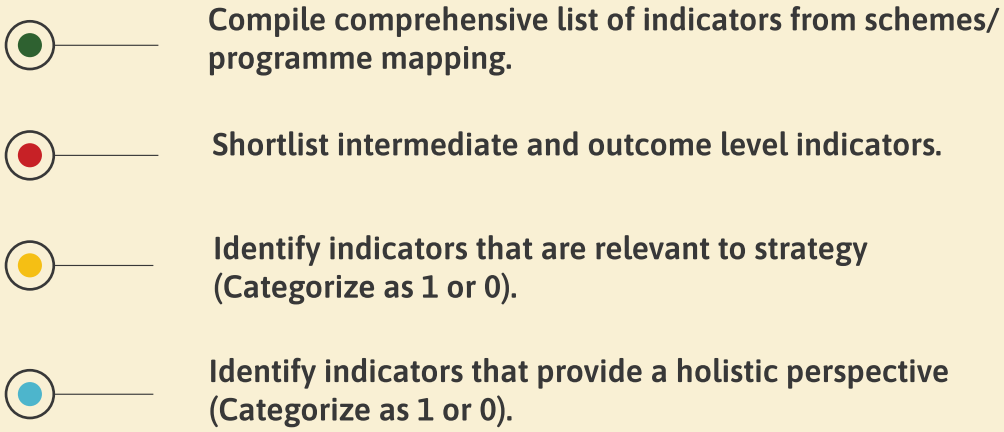


Figure 13: Process for Shortlisting M&E Indicators at the Mission Level

Shortlisting Indicators for the Sustainable Agriculture Mission

1: The Sustainable Agriculture Mission has a total of 128 indicators in the comprehensive list of common indicators obtained from various schemes/programmes/dashboards.

2: All the indicators in the comprehensive list are classified as output, intermediate outcome, and outcome based on the following criteria:

a. The indicators were categorised as short-term, medium-term, or long-term based on the timeline on which an indicator might show change.
b. Context that the strategy provides: The indicator will be defined as short-term, medium-term or long-term based on the context that the strategy and target that the UPSAPCC provides to the action point.

The comprehensive list of indicators for the Sustainable Agriculture Mission were cut down to 30 indicators by including only intermediate and outcome indicators.

3: Relevance to SAPCC Strategy: This is a binary parameter. Until now, all the mapping was done at the action-point level. To shortlist mission-relevant indicators, we focus on the strategies of the SAPCC missions. A score of 1 is recorded if the indicator is relevant to any particular strategy of the mission and a score of 0 if the indicator is not relevant to any strategy.

4: Holistic perspective: This is also a binary parameter. Indicators that provide an overview of the mission, and their positive movement (progress) indicate fulfilment of the strategy and therefore health of the natural resource are considered as indicators providing a holistic perspective. Negative movements would therefore indicate gaps in achievement of the strategy. A holistic perspective is viewed in conjunction with the relevance to strategy.

A score of 1 is noted if the indicator is able to capture the holistic perspective of the strategy it is mapped to. These indicators can be holistic independently or a combination of indicators can give a holistic perspective of the particular strategy. For instance, the area under drip irrigation does not provide a holistic perspective and is noted as 0 individually. However, when combined with the area under sprinkler irrigation, both indicators will provide a holistic perspective on the area under micro-irrigation practices.

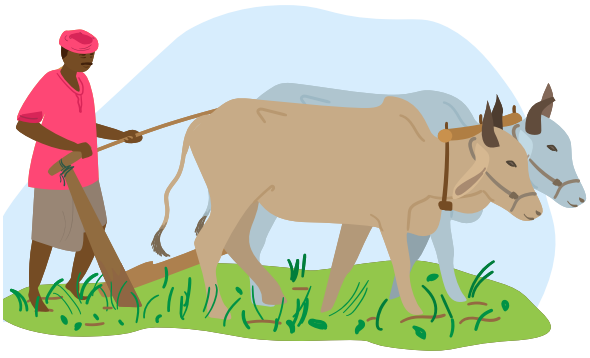


Table 13 illustrates the shortlisting approach (template) applied to the Sustainable Agriculture Mission.

No.	Indicators (30)	Mapping to Strategy	Relevance to SAPCC Strategy (1/0)	Holistic Perspective (1/0)	Data Source
Agro-weather Services					
1	No. of District Agro-Meteorology Units (DAMUs) established	1,3	1	1	Gramin Krishi Mausam Sewa
2	No. of Agro-automatic weather stations established	1,3	1	0	Gramin Krishi Mausam Sewa
3	Access to information and technology	1	1	1	UP-SAPCC
4	No. of farmers accessing the knowledge-based decision support system	1	1	1	Gramin Krishi Mausam Sewa
5	Disaster preparedness score as per Disaster Resilience Index	1	1	1	Disaster Scorecard for States and Union Territories of India Report Vol. 1, NDMA, NITI Aayog SDG Index 2020-21

Table 13: Shortlisting Approach – the Sustainable Agriculture Mission

For example – Consider the indicator **No. of District Agro-Meteorology Units (DAMUs)** established

- It maps to Strategy 1 and Strategy 3. Strategy 1 states, "Generate and disseminate precise weather forecasts to all farmers based on high resolution network of weather observation stations and ensure last mile delivery of agro-met services." Strategy 3 states, "Mainstream climate smart adaptation in agriculture production, consumption and livelihoods, develop and implement contingency plans at village level in UP".
- This indicator is relevant for both the strategies and thus a score of 1 is given against it.
- This indicator alone is not able to provide a holistic perspective of the strategies it is mapped to. However, No. of District Agro-Meteorology Units established (DAMUs) in combination with the indicator No. of Agro-Automatic Weather Stations established can provide a holistic perspective and thus a score of 1 is given to this pair of indicators.
- The data source is Gramin Mausam Krishi Sewa.

Figure 14 shows the distribution of a comprehensive list of common indicators vs shortlisted indicators for all the sectors of the UPSAPCC.

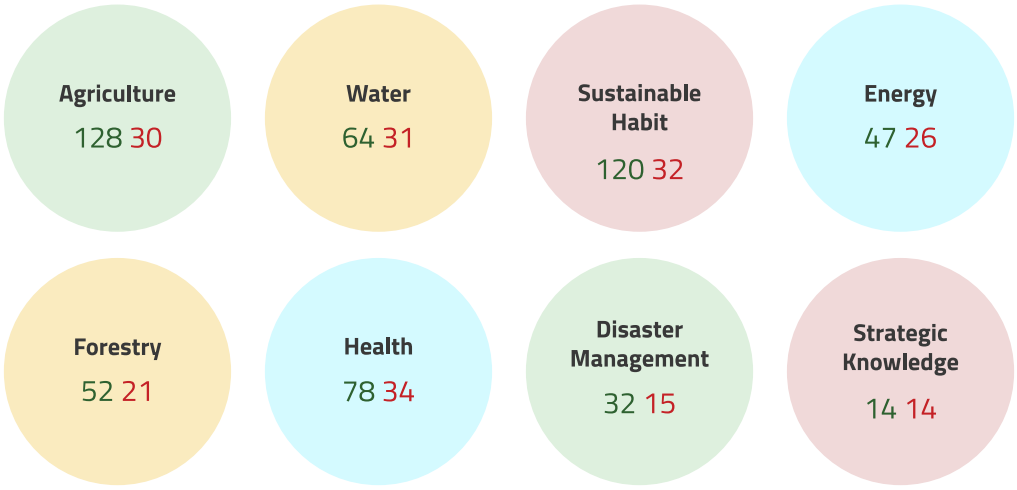


Figure 14: Mission-wise Shortlisted Indicators (Before Consultation with Line Departments)

Step 3: Consultation with Line Departments

A critical ingredient of the revised UPSAPCC is the creation and operationalization of a robust M&E system to better plan, manage, monitor, and evaluate implementation activities under the eight missions of the SAPCC. The M&E system will track the progress of implementation activities, enable the meeting of envisaged adaptation and mitigation goals, and highlight areas that require more focused intervention.

A two-day consultative workshop was organized by the UP DoEFCC on "Framework Development of an M&E system for the revised UPSAPCC" on the 8th and 9th of December 2022 in Lucknow, UP.

The objective was to garner inputs and insights to craft a relevant, practical and effective M&E framework and to highlight solutions to strengthen institutional mechanisms for implementation of the framework.

The consultative workshop was conducted under the chairmanship of Mr. Manoj Singh, Additional Chief Secretary, DoEFCC, GoUP. He underscored the importance of a collaboration across line departments for better institutionalization of the M&E framework. Ms. Mamta Sanjeev Dubey, PCCF and HoFF was the guest of honour and graced the occasion with her valuable insights. She reiterated thataddressing climate change requires a certain degree of change in mindset. The consultation was presided over by Mr. Ashish Tiwari, Secretary, DoEFCC, GoUP, who emphasized the need for creating a robust M&E system in measuring the progress of SAPCC activities.

The workshop brought together line departments (See Table 14) relevant to the eight SAPCC missions.

No.	Mission	Participating Departments
1.	Sustainable Agriculture	Agriculture, Horticulture & Food Processing, Fisheries, Animal Husbandry, Dairy Development, Sugarcane Development, NABARD, Remote Sensing Application Center, PRI, IMD, Minor Irrigation, and Sugar Industry & Cane Development Department
2.	Jal	Ground Water Department, Minor Irrigation, Namami Gange and Gramin Jalapurti Vibhag, Irrigation & Water Resources, UP Jal Nigam (rural), UP Jal Nigam (urban), Public Works Department (PWD), State Water Resources Agency (SWaRA), and State Mission for Clean Ganga
3	Green UP	Forest Department, UP Forest Corporation, UP Biodiversity Board, Directorate of Environment, Forest & Wildlife, and DoEFCC
4	Enhanced Energy Efficiency and Green Energy	Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA), Directorate Electrical Safety, UPSRTC, Transport Department, UP Power Corporation Ltd. (UPPCL), UP Council of Science & Technology, MSME & Export Promotion, and UP Rajya Vidyut Utpaadan Nigam (UPRVUNL)
5	Sustainable Habitat	PRI, Rural Development, Urban Development, Infrastructure and Industrial Development, MSME & Export Promotion, PWD, UP Pollution Control Board (UPPCB), Housing & Urban Planning, Directorate of Local Bodies, and UP State Road Transport Corporation (UPSRTC) Transport Department
6	Human Health	Department of Medical Health & Family Welfare
7	Disaster Management	State Disaster Management Authority (UPSDMA), Relief Commissioner, Remote Sensing Application Centre, and IMD
8	Strategic Knowledge	Directorate of Environment (DoE) and UP Climate Change Authority

Table 14: Line Departments Relevant for the SAPCC Missions

Day 1 of the consultation's agenda focused on deliberating on indicators developed for the Sustainable Agriculture Mission, the Jal Mission, the Sustainable Habitat Mission and the Enhanced Energy Efficiency and Green Energy Mission. The workshop witnessed participation of officials from various departments such as those of Agriculture, Horticulture & Food Processing, PRI, Urban Development, Irrigation, Public Works, IMD, and NABARD.

Day 2 of the consultation concentrated on discussions of the UPSAPCC Missions of Human Health, Strategic Knowledge, Disaster Management and Green UP. Officials from various departments such as those of Medical Health & Family Welfare Department, PRI, UPSDMA, Relief Commissioner, Remote Sensing Application Centre, Forest Department, and UP Forest Corporation actively contributed to the dialogue on the M&E framework under the guidance of Mr. Ashish Tiwari.

On both days, participants provided their perspectives on KPIs that track medium- and long-term climate and climate adjacent outcomes. They also deliberated about the contours of the data collection and management systems.

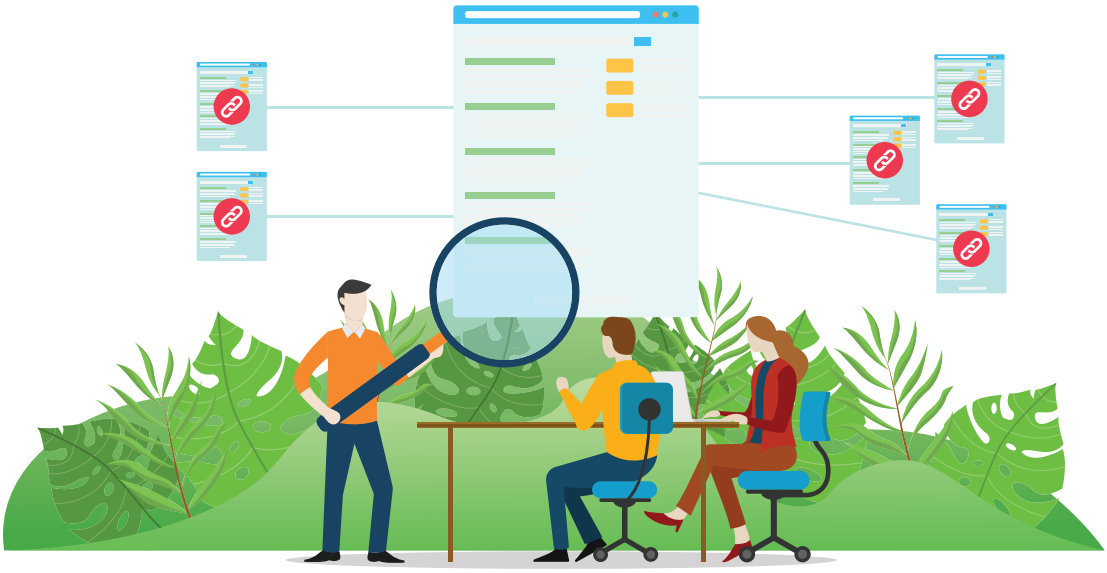
Indicators from all the eight missions, prior to deliberation, were classified with respect to different strategies. To obtain perspectives on each indicator, the following categories were populated during the discussion with line departments:

- Strategies mapped
- Data source of indicators
- Scorecard comprises a ranking criteria used for shortlisting the indicators
- Periodicity
- Responsibility
- Notes on additional data sources

Several suggestions to buttress the M&E system were provided. The feasibility of the existing data architecture to provide periodic data was also discussed along with the way forward in making this M&E framework robust and implementable.

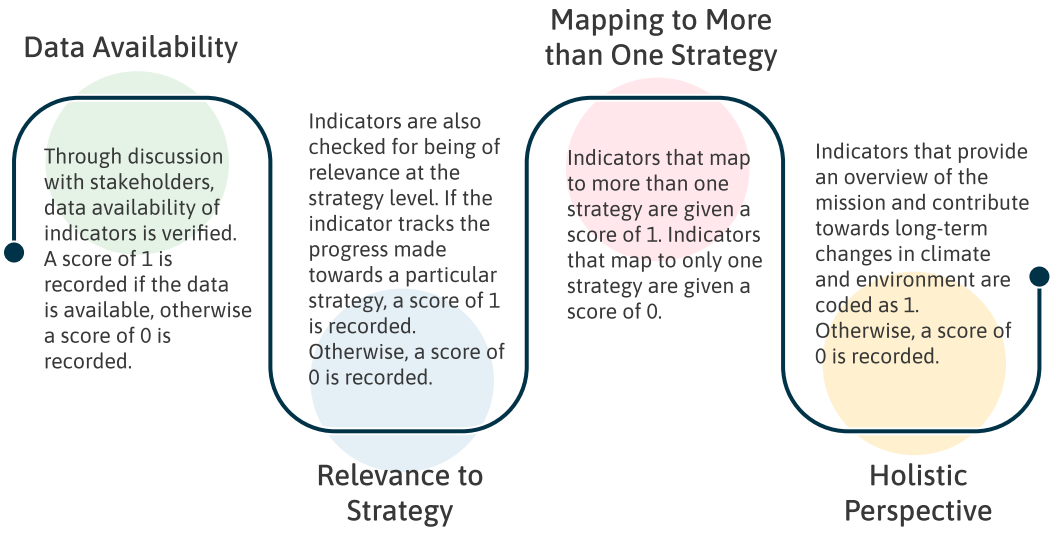
Data Sources of Indicators

The names of schemes, programmes, and dashboards relevant for each indicator has been added as data sources.



Scorecard for Shortlisting the Indicators

A scorecard was developed to shortlist mission-level indicators. The scorecard contained some ranking criteria defined in Figure 15.



Scoring criteria: Indicators will be scored individually on the above four parameters. The summation of all four scores will be recorded as: 0 – 1 = low priority; 2 = medium priority; 3 – 4 = high priority

Figure 15: Scorecard for Shortlisting Indicators for the M&E Framework

Periodicity

The periodicity of data collection for each indicator was mentioned. Data could be collected annually, biannually, quarterly, monthly, or at a real-time frequency.

Responsibility

During the consultation, the line departments suggested the name of the department responsible for collecting data pertaining to each indicator.

Additional Data Sources

During the consultative process, line departments also suggested additional schemes pertaining to the indicators.

The Sustainable Agriculture Mission

This mission has five strategies:

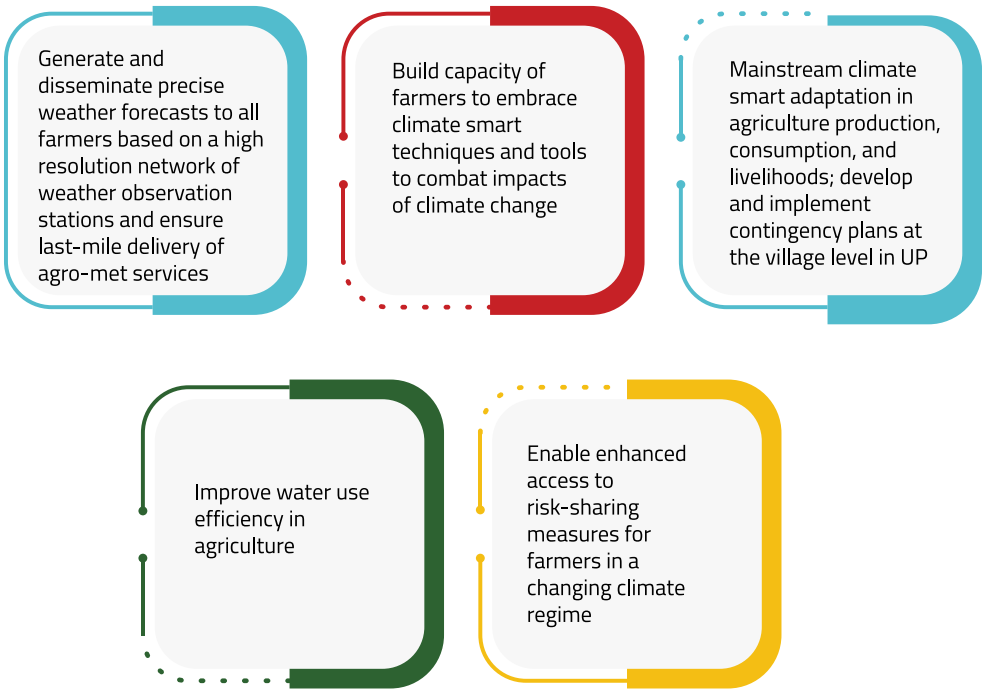


Figure 16 : Strategies under the Sustainable Agriculture Mission

For Strategy One of the Sustainable Agriculture Mission, namely "Generate and disseminate precise weather forecasts to all farmers based on a high resolution network of weather observation stations and ensure last-mile delivery of agro-met services", four indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. No. of agro-automatic weather stations established
2. Access to information and technology
3. No. of farmers accessing the knowledge-based decision support system
4. Disaster preparedness score as per the Disaster Resilience Index

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	No. of agro-automatic weather stations established	1	1	1	0	3	High
2	Access to information and technology	0	0	1	0	1	Low
3	No. of farmers accessing the knowledge-based decision support system	0	1	1	1	3	High
4	Disaster preparedness score as per the Disaster Resilience Index	0	1	1	1	3	High

Table 15a: Scoring Sheet for the Indicators of Strategy One of the Sustainable Agriculture Mission

Therefore, in consultation with the line departments, three indicators for the strategy were ranked as high and one indicator was ranked as low. Table 15b presents the shortlisted indicators for Strategy One of the Sustainable Agriculture Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1.	No. of agro-automatic weather stations established	IMD, Department of Agriculture	Annually
2.	Access to information and technology	Urban Development Department	Monthly
3	No. of farmers accessing the knowledge-based decision support system	IMD, Department of Agri-culture, and Relief Commissioner	Bi-weekly
4	Disaster preparedness score as per the Disaster Resilience Index	Revenue Dept., UPSD-MA, and Municipal Corporations	Seasonal

Table 15b : Shortlisted Indicators for Strategy One of the Sustainable Agriculture Mission

The Jal Mission

This mission has five strategies :

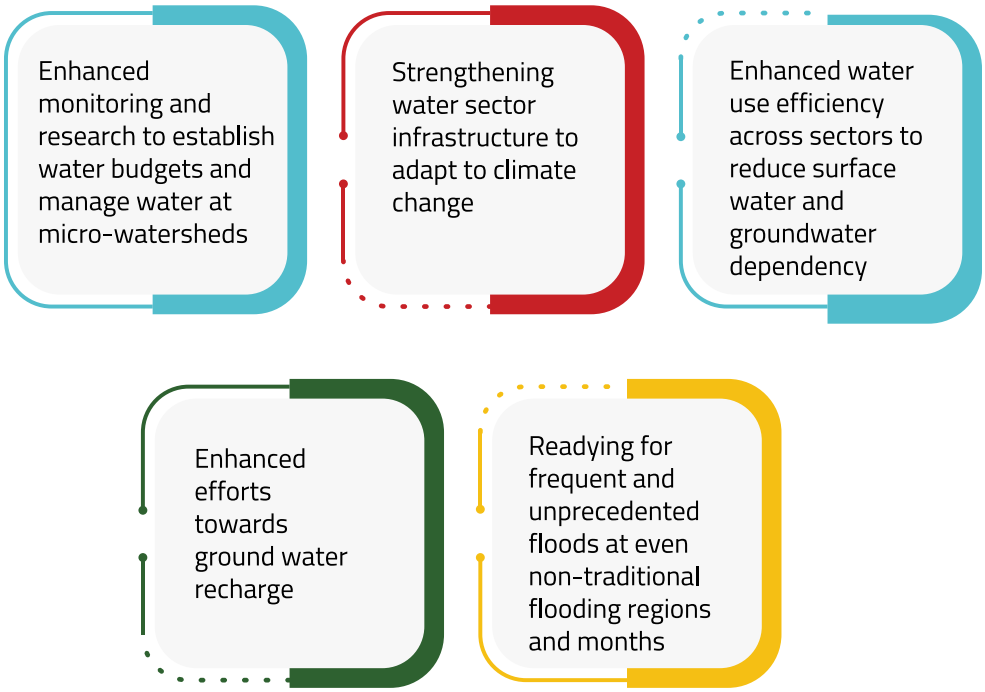


Figure 17 : Strategies under the Jal Mission

For Strategy One of the Jal Mission, namely "Enhanced monitoring and research to establish water budgets and manage water at micro-watersheds", 11 indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. Annual groundwater recharge and extraction
2. No. of reuse and recharge structures
3. Percentage area of river basins brought under integrated water resources management
4. Percentage of total minor irrigation schemes in use, weighted by the percentage of irrigation potential utilized
5. No. of village action plans made
6. Gram Panchayats (GPs) with community-led Water Security Plans (WSP) approved
7. No. of GP-level water budgets completed
8. No. of GPs that have implemented their water budgets
9. No. of GPs adopting participatory groundwater management
10. No. of Gram Panchayat Development Plans (GPDP) that have incorporated water management
11. No. of basin authorities established

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Annual groundwater recharge and extraction	1	1	1	1	4	High
2	No. of reuse and recharge structures	1	1	1	1	4	High
3	Percentage area of river basins brought under integrated water resources management	1	1	1	1	4	High
4	Percentage of total minor irrigation schemes in use, weighted by the percentage of irrigation potential utilized	1	0	1	1	3	High
5	No. of village action plans made	0	1	1	0	2	Medium
6	Gram Panchayats (GPs) with community-led Water Security Plans (WSP) approved	0	1	1	1	3	High
7	No. of GP-level water budgets completed	0	1	1	0	2	Medium
8	No. of GPs that have implemented their water budgets	0	1	1	0	2	Medium

Table 16a: Scoring Sheet for the Indicators of Strategy One of the Jal Mission

9	No. of GPs adopting participatory ground-water management	0	1	1	0	2	Medium
10	No. of Gram Pancha-yat Development Plans (GPDP) that have incorporated water management	0	1	1	0	2	Medium
11	No. of basin author-ities established	1	1	1	1	4	High

Table 16a: Scoring Sheet for the Indicators of Strategy One of the Jal Mission (Contd.)

Therefore, in consultation with the line departments, six indicators for the strategy were ranked as high and five indicators were ranked as medium. Table 16b presents the shortlisted indicators for Strategy One of the Jal Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1	Annual groundwater recharge and extraction	Groundwater Department	Annually
2	No. of reuse and recharge structures	Minor Irrigation Department	Annually
3	Percentage area of river basins brought under integrated water resources management	UP SWaRa	Annually
4	Percentage of total minor irrigation schemes in use, weighted by the percentage of irrigation potential utilized	Minor irrigation Department	Annually
5	No. of village action plans made	Jal Jeevan Mission	Annually
6	Gram Panchayats (GPs) with community-led Water Security Plans (WSP) approved	Groundwater Department	Annually
7	No. of GP-level water budgets completed	Groundwater Department	Annually
8	No. of GPs that have implemented their water budgets	Groundwater Department	Annually
9	No. of GPs adopting participatory groundwater management	Groundwater Department	Annually
10	No. of Gram Panchayat Development Plans (GPDP) that have incorporated water management	State Water and Sanitation Mission (SWSM)	Annually
11	No. of basin authorities established	State Mission for Clean Ganga (SMCG)	Annually

Table 16b: Shortlisted Indicators for Strategy One of the Jal Mission

The Green UP Mission

This mission has five strategies :

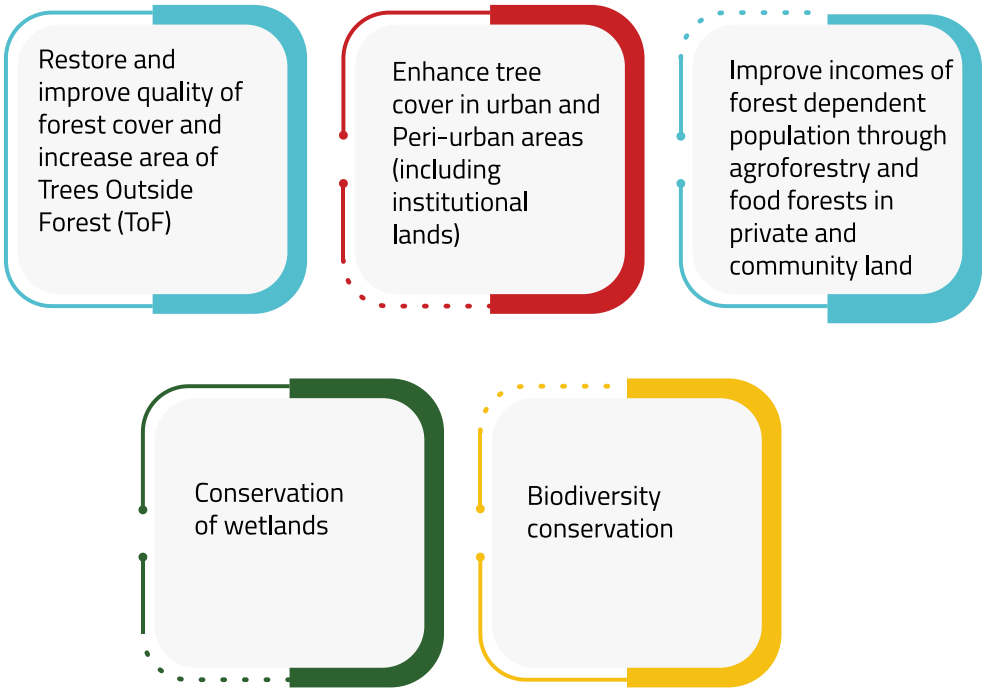


Figure 18 : Strategies under the Green UP Mission

For Strategy One of the Green UP Mission, namely "Restore and improve quality of forest cover and increase area of Trees Outside Forest (ToF)", nine indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. Area under green cover
2. Area under forest cover
3. Percentage change in forest area
4. Area under tree cover
5. Tree cover as a percentage of total geographical area
6. Percentage of degraded forest land over total forest area
7. Increase in canopy density
8. Area under very dense forest as a percentage of total forest area
9. Area under moderately dense forest as a percentage of total forest area

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Area under green cover	0	1	1	1	3	High
2	Area under forest cover	0	0	1	0	1	Low
3	Percentage change in forest area	0	1	1	0	2	Medium
4	Area under tree cover	0	1	1	1	3	High
5	Tree cover as a percentage of total geographical area	0	1	1	0	2	Medium
6	Percentage of degraded forest land over total forest area	0	1	1	0	2	Medium
7	Increase in canopy density	0	1	1	1	3	High
8	Area under very dense forest as a percentage of total forest area	0	1	1	1	3	High
9	Area under moderately dense forest as a percentage of total forest area	0	1	1	1	3	High

Table 17a: Scoring Sheet for the Indicators of Strategy One of the Green UP Mission

Therefore, in consultation with the line departments, five indicators for the strategy were ranked as high, three indicators were ranked as medium and one indicator was ranked as low. Table 17b presents the shortlisted indicators for Strategy One of the Green UP Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1	Area under green cover	Forest Department	Annually/ Bi-annually
2	Area under forest cover	Forest Department	Annually/ Bi-annually
3	Percentage change in forest area	Forest Department	Annually/ Bi-annually
4	Area under tree cover	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
5	Tree cover as a percentage of total geographical area	Forest Department	Annually/ Bi-annually
6	Percentage of degraded forest land over total forest area	Forest Department	Annually/ Bi-annually
7	Increase in canopy density	Forest Department	Annually/ Bi-annually
8	Area under very dense forest as a percentage of total forest area	Forest Department	Annually/ Bi-annually
9	Area under moderately dense forest as a percentage of total forest area	Forest Department	Annually/ Bi-annually

Table 17b : Shortlisted Indicators for Strategy One of the Green UP Mission

The Enhanced Energy Efficiency and Green Energy Mission

This mission has six strategies :

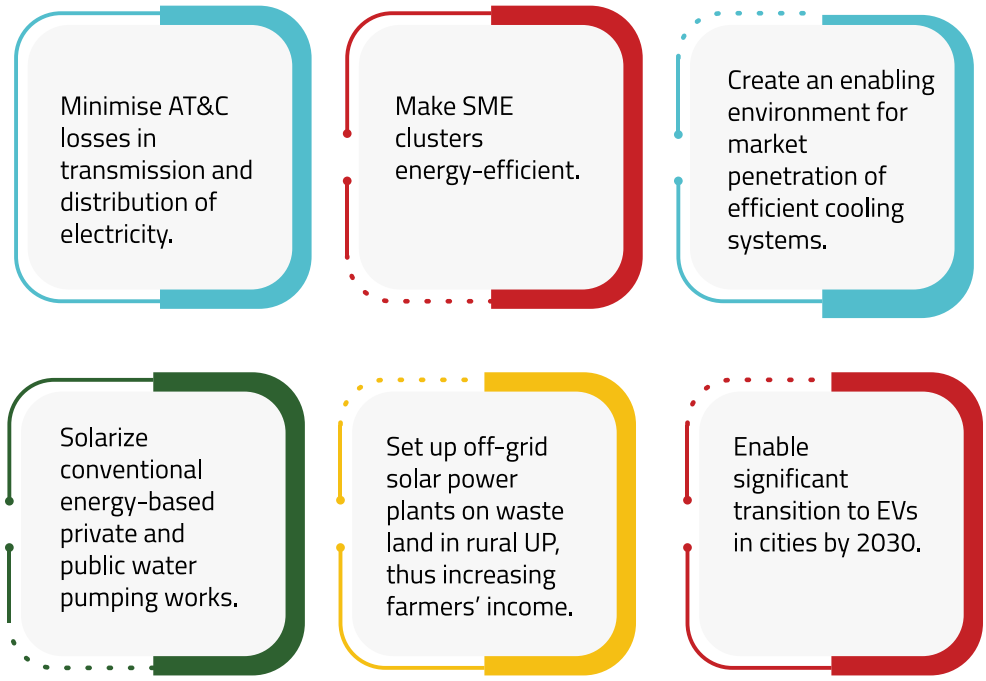


Figure 19 : Strategies under Enhanced Energy Efficiency and Green Energy Mission

For Strategy One of the Enhanced Efficiency and Green Energy Mission, namely 'Minimise Aggregate Technical and Commercial (AT&C) losses in transmission and distribution of electricity', five indicators were shortlisted and deliberated upon with relevant line departments.

These indicators are:

1. AT&C Loss
2. Average Cost of Supply (ACS) – Average Realizable Revenue (ARR) Gap
3. Percentage of metered connections
4. No. of sub-transmission and distribution network strengthened
5. Solar pumping capacity installed
6. Transmission & Distribution (T&D) Loss*

*Initially five indicators were presented. During the discussion with line departments, the T&D Loss indicator was suggested to be included in this shortlist.

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
	AT&C Loss (%)	0	1	1	1	3	High
	T&D loss (%)	0	1	1	1	3	High
	ACS - ARR Gap (Rs/ unit)	0	1	1	1	3	High
	Percentage of metered connections	0	1	1	1	3	High
	No. of sub-transmission and distribution network strengthened	1	1	1	1	4	High
	Solar pumping capacity installed	1	1	1	1	4	High

Table 18a: Scoring Sheet for the Indicators of Strategy One of the Enhanced Energy Efficiency and Green Energy Mission

Therefore, in consultation with the line departments, six indicators for the strategy were ranked as High. Table 18b presents the shortlisted indicators for Strategy One of the Enhanced Efficiency and Green Energy Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1.	AT&C Loss (%)	UPPCL	Monthly
2.	T&D loss (%)	UPPCL	Monthly
3	ACS - ARR Gap (Rs/ unit)	UPPCL	Monthly
4	Percentage of metered connections	UPPCL	Monthly
5	No. of sub-transmission and distribution network strengthened	UPPCL	Monthly
6	Solar pumping capacity installed	UPPCL and UPNEDA; Department of Horticulture for Component B	Annually

Table 18b: Shortlisted Indicators for Strategy One of the Enhanced Energy Efficiency and Green Energy Mission

The Sustainable Habitat Mission

This mission has nine strategies :

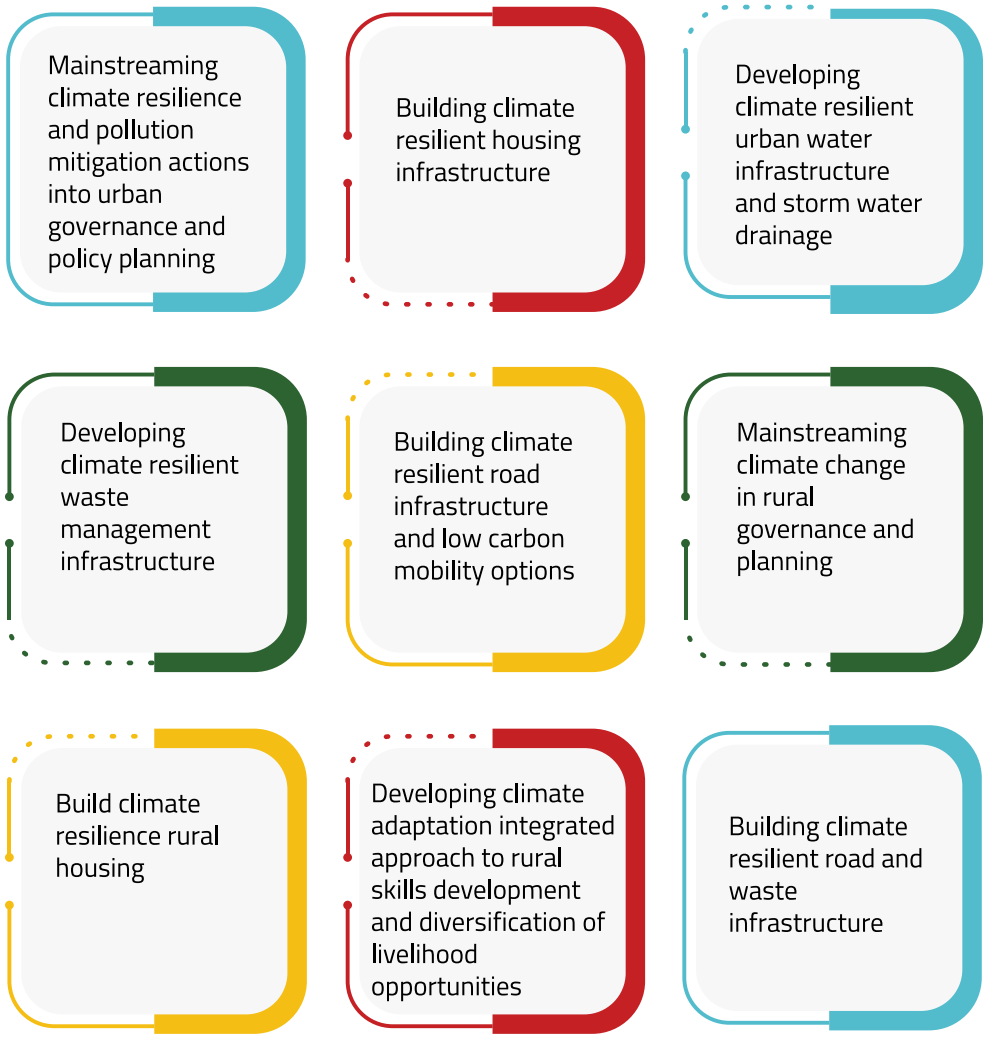


Figure 20: Strategies under the Sustainable Habitat Mission

For Strategy One of the Sustainable Habitat Mission, namely "Mainstreaming climate resilience and pollution mitigation actions into urban governance and policy planning", four indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. Percentage of households at risk to damage by wind, extreme rainfall and earthquakes
2. Access to basic amenities (safe drinking water, sanitation, and wastewater drainage)
3. No. of Nagar Panchayats developed as Adarsh Nagar Panchayats
4. Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted)

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Percentage of households at risk to damage by wind, extreme rainfall and earthquakes	0	1	1	1	3	High
2	Access to basic amenities (safe drinking water, sanitation and wastewater drainage)	1	1	1	1	4	High
3	No. of Nagar Panchayats developed as Adarsh Nagar Panchayats	0	1	1	1	3	High
4	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	0	1	1	1	3	High

Table 19a: Scoring Sheet for the Indicators of Strategy One of the Sustainable Habitat Mission

Therefore, in consultation with the line departments, all four indicators for the strategy were ranked as high. Table 19b presents the shortlisted indicators for Strategy One of the Sustainable Habitat Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1.	Percentage of households at risk to damage by wind, extreme rainfall and earthquakes	Revenue Department, SDMA, and Municipal Corporations	Seasonal
2.	Access to basic amenities (safe drinking water, sanitation and wastewater drainage)	Urban Development Department	Monthly
3	No. of Nagar Panchayats developed as Adarsh Nagar Panchayats	Urban Development Department	Annually
4	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	Urban Development Department	Annually

Table 19b : Shortlisted Indicators for Strategy One of the Sustainable Habitat Mission

The Human Health Mission

This mission has five strategies:

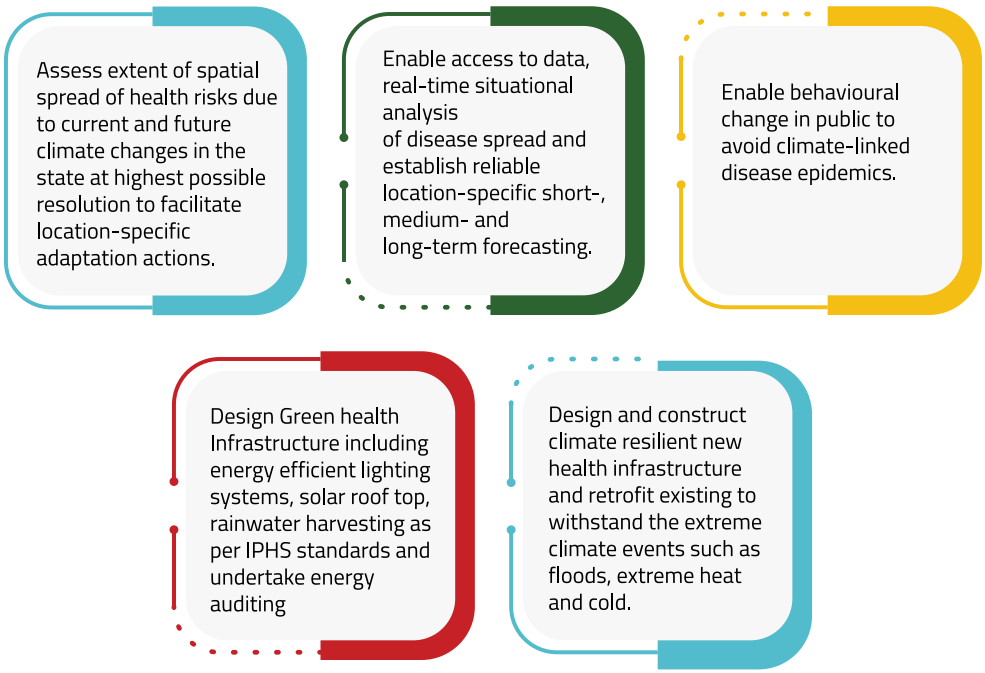


Figure 21: Strategies under the Human Health Mission

For Strategy One of the Human Health Mission, namely "Assess extent of spatial spread of health risks due to current and future climate change in the state at highest possible resolution to facilitate location specific adaptation actions", 16 indicators were shortlisted for and deliberated upon with relevant line departments. These indicators are:

1. Disease incidence (vector-borne)
2. Disease incidence (respiratory)
3. Disease incidence (water-borne)
4. Mortality due to Heat-related Illnesses (HRI)
5. Morbidity due to heat-related illnesses (HRI)
6. Prevalence of diarrhoea among children below 5 years of age
7. Prevalence of acute respiratory infection among children below 5 years of age
8. Anaemia prevalence among children aged 6-59 months
9. Anaemia prevalence among pregnant women
10. Anaemia in men (Age 15 - 49)
11. Anaemia in women (Age 15 - 49)
12. Percentage of children aged under 5 years who are underweight
13. Percentage of children under age 5 years who are stunted
14. Percentage of children under age 5 years who are wasted
15. Women whose BMI is below normal
16. Men whose BMI is below normal

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Disease incidence (vector borne)	1	1	1	1	4	High
2	Disease incidence (respiratory)	1	1	1	1	4	High
3	Disease incidence (water borne)	1	1	1	1	4	High
4	Mortality due to Heat Related Illnesses (HRI)	1	1	1	1	4	High
5	Morbidity due to heat related illnesses (HRI)	1	1	0	0	2	Medium
6	Prevalence of diarrhoea among children below 5 years of age	1	1	0	0	2	Medium
7	Prevalence of acute respiratory infection among children below 5 years of age	1	1	0	0	2	Medium
8	Anaemia prevalence among children aged 6-59 months	1	1	0	0	2	Medium
9	Anaemia prevalence among pregnant women	1	1	0	0	2	Medium
10	Anaemia in Men (Age 15 - 49)	1	1	0	0	2	Medium

Table 20a: Scoring Sheet for the Indicators of Strategy One of the Human Health Mission (Contd.)

11	Anaemia in Women (Age 15 - 49)	1	1	0	0	2	Medium
12	Percentage of children aged under 5 years who are underweight	1	1	0	0	2	Medium
13	Percentage of children under age 5 years who are stunted	1	1	0	0	2	Medium
14	Percentage of children under age 5 years who are wasted	1	1	0	0	2	Medium
15	Women whose BMI is below normal	1	1	0	0	2	Medium
16	Men whose BMI is below normal	1	1	0	0	2	Medium

Table 20a: Scoring Sheet for the Indicators of Strategy One of the Human Health Mission (Contd.)

Therefore, in consultation with the line departments, four indicators for the strategy were ranked as high and twelve indicators were ranked as medium. Table 20b presents the shortlisted indicators for Strategy One of the Human Health Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1	Disease incidence (vector borne)	Department of Health and Family Welfare	Monthly
2	Disease incidence (respiratory)	Department of Health and Family Welfare	Monthly
3	Disease incidence (water borne)	Department of Health and Family Welfare	Monthly

Table 20b: Shortlisted Indicators for Strategy One of the Human Health Mission

4	Mortality due to Heat Related Illnesses (HRI)	Department of Health and Family Welfare	Monthly
5	Morbidity due to HeatRelated Illnesses (HRI)	Department of Health and Family Welfare	Monthly
6	Prevalence of diarrhoea among children below 5 years of age	Department of Health and Family Welfare	Annual
7	Prevalence of acute respiratory infection among children below 5 years of age	Department of Health and Family Welfare	Annual
8	Anaemia prevalence among children aged 6-59 months	Department of Health and Family Welfare	Annual
9	Anaemia prevalence among pregnant women	Department of Health and Family Welfare	Annual
10	Anaemia in Men (Age 15 - 49)	Department of Health and Family Welfare	Annual
11	Anaemia in Women (Age 15 - 49)	Department of Health and Family Welfare	Annual
12	Percentage of children aged under 5 years who are underweight	Department of Health and Family Welfare	Annual
13	Percentage of children under age 5 years who are stunted	Department of Health and Family Welfare	Annual
14	Percentage of children under age 5 years who are wasted	Department of Health and Family Welfare	Annual
15	Women whose BMI is below normal	Department of Health and Family Welfare	Annual
16	Men whose BMI is below normal	Department of Health and Family Welfare	Annual

Table 20b: Shortlisted Indicators for Strategy One of the Human Health Mission (Contd.)

The Disaster Management Mission

This mission has two strategies:

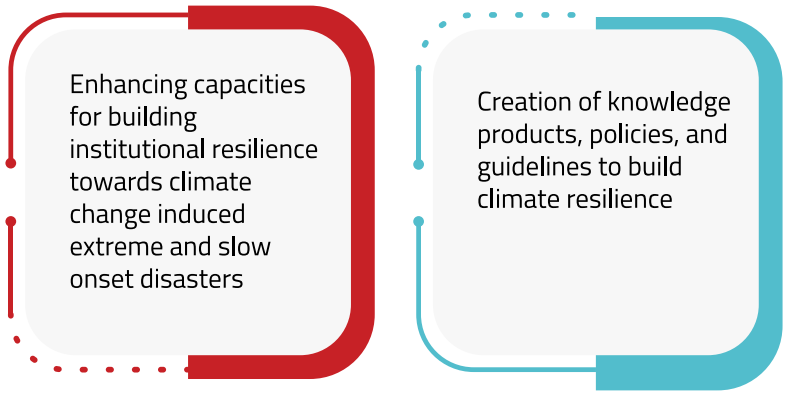


Figure 22 : Strategies under the Disaster Management Mission

For Strategy One of the Disaster Management Mission, namely "Enhancing capacities for building institutional resilience towards climate change induced extreme and slow onset disasters", 15 indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. Percentage of households at risk to damage by wind, extreme rainfall, and earthquakes
2. Number of human lives lost per crore population due to extreme weather events
3. Disaster preparedness score as per the Disaster Resilience Index
4. Risk assessment score as per the Disaster Resilience Index
5. Risk prevention and mitigation score as per the Disaster Resilience Index
6. Risk governance score as per the Disaster Resilience Index
7. Disaster reconstruction score as per the Disaster Resilience Index
8. Hazard risk index
9. Flood hazard area
10. Percentage area of river basins brought under integrated water resources management
11. Population affected
12. No. of cattle/livestock perished
13. Cropped area affected
14. Estimated value of damaged crops
15. Estimated value of damage to infrastructure

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Percentage of households at risk to damage by wind, extreme rainfall and earthquakes	0	1	1	1	3	High
2	No. of human lives lost per 1 crore population due to extreme weather events	1	1	1	0	2	Medium
3	Disaster preparedness score as per Disaster Resilience Index	0	1	1	1	3	High
4	Risk Assessment Score as per Disaster Resilience Index	0	1	1	1	3	High
5	Risk Prevention & Mitigation Score as per Disaster Resilience Index	1	1	1	1	4	High
6	Risk Governance Score as per Disaster Resilience Index	1	1	1	1	4	High
7	Disaster Reconstruction Score as per Disaster Resilience Index	0	1	1	1	3	High

Table 21a: Scoring Sheet for the Indicators of Strategy One of the Disaster Management Mission

8	Hazard Risk Index Flood	0	1	1	1	3	High
9	hazard area	0	1	1	0	2	Medium
10	Percentage area of river basins brought under integrated water resources management	1	1	1	0	3	High
11	Population affected	0	1	1	0	2	Medium
12	No. of cattle/livestock perished	0	1	1	0	2	Medium
13	Cropped area affected	0	1	1	0	2	Medium
14	Estimated value of damaged crops	1	1	1	0	3	High
15	Estimated value of damage to infrastructure	0	1	1	0	2	Medium

Table 21a: Scoring Sheet for the Indicators of Strategy One of the Disaster Management Mission (Contd.)

Therefore, in consultation with the line departments, seven indicators for the strategy were ranked as high and eight indicators were ranked as medium. Table 21b presents the shortlisted indicators for Strategy One of the Disaster Management Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1	Percentage of households at risk to damage by wind, extreme rainfall and earthquakes	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
2	No. of human lives lost per crore population due to extreme weather events	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
3	Disaster preparedness score as per the Disaster Resilience Index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
4	Risk assessment score as per the Disaster Resilience Index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
5	Risk prevention and mitigation score as per the Disaster Resilience Index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
6	Risk governance score as per the Disaster Resilience Index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
7	Disaster reconstruction score as per the Disaster Resilience Index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
8	Hazard risk index	Revenue Dept., UPSDMA, and Municipal Corporations	Seasonally
9	Flood hazard area	Remote Sensing Application Center (RSAC)	Seasonally
10	Percentage area of river basins brought under integrated water resources management	Irrigation Department	Seasonally
11	Population affected	Revenue Dept., UPSDMA	Seasonally + Real time
12	No. of cattle/livestock perished	Revenue Dept., UPSDMA	Seasonally + Real time
13	Cropped area affected	Revenue Dept., UPSDMA	Seasonally
14	Estimated value of damaged crops	Revenue Dept., UPSDMA	Seasonally
15	Estimated value of damage to infrastructure	Revenue Dept., UPSDMA	Seasonally

Table 21b: Shortlisted Indicators for Strategy One of the Disaster Management Mission

The Strategic Knowledge Mission

This mission has four strategies :

Figure 23 : Strategies under the Strategic Knowledge Mission

For Strategy One of the Strategic Knowledge Mission, namely "Building institutional capacity of CCA", six indicators were shortlisted and deliberated upon with relevant line departments. These indicators are:

1. Development of platform on climate change knowledge
2. No. of expert committees formed
3. No. of capacity building sessions conducted for UP CCA personnel
4. Executing cell established
5. No. of personnel recruited to strengthen human resources in the CCA
6. No. of institutions consolidated under climate change knowledge platform

Step 1: Each indicator was mapped to different data sources as discussed in the previous sections.

Step 2: The scores for each indicator were calculated using the scorecard mentioned below.

No.	Indicators	Mapping to More than One Strategy	Data Availability	Relevance to Strategy	Holistic Perspective	Total Score	Rank
1	Development of platform on climate change knowledge	1	1	0	1	3	High
2	No. of expert committees formed	0	1	1	0	2	Medium
3	No. of capacity building sessions conducted for UP CCA personnel	0	1	1	0	2	Medium
4	Executing cell established	0	1	1	0	2	Medium
5	No. of personnel recruited to strengthen human resources in the CCA	0	1	1	0	2	Medium

Table 22a: Scoring Sheet for the Indicators of Strategy One of the Strategic Knowledge Mission

Therefore, in consultation with the line departments, one indicator for the strategy was ranked as high and four indicators were ranked as medium. Table 22b presents the shortlisted indicators for Strategy One of the Strategic Knowledge Mission along with the department responsible for collating data and the periodicity at which data can be collected.

Step 3: The periodicity and the responsible authority of all the indicators were validated with the line departments.

No.	Mission	Responsibility	Periodicity
1	Development of platform on climate change knowledge	DoEFCC	Annual
2	No. of expert committees formed	DoEFCC	Annual
3	No. of capacity building sessions conducted for UP CCA personnel	DoEFCC	Annual
4	Executing cell established	DoEFCC	Annual
5	No. of personnel recruited to strengthen human resources in the CCA	DoEFCC	Annual

Table 22b: Shortlisted Indicators for Strategy One of the Strategic Knowledge Mission

Step 4: Reviewing and Finalizing Mission- level Indicators

After the consultation with the line departments, feedback received was assimilated. It was realized that there were indicators across all the missions that needed further follow-up. To address these gaps and finalize the mission-level indicators, further one-to-one consultations with relevant government departments were conducted. For instance, the team met officials from the Department of Health and Family Welfare, UP Technical Support Unit (TSU), Banker's Institute of Rural Development (BIRD), and UP Biodiversity Board. After these one-on-one discussions, the following strategy was adopted:

- Indicators for which data was not being collected or collated and/or was not relevant to the strategy or mission were removed from the list. For instance, water productivity from the Jal Mission and malnutrition- and anaemia-related indicators in the Human Health Mission were removed.
- Line department officials suggested rephrasing some indicators for which data was being collected from existing data systems. For instance, in the Jal Mission, the groundwater restoration indicator was changed to two separate indicators: annual groundwater extraction and annual groundwater restoration.
- Some suggestions were made to add new SMART indicators for which data was available; it was felt that such indicators could be better parameters for monitoring progress towards 2030 targets. The Strategic Knowledge Mission had mostly new indicators that seemed more relevant to monitor progress across the mission. The number of research studies conducted that are aligned to the climate action plan at the state level and the number of district knowledge centres established are examples of such indicators.

After post-discussion assessment of the indicators and a thorough clean-up of the M&E frameworks for all missions, the indicators were applied to the scorecard system (explained earlier) and tested against the following criteria:

- Data availability
- Relevance to strategy
- Mapping to more than one strategy
- Holistic perspective

Indicators that had a total score of 3 or 4 across the four criteria mentioned above were ranked as high priority, a total score of 2 was ranked as medium' priority, and a score of 0 or 1 was ranked as low priority. Indicators that were categorized as high priority were considered for the final list of mission-level indicators. However, in some missions, the team also considered indicators that were ranked as medium priority because of a lack of high-priority indicators mapped to the strategies.

The finalized list of indictors for the M&E framework for all the eight missions are presented in the tables below. (For the detailed operationalized M&E framework of each mission, please refer to the respective booklets.)

Blue text: Vulnerability indicators (from SAPCC)
Pink Text: These indicators are not from any current scheme since they are part of an action point, which is a recommendation for something that needs to happen in future.
Brown Text: Indicators from NITI Aayog SDG Index 2020
Green text: Dashboards and Reports

S. No	Indicators(20)	Mapping to Strategy
1	No. of Agro-automatic weather stations established	1,3
2	No. of farmers accessing the knowledge based decision support system	1
3	No. of fishermen benefitted under Centrally Sponsored Scheme on "Fisheries Training and Extension"	2
4	No. of exposure visits on CRPs/CSA	2
5	Establishment of climate smart centres	2
6	No. of stakeholders trained (Govt. officials, NGO staff, BODs and CEOs of FPOs, SHG member, Bankers)	2
7	Area under Drip irrigation under PMKSY	3,4
8	Area under Sprinkler irrigation under PMKSY	3,4
9	No. of farmers using Post harvest technology practices	3
10	Area under Stress Tolerant Varieties (STVs)	3,4
11	Production of Horticulture crops	3
12	No. of FPOs availed loans under Atmanirbhar Kisan Integrated Development Scheme /Atma Nirbhar Krishak development	3
13	Total area under organic farming	3
14	Total number of farmers issued Soil Health Card	3
15	No. of irrigation and drainage systems modernized	4
16	Gross Area Under Irrigation by Sources	4
17	No. of water user associations (WUA)* formed	4
18	No. of farmers availed claims under PM-Fasal Bima Yojana/ RWBCIS	5
19	Crop insurance coverage	5
20	Crop (major cereals) yield variability (Coefficient of variation)	5

Table 23 : Indicators for the Sustainable Agriculture Mission

S. No	Indicators(11)	Mapping to Strategy
1	Annual groundwater recharge	1,3,4
2	Annual groundwater extraction	1,3,4
3	No. of recharge structures	1,2,3,4
4	No. of GPs that have implemented their water budgets	1
5	No. of Gram Panchayat Development Plans (GPDP) that have incorporated water management	1
6	Percentage groundwater withdrawal against availability (N-SDG & UP SDG)	3,4
7	Total state area brought under micro irrigation	3
8	No. of farmers implementing micro-irrigation practices	3
9	Proportion of planned institutional and commercial buildings in urban areas with roof top rainwater harvesting system	3
10	No. of wells with functioning meters for monitoring groundwater level (observation wells), volumetric water use or energy use	3,4
11	Percentage of blocks/mandals/taluka over-exploited (N-SDG & UP-SDG)	4

Table 24: Indicators for the Jal Mission

S. No	Indicators(8)	Mapping to Strategy
1	Tree cover as a percentage of the total geographical area	1
2	Carbon stock stored in forest area	1
3	Area under very dense forest as a percentage of the total forest area	1
4	Area of wetlands inside the forest	4
5	Establishment of climate smart centres	4
6	No. of wetlands notified under Wetlands (Conservation and Management Rules) 2017	4
7	Red list index	5
8	Protected area as percentage of total geographical area/ forest area	5

Table 25: Indicators for the Green UP Mission

Blue text: Vulnerability indicators (from SAPCC)
Pink Text: These indicators are not from any current scheme since they are part of an action point, which is a recommendation for something that needs to happen in future.
Brown Text: Indicators from NITI Aayog SDG Index 2020
Green text: Dashboards and Reports

S. No	Indicators(13)	Mapping to Strategy
1	AT&C Loss	1
2	ACS - ARR Gap	1
3	Percentage of metered connections	1
4	Solar pumping capacity installed	1,4
5	No. of technicians trained	2
6	No. of technicians trained	3
7	Grid-connected solar power generated	5
8	RE grid capacity set under PM-KUSUM	5
9	Decentralised off-grid renewable energy systems/devices in both rural and urban areas	5
10	Commissioned/ Installed off-grid capacity	5
11	Renewable energy share in the total installed electricity generation	5
12	No. of electric vehicles registered	6
13	No. of charging points on highways and in public places (residential towns, petrol stations, and railway and bus terminals)	6

Table 26: Indicators for the Energy Efficiency and Green Energy Mission

S. No	Indicators(16)	Mapping to Strategy
1	Percentage of households at risk to damage by wind, extreme rainfall, and earthquakes	1
2	Access to basic amenities (safe drinking water, sanitation, and wastewater drainage)	1,2,3
3	Population density	2
4	No. of rooftop water harvesting structures in U.P	2,3
5	Percentage of urban households with drainage facility	3
6	No. of municipal corporations banning single-use plastic	4
7	No. of EVs rolled out	5
8	Total registered motor vehicles in million-plus cities	5
9	**No. of training programmes conducted for PRIs at block level (for ODF_plus activities)**	6
10	**No. of model ODF-plus villages that are declared and verified**	6

Table 27: Indicators for the Sustainable Habitat Mission

Blue text: Vulnerability indicators (from SAPCC)
Pink Text: These indicators are not from any current scheme since they are part of an action point, which is a recommendation for something that needs to happen in future.
Brown Text: Indicators from NITI Aayog SDG Index 2020
Green text: Dashboards and Reports

S. No	Indicators(8)	Mapping to Strategy
1	Disease incidence (vector borne) · Malaria · Dengue · Leptospirosis · Scrub Typhus	1,2
2	Disease incidence (respiratory)	1,2
3	Disease incidence (water borne) · Cholera · Diarrhoea · Typhoid	1,2
4	Mortality due to Heat Related Illnesses (HRI)	1,2
5	Mortality due to cold wave	1,2
6	Percentage of households aware about protection from heat waves	3
7	Percentage of households aware about sources of vector borne diseases	3
8	Percentage of households adopting hand washing practices (water borne diseases)	3

Table 28: Indicators for the Human Health Mission

S. No	Indicators(13)	Mapping to Strategy
1	Disaster preparedness score as per Disaster Resilience Index	1
2	Risk Prevention & Mitigation Score as per Disaster Resilience Index	1
3	Hazard Risk Index	1
4	No. of human lives lost per 1 crore population due to extreme weather events	1
5	Population affected	1
6	No. of cattle/livestock perished	1
7	Cropped area affected	1
8	Estimated value of damaged crops	1
9	Estimated value of damage to infrastructure	1
10	No. of IEC material developed	2
11	No. of early warning information disseminated	2
12	No. of trainings conducted for government officials	2
13	No. of Aapda Mitras Trained	2

Table 29: Indicators for the Disaster Management Mission

Blue text: Vulnerability indicators (from SAPCC)
Pink Text: These indicators are not from any current scheme since they are part of an action point, which is a recommendation for something that needs to happen in future.
Brown Text: Indicators from NITI Aayog SDG Index 2020
Green text: Dashboards and Reports

S. No	Indicators(7)	Mapping to Strategy
1	No. of climate action plans developed at the district level	1
2	No. of research studies conducted that are aligned to the climate action plan at the state level	1
3	No. of impact studies conducted that are aligned to the climate action plan at the state level	1
4	No. of district knowledge centres established	2
5	No. of GPs where climate interventions are integrated with the GPDP	3
6	No. of stakeholders trained on climate action at the state and district level	3
7	No. of women trainers trained related to climate action	3

Table 30: Indicators for the Strategic Knowledge Mission

WAY FORWARD

There is a dearth of well-established standard M&E frameworks to monitor climate change adaptation and mitigation activities globally.

While many such standard ready-to-adopt frameworks and methodologies are available for the various development interventions, it is a challenge in the field of climate change. Some existing frameworks include the UNDP's M&E Framework9, the Adaptation Measurement Implementation Framework, and the Tracking Adaptation and Measuring Development (TAMD) Framework developed by the International Institute for Environment and Development10. In most cases, either these M&E frameworks need to be significantly adapted or developed from scratch.

In the Indian context, while most states have drafted their respective SAPCCs, only few of them have revised the SAPCC based on the recent international climate commitments that India has pledged. Moreover, there is a dearth of operational M&E frameworks across the country that tracks the progress of the SAPCC activities against its 2030 target.

Uttar Pradesh has been instrumental in bridging this gap by envisioning an acceptable, dynamic M&E framework viable across all missions, covering both adaptation and mitigation focus. This framework has been developed with extensive involvement of the implementing partners, and will be operationalized soon.

One of the challenges of developing an M&E framework for climate change is that the effects of climate change adaptation and mitigation actions take a considerable amount of time to be visible. Timeframes of expected benefits of climate actions are longer and might outlast the time span of schemes, programmes, and projects that implement the targeted actions. In addition, outcomes cannot be directly attributed to projects or actions.
The developed M&E framework has some limitations due to the approach adopted. This approach, as mentioned earlier, is based only on existing government schemes and programmes. It is acknowledged that there is a lack of clarity on the timeline and continuity of identified schemes and programmes. Some schemes might end earlier, get subsumed, or be renamed into some other scheme. Hence, the framework needs to be adaptive and accommodate this dynamic nature of the schemes.

Climate actions are inherently complex as they require interventions across sectors, departments, and levels. This adds to the ambiguity in data responsibility. The DoEFCC is pioneering the development of this M&E framework. However, to operationalize the framework, there needs to be political will and participation from all the relevant departments across the eight missions of the UPSAPCC.

Lack of existing M&E frameworks, the long time span it takes to show any visible impacts of climate actions, the dynamic nature of schemes, and getting implementation partners on board to implement the M&E framework are some critical challenges that we identified during the framework development process.

To address the challenges and limitations mentioned above, the M&E framework was developed from scratch after various rounds of deliberations and consultations, both one-on-one and in collective workshop format with the implementation partners. The approach developed organically during these discussions. The finalized indicators went through a rigorous process of verification with the implementing partners and were finalised in agreement with them. To ensure the development of a robust implementable M&E framework, it was decided to keep the framework dynamic. This will also require active coordination among the implementing partners in sharing data, which will be fed into the MIS once it is developed.
This M&E framework will be useful only when a user-friendly MIS is developed based on this blueprint, which can fetch data from the various implementing partners at the periodicity defined on the portal and subsequently provide easy access to the DoEFCC. This will ensure that the DoEFCC takes cognizance of the current status with respect to each activity listed in the SAPCC and further track progress towards achieving their 2030 targets.

9. Quang, V. D. D., & Huong, H. T. L. (2020). Development of a framework for climate change adaptation actions' effectiveness evaluation. Vietnam Journal of Hydrometeorology. http://vnjhm.vn/data/article/1053/5.%20Proofreading.pdf
10. Brooks, N., Anderson, S., Burton, I., Fisher, S., Rai, N., & Tellam, I. (2013). An operational framework for Tracking Adaptation and Measuring Development (TAMD). IIED. https://www.iied.org/sites/default/files/pdfs/migrate/10038IIED.pdf

Recommendations

Some recommendations to ensure the smooth implementation of the MIS include:

- In the long term, the goal should be to implement a centralized data system that will eventually allow all implementing partners to exchange data without any hassles.
- Coordination between the implementing partners regarding data sharing is of utmost importance for the framework to be operational.
- Each mission-relevant implementing partner should assign a nodal officer to ensure data for the finalized SAPCC indicators gets updated at the suggested periodicity.
- The framework has been kept dynamic to ensure that new indicators that appear to be critical can be incorporated at a later stage.
- Indicators presented in the M&E framework are adopted from existing government schemes and programmes. Due to the volatile nature of the schemes and the time taken for the effects of climate change to be visible, the data availability for these indicators might change in future. Hence, indicators should be reviewed periodically via a consultative process.

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