

FROM GLOBAL TO LOCAL

CLIMATE ACTION ON THE GROUND

Learnings from Karnataka's State Action Plan on Climate Change



CEE

Centre for Environment Education

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The accuracy and authenticity of secondary research and data cited in this study are the responsibility of the respective sources. Certain aspects of the Karnataka State Action Plan on Climate Change (KSAPCC) related to agriculture and water fall outside the scope of this study and are therefore not addressed.

While every effort has been made to ensure accuracy in research, compilation, editing, and review, the information provided is not guaranteed to be error-free. The content may be used for non-commercial educational purposes, provided due credit is given to the authors.

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Their collective efforts, insights, and leadership have been integral in bringing this publication to fruition. We sincerely thank them for their dedication and contributions to advancing the cause of sustainable development.

Rejini Simpson

Preface



Shri Kartikeya V. Sarabhai
Director
Centre For Environment Education

The Centre for Environment Education (CEE) has long been a pioneer in promoting sustainability and environmental stewardship. With its diverse initiatives, CEE has worked tirelessly to integrate sustainability principles into education, community development, and policymaking. Its efforts reflect a commitment to addressing the pressing challenges of climate change while empowering communities and institutions to take collective action for a resilient future.

At the global level, the urgency of combating climate change has United Nations, organizations, and individuals working together under frameworks like the Paris Agreement. These efforts highlight the importance of collective responsibility in mitigating climate impacts. CEE aligns with these global imperatives through localized initiatives, demonstrating that solutions rooted in local contexts are essential to achieving global sustainability goals.

A key component of effective climate action is the multi-stakeholder approach. Recognizing the interconnected nature of climate issues, CEE actively engages with governments, civil society, academia, and local communities to co-create solutions. This collaborative model ensures that

actions are inclusive, impactful, and tailored to the needs of all stakeholders, fostering greater accountability and effectiveness in addressing the climate crisis.

Education and awareness form the cornerstone of CEE's interventions. By promoting climate literacy and building capacity at all levels, CEE equips individuals and communities with the knowledge and skills needed to address climate challenges. From schools to grassroots communities, its programs inspire and empower people to make informed decisions and take action for sustainable living.

In Karnataka, the Karnataka State Action Plan on Climate Change (KSAPCC) represents a critical framework for addressing climate impacts, particularly in key sectors like water and agriculture. The partnership between CEE, HSS India, and EMPRI has been instrumental in strengthening the effective implementation of climate action across the state. Their collaboration has brought innovative tools like the KSAPCC Monitoring Dashboard to life, enabling real-time tracking and

evaluation of climate initiatives.

This book is a testament to these collective efforts. It delves into the importance of sub-national policies in tackling climate change, sharing valuable insights and lessons from Karnataka's experience. By showcasing the role of stakeholder engagement and robust monitoring and evaluation mechanisms, this book provides a roadmap for replicating and scaling effective climate strategies, not just in Karnataka but globally.

As we navigate the complexities of the climate crisis, CEE's unwavering commitment to sustainability, through education, collaboration, and localized climate action, has made a profound impact on both local and global climate efforts. This work continues to inspire and empower communities to drive meaningful change for a sustainable future.

December 18, 2024



Shri Kartikeya V. Sarabhai
Bengaluru

Foreword



Shri B P Ravi, IFS
Director General
Environmental Management And
Policy Research Institute
Government Of Karnataka

Karnataka, a state of rich biodiversity and dynamic landscapes, faces growing environmental challenges due to climate change. The Karnataka State Climate Profile (KSCP) serves as a vital tool in understanding the state's climate trends, vulnerabilities, and opportunities. By identifying key regional impacts and potential mitigation strategies, it lays the groundwork for more effective climate action in the state, ensuring a sustainable future for generations to come.

The Karnataka State Action Plan on Climate Change (KSAPCC) is an essential framework for addressing these challenges. Environmental Management and Policy Research Institute (EMPRI) has played a pivotal role in the development of the KSAPCC, collaborating with various stakeholders to create a comprehensive roadmap for climate action across multiple sectors. This includes sustainable development, water resources, agriculture, health, and energy.

EMPRI's expertise has been instrumental in ensuring that the KSAPCC is scientifically robust, inclusive, and actionable. Through extensive research, data analysis, and consultation with experts, the institute has provided critical support in formulating sector-

specific policies that respond to Karnataka's unique climate challenges.

The partnership between Centre for Environment Education (CEE) and Hanns-Seidel-Stiftung (HSS) India with EMPRI has been a cornerstone of the effort to strengthen the implementation of climate action across the state. Together, they have worked tirelessly to promote climate resilience, enhance capacity building, and foster community involvement in the state's climate action initiatives.

The synergy between these organizations has resulted in the development of the KSAPCC Monitoring Dashboard, a tool designed to track, evaluate, and amplify climate actions at the subnational level. This tool is a testament to the power of collaboration and will play a crucial role in ensuring that Karnataka's climate goals are met effectively and efficiently.

This book, highlights how sub-national policies, supported by effective stakeholder engagement and monitoring systems, can

mitigate climate impacts and serve as models for other regions. The learnings from Karnataka's SPACC offer a roadmap for policymakers, community leaders, and businesses to collaborate on climate resilience. By showcasing best practices and multi-stakeholder approaches, the book emphasizes the importance of local actions in achieving broader climate goals.

As we move forward, the continued partnership between EMPRI, CEE, and HSS India will remain vital in driving Karnataka's climate action agenda. Together, we are working towards a future where sustainable development and climate resilience go hand in hand, ensuring the long-term wellbeing of both the people and the environment of Karnataka.

December 18, 2024



Shri BPRavi, IFS
Bengaluru

Message



Ms. Judith Weinberger-Singh
Resident Representative
Hanns Seidel Foundation (HSF)
India

I am delighted to see the release of the book, titled “The Role of Subnational Policies in Meeting the Climate Change Challenge – Learnings from Karnataka’s SPACC”. The book draws on the empirical learnings of the HSF-CEE’s joint project from 2021 to 2023 in Karnataka and its direct outputs, especially the working papers and policy briefs. It offers deep insights into the climate change challenges and throws lights on knowledge generation, capacity building, institutional and multi-stakeholders engagement, inclusive and participatory approaches, and role of international cooperation in localising climate action.

The state of Karnataka has achieved remarkable progress when it comes to localising its climate policies. Though the state faces multi-faceted, extreme climate events from droughts to floods, it has been adopting innovative strategies and sustainable solutions to tackle the fast-unfolding climate vagaries in the state. Through the HSF-CEE’s joint partnership together with the immense institutional support of Environmental Management & Policy Research Institute (EMPRI), Government of Karnataka, the aforementioned three-year project contributed to the government’s efforts to bridge the knowledge gaps, enhance

policy efficacy and foster collaboration among state and non-state actors, from village to state, to effectively address the multidimensional climate challenges facing the state.

Our project intervention squarely focused on the critical intersection of the water and agricultural sector. This area offers significant opportunities for learning and intervention in view of the current and future challenges posed by climate change, involving multiple stakeholders and demonstrating the potential impact of effective subnational policies.

On behalf of the Hanns Seidel Foundation India, I extend my heartfelt congratulations to the leadership and project team of CEE on the launch of this significant publication. I am confident that the book will serve as a guiding document for the larger policy community, academia and civil society. It will undoubtedly inspire greater collaboration at national and international levels on this vital issue where India and Germany / the European Union continue to collaborate across

various fields as strategic partners.

December 17, 2024



Ms. Judith Weinberger-Singh
Bengaluru

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Abbreviations

ADB	Asian Development Bank
ATMA	Agricultural Technology Management Agency
ATREE's	Ashoka Trust for Research in Ecology and the Environment
COP	Conference of Parties
CSD	Centre for Sustainable Development
CSOs	Civil Society Organisations
DFID	Department for International Development
EMPRI	Environmental Management & Policy Research Institute
ENSYDE	Environmental Synergies in Development
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GIM	National Mission for a Green India
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
Gol	Government of India
G2G	Government to Government
ICRIER	Indian Council for Research on International Economic Relations
ICT	Information and Communications Technology
INDCs	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
KfW	Kreditanstalt für Wiederaufbau
KII	Key Informant Interviews
KISWRMIP	Karnataka Integrated Sustainable Water Resources Management & Investment Program
KMEA	Karnataka Monitoring and Evaluation Authority
KSAPCC	Karnataka State Action Plan on Climate Change
KSNDMC	Karnataka State Natural Disaster Monitoring Centre
KVKs	Krishi Vigyan Kendra's
LTS	Long-term Strategies
M&E	Monitoring and Evaluation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoEFCC	Ministry of Environment, Forest and Climate Change
NABARD	National Bank for Agriculture and Rural Development
NAPCC	National Action Plan of Climate Change
NAPs	National Adaptation Plans
NDC	Nationally Determined Contributions
NGOs	Non-Governmental Organizations
NMEEE	National Mission for Enhanced Energy Efficiency
NMSA	National Mission for Sustainable Agriculture
NMSHE	National Mission for Sustaining the Himalayan Ecosystem
NMSH	National Mission on Sustainable Habitat
NMSKCC	National Mission on Strategic Knowledge for Climate Change
NSM	National Solar Mission
NWM	National Water Mission

RWH	Rainwater Harvesting
SAPCC	State Action Plans on Climate Change
SDC	Swiss Agency for Cooperation and Development
SDGs	Sustainable Development Goals
TERI	The Energy and Resources Institute
TREND	Trust for Rejuvenation of Environment and Nature Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN	United Nation
WUCS	Water User Cooperative Societies



1

Introduction

Climate change is one of the most pressing challenges of our time, demanding urgent and sustained action across every level of society. Its impacts ripple across ecosystems, economies, and societies, transcending borders and sectors. As the global community grapples with this multifaceted crisis, it becomes increasingly clear that effective action requires not just top-down policy frameworks but also ground-level engagement and cross-sectoral collaboration. The Karnataka State Action Plan on Climate Change (KSAPCC) is a testament to such an approach, designed to address the state's unique climate challenges through strategic, localized action. At the heart of its implementation lies a vision for sustainable agriculture and integrated water resource management—two pillars critical for the well-being of millions in Karnataka and beyond.

The Centre for Environment Education (CEE), in partnership with the Hanns Seidel Stiftung (HSS), India, recognized the importance of strengthening multi-stakeholder approaches for the KSAPCC's effective implementation. This book provides a detailed account of the ongoing efforts, lessons, and outcomes from this initiative. Focusing on building capacity,

improving monitoring systems, and facilitating multi-sectoral engagement, CEE has been working on aligning local climate actions with broader national and international climate commitments.

In 2021, CEE conducted an in-depth qualitative study on the KSAPCC's implementation, which marked the first of several of its efforts to bridge policy with practice. The findings highlighted significant opportunities to enhance policy effectiveness, particularly in the areas of sustainable agriculture and water resource management. These two sectors, which are central to the state's economy and food security, are also the most vulnerable to climate risks such as erratic rainfall, droughts, and floods. Thus, building resilience in these areas was not just a matter of policy adjustment but of ensuring the future sustainability of Karnataka's agrarian communities.

The study's insights informed the development of a Policy Brief in 2022, which laid out practical solutions to strengthen the local implementation of the KSAPCC. By emphasizing the efficient use of water resources and promoting sustainable agricultural practices, the Policy Brief offered actionable recommendations to improve climate resilience in the state's

most vulnerable sectors. This document served as a critical tool for stakeholders, from government agencies to civil society organizations, providing a roadmap for implementing the KSAPCC at the grassroots level.

The Centre for Environment Education (CEE) engaged stakeholders for the policy brief by adopting a consultative, inclusive approach at the district level. Representatives from local self-governments, line departments, academia, and farmer communities were involved in brainstorming sessions to identify locale-specific climate risks and prioritize solutions. This collaborative method helped establish a cross-sectoral working group to align district-level actions with the Karnataka State Action Plan on Climate Change (KSAPCC), ensuring stakeholder buy-in through shared ownership and actionable roadmaps.

In continuation of this work, CEE conducted another exercise in 2022, focusing on the linkages between the National Action Plan on Climate Change (NAPCC) and the KSAPCC. This effort shed light on how aligning

state policies with national missions, particularly those focused on water and agriculture, can streamline implementation and improve outcomes. The study identified existing gaps in communication and coordination, providing a foundation for greater policy coherence across governance levels.

In 2023, CEE expanded its focus by exploring the role of Non-Governmental Organisations (NGOs) in supporting climate action at the local level. NGOs often serve as bridges between communities and policy frameworks, translating high-level strategies into tangible, community-based actions. The study on “Engaging Non-Governmental Organisations in KSAPCC Localisation in the Water and Agriculture Sectors” emphasized the importance of multi-stakeholder collaboration, transparency, and accountability. Through real-world case studies, it demonstrated how the inclusion of NGOs in climate governance can enhance public awareness, foster joint action, and improve decision-making processes at the state level.



In 2023, CEE, in its study, identified the need for a robust, unified monitoring system to provide real-time updates on the progress of KSAPCC implementation, enabling course corrections and improved decision-making. CEE's teamwork identified the gap and suggested the dashboard element for the web design and layout, enhancing the usability and effectiveness of the proposed system. Perhaps one of the most significant contributions of CEE's ongoing work has been the development of a comprehensive monitoring and evaluation framework for the KSAPCC. With the support of HSS India, CEE proposed a G2G (government-to-government) e-governance monitoring system, aimed at tracking real-time progress in KSAPCC implementation. This system, which requires inter-departmental coordination, enables the visualization of outlay spending, outputs, and outcomes, providing government officials with the data needed to make informed decisions. By integrating such a system, Karnataka can ensure that its climate actions are not only on track but also contributing effectively to the larger goals of the Nationally Determined Contributions (NDCs) under the Paris Agreement, driving impactful climate governance.

As the project moves forward in 2024, CEE is working closely with the Government of Karnataka to further refine and enhance the monitoring system. Key to this effort is capacity building ensuring that government officials are equipped with the knowledge and tools necessary to manage and implement the monitoring

tasks effectively. Through workshops, training modules, and continuous engagement, CEE is helping to build a robust institutional framework that supports not only the implementation but also the long-term success of the KSAPCC.

In the broader context of climate governance, the Union Ministry of Environment, Forest & Climate Change's (MoEF&CC) mandate for revising SAPCCs, particularly the 10th principle calling for an institutional mechanism for stakeholder engagement, inclusivity, and capacity building, underscores the importance of CEE's work. By focusing on these core elements—multi-stakeholder collaboration, transparency, monitoring, and capacity building—CEE's efforts are aligned with the national guidelines, ensuring that Karnataka's climate policies contribute meaningfully to India's overall climate goals.

This document is intended as a key resource for policymakers, practitioners, and researchers alike. It encapsulates the lessons learned, the challenges faced, and the successes achieved in enhancing the implementation of the KSAPCC. More importantly, it serves as a blueprint for how multi-stakeholder approaches can drive climate action, not only in Karnataka but in other states and regions as well. The work outlined here is a reminder that climate change cannot be addressed in isolation; it requires the concerted efforts of governments, civil society, and communities, working together toward a shared vision of a sustainable future.



2

Climate Change and its impact

Human activity is causing the climate emergency, propelling it forward at an unprecedented pace with effects manifesting globally. Since the industrial revolution, anthropogenic actions such as the burning of fossil fuels have caused a notable increase in the intensity and frequency of extreme weather events like heat waves, cyclones, and heavy rainfall along the globe. As greenhouse gas emissions continue to rise, further warming and major alterations to Earth's climate system are inevitable, heightening the risk of severe and irreversible impacts on both humanity and ecosystems. Consequently, climate change stands as one of the most pressing and complex challenges faced by our planet today. From shifting weather patterns that threaten food security, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. In order to prevent unmanageable climate risks, it is critical to take decisive steps to reduce global greenhouse gas emissions.

Global Policy

Assessment reports by the Intergovernmental Panel on Climate Change (IPCC) highlight the fact that the primary impact of climate change will be felt by agrarian-based, environmen-

tally vulnerable economies in the global south due to their higher exposure to stronger climate impacts and lower climate resilience. This category predominantly includes developing and emerging nations, characterized by limited adaptive capabilities stemming from inadequate infrastructure, lower levels of education and income and other constraints. Moreover, the slower response mechanisms of these countries tend to exacerbate their inherent vulnerabilities. With reduced resilience, these nations face the added challenge of balancing development needs and economic advancement for their sizable populations, further heightening their susceptibility to climate-related risks. The widespread and rapid climatic changes happening in terms of extreme heat waves and prolonged droughts pose increasing threats to an ecologically sensitive, developing, and agrarian economy like India. They not only affect survival and livelihood of the rural agrarian population but also are potent threats to food security and economic growth in the future.

Climate policy requires planning and action for implementation at a global, national, subnational, and local level. The mode of achieving rapid and sustainable climate action on mitigation and adaptation is through

science-based targets, realistic and participative implementation and monitoring as highlighted by UNEP.

Need for Policy Response at the Country Level

In this regard, India has developed its policy response through missions and programmes to reduce its climate vulnerability and to reduce greenhouse gas emissions while keeping economic growth in view. The Prime Minister's Council on Climate Change was constituted in 2007, in order to co-ordinate the National Action for Assessment, Adaptation and Mitigation of Climate Change. The National Action Plan of Climate Change (NAPCC) was released by the Prime Minister in June 2008. Under the NAPCC, with the approval of PM's Council on Climate Change, eight national missions covering mitigation, adaptation and knowledge building are being implemented.

India's national climate policy like those of other countries, is influenced by the demands of international climate policy. India actively engages in international climate negotiations, while also taking into account domestic factors that play a role in the implementation of initiatives to mitigate greenhouse gas emissions and build resilience to climate change effects, particularly in vulnerable sectors like agriculture and water management.

National Action Plan on Climate Change

India was among the world's first countries to propose a comprehensive policy instrument to mitigate climate change and adapt to its impacts in the form of the National Action Plan on Climate Change (NAPCC), released on 30th June 2008. The plan sets out the pursuit of development goals that

offer growth with long-term 'climate change co-benefits'. It is a national strategy of eight climate change submissions to help adapt and magnify ecological sustainability in India's development path. As such, NAPCC includes mitigation and adaptation approaches with its eight missions:

National Action Plan on Climate Change

8 missions to address climate change concerns & promote sustainable development

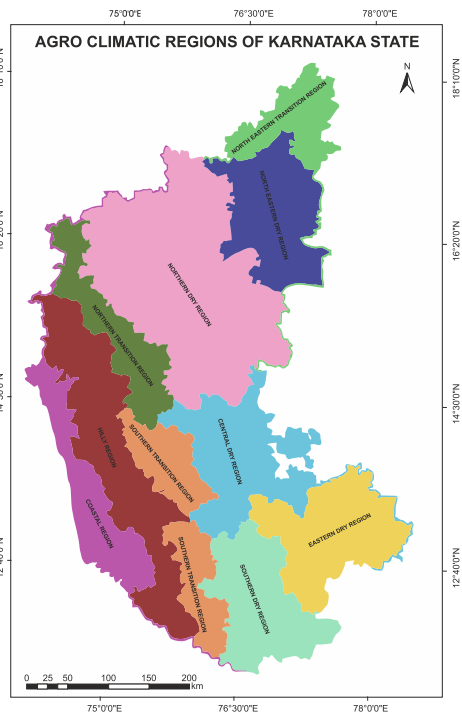


These eight national missions partly build upon earlier initiatives – such as the solar mission – and form the core of the NAPCC, which represent multi-pronged, long term and integrated strategies for achieving key goals in climate change. This approach served as the blueprint for India's Intended National Determined Contribution (see below), which was the key document for India's support to the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC).

In international climate policy, the phenomenon of climate change has been acknowledged since the first assessment report by the Intergovernmental Panel on Climate Change (IPCC) in 1990. Negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) have resulted in two key international treaties: the Kyoto Protocol (1997) and the Paris Agreement (2015). The Paris Agreement marks a pivotal shift by

prioritizing climate change adaptation alongside mitigation efforts. One of the key factors for the success of the comprehensive Paris Agreement was the task given to all countries to develop the Intended Nationally Determined Contributions (INDCs). These are national climate plans—for India, an update of its NAPCC. Since Paris, countries regularly update their NDCs on mitigation and adaptation actions, supported by financial provisions or requirements, and resubmit them to the UNFCCC. Every five years, the global stocktake assesses the progress made towards the long-term global goals of the Paris Agreement: a) limiting global temperature rise “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”, b) “foster climate resilience” and c) “making finance flows consistent” with a) and b). The first global stocktake of 2023 and IPCC (Assessment Report 6), its primer source of information in this regard, concludes that the goal of limiting global warming to 1.5°C is still in reach if the urgent actions are taken. The second global stocktake is scheduled for 2028, when India offered to host the annual climate talks (COP33).

India submitted its (I) NDC on 2nd October 2015. The plan included eight goals, three of which have quantitative mitigation targets for 2030, namely to achieve a cumulative installed electricity capacity from non-fossil sources of 40 per cent, to reduce the emissions intensity of GDP by 33 to 35 per cent compared to 2005 levels, and to create an additional 2.5 to 3 billion tonnes of carbon sinks. On 3 August 2022, the Union Cabinet under the Chairmanship of the Prime Minister passed the updated Nationally Determined Contribution (NDC) for consideration by the United Nations



Framework Convention on Climate Change (UNFCCC) under the Paris Agreement, increasing the existing targets to about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 and raising the emissions intensity of the GDP by 45 per cent by 2030 from the 2005 level to reach India's goal of net zero emissions by 2070. The latter was a translation of the Panchamrit (five nectar elements) – India's action plan against climate change, announced at COP 26 in Glasgow, United Kingdom.

As updates occur at both international and national level, the Ministry of Environment, Forest & Climate Change (MoEF&CC) formulated and circulated a common framework for revision of SAPCCs in 2019, clearly outlining ten principles. It is evident from the common framework that the revised SAPCC should not only

envisage inclusive and sustainable development but climate-resilient and low-carbon development, and the vulnerability of poor sections of the society be tackled through a clear plan that is backed by latest knowledge, science, models, finance and institutional mechanisms.

The importance of State level policy and action plans

After the Indian government had proposed its National Action Plan on Climate Change in 2008, the Indian Prime Minister in 2009 asked all 29 states and seven union territories to prepare respective state action plans based on the local needs which are known as the State Action Plans on Climate Change (SAPCC).

While the NAPCC laid out a comprehensive strategy at the national level to address climate change, the SAPCCs empower individual states to formulate their own plans. This move to empower states to create their own specific policy recognizes the diversity of climate challenges and responses across regions within India. By engaging states directly in climate action planning, the SAPCCs promote local ownership, foster innovation, and enable context-specific solutions. It also facilitates the integration of climate considerations into broader state-level policies and development agendas, enhancing resilience and sustainability at the sub-national level. Ultimately, the transition from NAPCC to SAPCC ideally implies a more inclusive and participatory approach to climate governance, better equipped to address the complexities of climate change at the grassroots level.

The rationale for the formation of the SAPCC was to decentralise action beyond the eight missions of the NAPCC, particularly covering

subjects like water and agriculture, which are affected by locally occurring climate impacts as well as they are state governed subjects in India's federal structure. In continuation to this, the centre government developed a Common Framework Document, with the assistance of expert agencies, to guide this process, stressing that it be participatory, while building capacity, developing a vulnerability assessment, and drawing on experts and donors for guidance and support.

In 2010/11, most of India's states and union territories formulated their first Action Plans on Climate Change, aligning them with specific adaptation measures addressing their states particular vulnerabilities as well as mitigation potentials. The plans outline the states' strategies for a range of sectors, including proposed actions and, in some cases, a timeline and budget for each. Sectors often include agriculture, water, transportation, energy, industries, urban development, and forestry, which are all climate-sensitive and highly relevant for local livelihoods and economic stability.

Several states have since released updates of their initial Action Plans, providing more comprehensive plans with more concrete timelines, roadmaps and budgets. In the process of updating their Plans, several state governments applied more participatory approaches to formulating new strategies in consultation with stakeholders such as local governments, expert groups and affected communities leading to improved climate resilience policy.

Karnataka's State Action Plan for Climate Change

As one of India's leading states in terms of economic growth and development, Karnataka faces a range of climate-related impacts, from

changes in rainfall patterns to rising temperatures and increased frequency and magnitude of extreme weather events. In response to these challenges, Karnataka has consulted with and involved premier research institutions and universities at the policy level for the preparation of the Karnataka State Action Plan on Climate Change (KSAPCC).

Linkages between KSAPCC and NAPCC are required in specific areas to address implementation challenges, close policy gaps, close communication gaps, and provide extensive stakeholder engagement platforms. Being a fundamental sub-national policy document focusing on climate change at the state level the KSAPCC aligns its framework of action for implementation with the mission laid out by NAPCC, including proposed actions, a timeline, and a budget for each specific effect. KSAPCC aims to decentralise action beyond the eight missions of the NAPCC, in areas such as participatory efforts, capacity building, and vulnerability assessment through expert's guidance and support.

Process of preparing the State Action Plan

In June 2009, the Government of Karnataka organised a Co-ordination Committee to oversee the adoption of

the NAPCC at the state level. It mandated the preparation of the KSAPCC to the Environmental Management & Policy Research Institute (EMPRI) and The Energy and Resources Institute (TERI). The first assessment was resubmitted in December 2013, in which the KSAPCC focuses on ten key sectors of importance for the state's economy and local livelihoods, namely: agriculture, water, biodiversity, health, transport, energy, industries, urban area, forestry and waste management.

The KSAPCC is the first ever attempt to address the issues of climate change through scientific adaptation and mitigation policies in the state. It is a comprehensive document that outlines various challenges, feasible action points that can be implemented in various sectors, also shortcomings in planning due to inadequate data on climate change and limited capacity in local climate policy making. Through innovative approaches and collaboration across sectors, the KSAPCC seeks to pave the way for a resilient, low-carbon future for Karnataka, contributing not only to the state's environmental sustainability but also to its economic growth and social equity.

Based on climate research and scenarios from 2004 to 2011, KSAPCC identified scope for

immediate sector-based actions by defining 200 actions of which 31 were tagged as priorities or entry points – water and agriculture, the focus areas of this study, among them. The implementation, interventions, and emerging trends in each section are based on missions identified in NAPCC. In order to achieve sector-wise targets, the document charts out the responsibilities of various departments of the state government for the implementation of the plan and allocation of funds. However, the state-level action plan, being the first of its kind and developed almost a decade ago, provides an adequate start for addressing climate change and lays a foundation for climate-focused planning.

Development of KSAPCC version 2

The second version of the Karnataka State Action Plan on Climate Change was prepared in 2021 and was approved by the Government of India in 2024. EMPRI, Government of Karnataka estimates that Rs. 52,827 crores are required between 2025 and 2030 to implement measures in agriculture, horticulture, forestry, rural development, and 10 other sectors. The KSAPCC version 2 is based on the common framework with 10 guidelines/principles recommended by MoEF&CC in 2019 for the revision of SAPCCs using the structure suggested by the MoEF&CC. According to KSAPCC 2.0, the revision of SAPCC is needed because climate science has advanced and because there have been many developments in international climate negotiations and commitments of countries around the world.

Broadly, there are three main reasons for updating the SAPCC. They include:

i) GoI has signed the Paris Agreement. This requires reducing GHG emissions and adaptation to climate change and respective further development of the KSAPCC;

ii) Additionally, SAPCC revision is an opportunity to evaluate and quantify the benefits of adaptation and mitigation strategies planned and implemented through SAPCC V.1, and to estimate the standards of achieved green growth;

iii) Finally, a revised SAPCC based on latest science will serve as the basis for seeking funding from Adaptation Fund of GoI, the Green Climate Fund, GEF, etc., and also from multilateral and bilateral agencies such as World Bank, ADB, UN agencies, KfW, SDC, DFID, GIZ, etc., for mitigation and adaptation projects.

Mitigation and Adaptation Plans of KSAPCC 2.0 are sketched out from the ongoing policies and programmes, also, the financial sources for implementation were leveraged from the different convergence as directed by NDC's common framework.

The KSAPCC 2021 assessment report indicates that both temperature and rainfall have changed in the districts of Karnataka over the historical period, and future projections indicate increasing temperatures and summer monsoon rainfall. Heavy rainfall events are also expected to increase, impacting natural resources, socioeconomic systems, and communities in different districts. These changes highlight the need to consider climate risks in state development plans and projects, aligning them with national goals and commitments such as the NDC to fulfil international obligations.

Adaptation measures in the water sector, like forest and wetland conservation, soil management, and flood protection, are gaining prominence as climate impacts become more and more frequent.

Many countries' climate plans spotlight agriculture as key for adaptation and mitigation, citing its potential socio-economic and environmental benefits. Over 78% of developing nations even include agriculture in their INDC mitigation strategies, emphasizing its role in rural development, poverty alleviation, and gender empowerment. Harnessing these synergies offers avenues for sustainable development and resilience in the face of climate change.





3

Karnataka's State Action Plan on Climate Change

Climate change, globally, requires action for implementation. The push by international policy dialogue is towards climate action at global, national and subnational levels. The mode of achieving climate action is through realistic targets, implementation and monitoring as highlighted by UNEP (2021). Within Climate Change, agriculture, followed by water draws maximum global effort, research, action, and funding for meeting challenges towards human survival. The challenges are enumerated by sector-specific studies and highlighted in action plans developed by individual countries (Singh and Schwarz, 2020; Rohilla et al, 2017; CST, 2014).

The climate scenario is an emerging threat to an ecologically sensitive, developing and agrarian economy like India and will likely threaten the survival and livelihood of rural communities dependent on agriculture and its allied sectors. Karnataka with 65 per cent of the geographical area under agriculture accounts for 28.6 per cent of state's Gross Domestic Product and supports 50 per cent of the rural workforce (EMPRI & TERI, 2013). Agriculture and crop production activities are highly vulnerable to climatic variations as inadequate temperature and irregular rains increase the pests and disease

outbreaks. On the other hand, there are opportunities to improve its resilience to climate change.

Karnataka with seven river basins and through rainfall receives 236 billion m³ of water every year. About 47 per cent of this will be lost through evapotranspiration and 46 per cent flows to the Arabian Sea. Hence, groundwater becomes a crucial natural resource for drinking and irrigation water. The state consists of 37,000 tanks and lakes covering a 6.9 lakh ha area (EMPRI & TERI, 2013). Physical water productivity of Rice crop is the lowest in Karnataka as compared to other Rice growing states, this indicates a poor water use efficiency scenario (NABARD – ICRIER, 2018). It strongly needs an integrated approach to water resource management in all areas to improve efficiency.

The Karnataka State Action Plan on Climate Change (KSAPCC, version 1 of 2013, version 2 prepared in 2021) is a fundamental sub-national policy document for addressing climate change at the state level. As a state policy, it aims to align its framework of climate action for implementation with the mission laid out by NAPCC. KSAPCC outlines its strategies for a range of sectors like renewable energy, rural development, agriculture, horticulture, forestry, and others, including proposed actions, a timeline,

and a budget for each specific effect as well as vulnerabilities of climate change in each. KSAPCC aims to decentralise action beyond the eight missions of the NAPCC, particularly covering subjects like water and agriculture which are state subjects. The focus of KSAPCC is to make its plan participatory, build capacity, develop a vulnerability assessment, and draw on experts and donors for guidance and support.

The Karnataka State Action Plan on Climate Change encompasses a total of 200 actions of which 31 are tagged as priority or entry points on climate change for the state, spread across multiple categories including implementation, data management, research and development as well as policy intervention; and covering a range of sectors. Out of these 31 priority actions, four from the water sector and four from the agricultural sector fall under the scope of this study. These Priority Action Points were selected based on the implementation arrangements responsibility to the key implementors from the Department of Agriculture and Department of Water Resources. The primary aim of this research study is to strengthen the efficiency of the KSAPCC, particularly in the Sustainable Agriculture and Integrated Water Resource sectors by reflecting on the implementation challenges,

policy, and communication gaps with an added emphasis on stakeholder engagement.

CEE conducted the KSAPCC study using a two-pronged approach, comprising policy analysis and qualitative surveys. The study included interviews with key stakeholders from government, civil society, and academia at the state level. Additionally, discussions were held with farmers in the Uttara Kannada region to gather grassroots insights.



Embracing renewable energy in farming for cost-effective, eco-friendly, and productive practices!

The following sections will depict the analysis of the 8-priority action points from agriculture and water sector and their state of implementation from policy analysis, quantitative surveys, Key Informant Interviews (KII) and discussions with farmers.

Table 1: Priority action points for agriculture and water sector

Reference	Sector	Priority Action Points
2	Agriculture	Establishing a State Level Policy body for devising cropping shifts
3		Promotion of dry land farming
4		Rendering theft of sprinkler pipes unviable
5		Creation of a market for indigenous agricultural crops
9		Water
10	Creation of Policy body for restricting groundwater use	
11	Introduction of a groundwater cess	
14	Revision of pricing policy for irrigation water	

Source: KSAPCC V.1 by EMPRI & TERI, 2013



Maximizing efficiency with drip irrigation: A smart solution for sustainable farming!

The policy analysis and synthesis of qualitative surveys reflect progress and showcase underlying challenges and recommendations for effectively implementing the statewide climate plan.

Agriculture

According to multiple key informant interviews and focus group discussions, the policies working on-ground with respect to agriculture sector are National Food Security Mission, Rashtriya Krishi Vikas Yojana as well as Bhoo Chetna, which was completed in 2017, however its major technical core - micronutrient adoption has been continued through soil enrichment programs. Other than these, a few policies such as the Bhoo samruddhi programme, and Krishi Bhagya Yojana are also being implemented. These are the policies mentioned under agriculture and allied sector of KSAPCC V1.

Establishing a state-level policy body for devising cropping shifts

The KSAPCC indicates that a state-level policy body should devise and promote cropping shifts to increase crop yield levels. This improves the resilience of farming communities through sustainable practices and reducing climate risks. Karnataka

Jnana Ayoga 2019 emphasizes that diversifying the cropping system is the key to minimize both weather as well as market risks. Shift in cropping pattern from paddy and sugarcane to millets and pulses, following agro-ecological methods would not only reduce water consumption but also reduce chemical fertilizer and pesticide utilization. There is need for a state-level body for devising the



Revitalizing lakes to combat drought and supporting farmers!

cropping shift with reference to climate change. Sample farmers have shown interest in growing millets solely because of the prevailing drought conditions, majority of them were unaware of the need for and importance of changing cropping patterns to conserve and protect the environment and about benefits from the government schemes. A need for proper prediction systems for suitable cropping patterns also emerged during discussions with policymakers and other stakeholders. Use of artificial intelligence and Drone Camera with GIS technology for weather predictions was suggested, which could be later communicated to farmers to adopt crops that best fit.

Promotion of Dry Land Farming

The KSAPCC advises to take up dry land farming activities to overcome

the issues of water and fodder scarcity under worsened climate change conditions. This method could offer a reliable source of income to rural and farming communities as the state has a maximum area under dryland condition. For this priority action point, mechanisms such as the creation of model farms and villages, establishment of fodder banks, development of suitable drought and pest-resistant crop varieties are suggested in the state action plan, which also forms a part of the National Mission on Sustainable Agriculture. On the other hand, surveys portray that farmers were unaware of policies or schemes pertaining to dry land farming. The sample farmers of Uttara Kannada region reported experiencing drought conditions (2016 to 2018), which further enhanced the need for the implementation of dry land farming techniques to conserve maximum amount of water through water and soil management practices. Discussions with focus group farmers showed that they have been growing dry farming crops like millets, post experiencing the drought conditions.

Rendering theft of sprinkler pipes unviable

Karnataka state is promoting micro-irrigation systems (drip and sprinkler irrigation techniques) to improve water use efficiency. The state's Department of Rural Development and Panchayati Raj promotes rainwater harvesting and sprinkler irrigation systems under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), as a drought-proofing measure. Karnataka State Water Policy also states that, key technological innovations along with expansion of drip and sprinkler irrigation could help reduce water use even in the more water-intensive crops such as paddy and sugarcane. The

KSAPCC states that expansion of micro-irrigation is hampered due to security concerns of distribution pipes. This should be tackled through eradication of the market for stolen pipes by bringing the farmer's net cost of distribution of pipes below the black-market cost. The farmer groups revealed that as their agriculture is mainly rain-fed, their need for sprinkler and drip irrigation increased due to extreme drought conditions (2016-18). The acute water shortage has led the farmers to implement drip/sprinkler irrigation methods, which they found beneficial in supporting agriculture during the drought period. It was also observed that they are not aware of schemes related to this action point.

Creation of a market for indigenous agricultural crops

Indigenous resilient varieties of crops such as maize, rice, sorghum require government's interventions to safeguard their conservation through gene pooling. These indigenous varieties have the potential to combat climate change impacts as compared to widespread high yielding varieties. The KSAPCC document mentions how landraces of many crops have provided the genes needed for pest and disease resistance and/or for the crops to adapt to poor soils, drought and cold temperatures. Hence, promoting cultivation and entire value and market chain of indigenous crops is the need of the hour. However, interviews with farmers depicted that farmers were largely unaware of the importance of cultivating climate-resilient indigenous crops. It appears that cropping decisions are made based on economic benefits from the yield and not as an informed choice for long-term planning in a climate-change world.

Water

Karnataka State Water Policy, Rejuvenation of rivers, Infiltration wells, Kere Sanjeevani, Karnataka Integrated Sustainable Water Resources Management & Investment Program (KISWRMIP), AtalBhujal-Yojana and Suvarna Krishi Honda programs are implemented in the Karnataka state. Integrated water resource management, watershed development scheme, rainwater harvesting for recharge of groundwater in urban areas, inter-basin water transfer, and ground water regulation schemes in various sectors including domestic, irrigation and industrial, are being implemented by the line departments.

Enforcement of Karnataka Groundwater Act

Groundwater has been indiscriminately used in the state with the extraction levels exceeding 100 per cent in many regions (KSAPCC). In

the agriculture sector, surface irrigation sources and traditionally used tanks have lost the cadence of irrigation and there has been a shift in the development of groundwater-based irrigation that has also led the way for intensive multi-season agriculture. Thus, the groundwater withdrawal is far in excess of recharge leading to declining water levels and increasing pumping costs. The findings of the current study reveal that the farmers have been using rainwater harvesting pits/tanks as well as constructed Krishi Honda (farm pond to harvest rainwater) to mitigate drought conditions under the Suvarna Krishi Honda Program. This helps farmers to store rainwater, preventing it from draining away while recharging and rejuvenating groundwater and provision of water during drought conditions, thus improving farmers' economic conditions by means of encouraging agricultural productivity.



Boosting income and food security with innovative water-harvesting solutions for resilient farming!

Creation of Policy body for restricting groundwater use

KSAPCC identifies 35 overexploited and three critical taluks with respect to groundwater exploitation and indicates that unplanned and excessive extraction of groundwater may lead to a no-water situation in the near future. To avoid such situations and instead promote groundwater recharge, there should be adequate mechanisms to restrict groundwater use. The country will move towards unsustainable agriculture from a water availability point of view, raising risks for the farmers, and promoting extreme inequity in the use of scarce water resources (NABARD & ICRIER, 2018) if its productivity is not enhanced. Thus, the creation of a policy body for restricting groundwater use in Karnataka is essential to improve its efficiency, but the study survey indicates that its current status is unknown to the policymakers. In the key informant's and knowledge partners' opinion bringing regulatory frameworks in groundwater extraction activities for various uses such as domestic, irrigation and industrial should include scientific evidence for its better utilization and also groundwater recharging must be undertaken to maintain adequate water table, as well as surface water remediation at contaminated sites to improve groundwater quality.

Introduction of a groundwater cess

Interior parts of Karnataka utilizes more groundwater than coastal regions creating an imbalance between its use and this has also resulted in drying of several bore wells leading to the dead investments of Rs. 2000 crores (Karnataka Water Policy 2002). Karnataka has 43 groundwater over-extracted taluks and 29 taluks have gone beyond 50 per cent of over-extraction (Public Affairs Centre,

2017). This situation can also be addressed through introduction of groundwater cess (KSAPCC). The groundwater fund created through the collection of this cess is planned to finance groundwater recharge schemes proposed by the private and public project proponents. Although groundwater cess was not particularly captured in surveys, the study revealed that the Advanced Centre for Integrated Water Resources Management (ACIWRM), a think tank to government's Water Resources Department (WRD), designed a new approach for groundwater management in partnership with people, Gram Panchayat and Civil Society organizations to prepare a Gram-Panchayat water security plan.

Revision of pricing policy for irrigation water

The rainfall is erratic and has uneven distribution (Karnataka Water Policy, 2002) in the state. While its irrigation system is highly dependent on surface water from perennial rivers, in the situation of fast depleting groundwater resources. Low-priced irrigation water is a substantial impediment to investment in water infrastructure and sustainable resource utilization and management. Thus, there is a need for cost-benefit analysis in order to assess the financial burden of irrigation water and to formulate a pricing policy rationalizing irrigation in view of efficiency, cost-effectiveness and long-term sustainability and the need for adequate finance (KSAPCC). The surveyed farmers were unaware of any such pricing policy for irrigation water.

Key Implementation Challenges

CEE's policy analysis and synthesis of qualitative surveys, with a focus on

water and agriculture, reveal critical gaps in implementing the priority action points outlined in the state action plan. Key challenges identified include inadequate public, civil society, and stakeholder participation during policy formulation, insufficient fund allocation, and low awareness among farmers regarding government policies and the impacts of climate change.

Further policy gaps were noted, such as farmers' reluctance to adopt new methods and technologies due to uncertainties, and limited coordination among departments during the preparation of the KSAPCC. Additionally, a detailed review of the KSAPCC document highlighted difficulties faced by departments in allocating funds for implementing certain action points due to their overly generic nature.

One of the most significant challenges identified was the lack of understanding among farmers regarding climate change and shifting rainfall patterns, which hampers their ability to adapt effectively. For example, while the KSAPCC emphasizes creating markets for indigenous crops, the study found resistance among farmers to adopt government-proposed schemes. At the same time, expanding to alternative crops is becoming essential to align with changing agro-climatic zones and evolving climate scenarios.

Based on the study, CEE has formulated a set of recommendations for the effective implementation of the statewide climate action plan, which are detailed in the next section.

Recommendations

The Karnataka State Action Plan on Climate Change (KSAPCC) emphasizes the need for a state-level policy body to guide cropping pattern shifts, promote dry land farming, and enhance water management through micro-

irrigation and groundwater regulation. Key initiatives include promoting millets and pulses over water-intensive crops, expanding dry land farming, improving water use efficiency, and implementing groundwater recharge and regulation. These measures aim to increase crop yields, improve farming community resilience, and ensure sustainable resource management under changing climate conditions. The implementation of KSAPCC has shown results over the years. The above analysis allows conclusions regarding improved implementation across the selected priority action points of KSAPCC:

The following recommendations have emerged from CEE's research analysis of the plan.

- **Strengthen Stakeholder Engagement and Public Participation**

Effective on-ground implementation of KSAPCC's water and agriculture priorities requires a participatory approach that engages stakeholders from the policy initiation stage, fosters collaboration between policymakers, practitioners, and researchers, and strengthens interlinkages between government departments. Periodic beneficiary feedback is crucial for refining these efforts, ensuring that farmer-driven policies are responsive to climate change anomalies and remain effective in the end.

- **Enhanced Scientific Approach to Build Resilience**

Bridging research gaps to address climate change challenges in agriculture and water management at the local and state levels is crucial. Promoting the exchange of local scientific knowledge and traditional farming practices

through mobile-based tools, community radios, and seasonal advisories can enhance climate-smart decision-making among farmers. Crop diversification, informed by scientific evidence and tailored to changing agro-climatic zones, will support sustainable ecosystems and secure farmer incomes. Establishing efficient prediction systems for cropping patterns, along with local water budgeting and security planning, can simplify crop selection and boost yields. Additionally, designing and implementing schemes for the sustainable use of surface and groundwater, supported by scientific evidence, and monitoring groundwater levels and quality, such as converting dry bore wells into recharge pits, will ensure sustainable water resource management. Thus, a research component accompanying the policy implementation can bridge science-policy gaps.

- **Strengthened Decision Making and Coordination**

Mainstreaming the KSAPCC action points into major departmental initiatives can significantly enhance its implementation, particularly when combined with a strengthened relationship between the Centre and state governments to facilitate knowledge exchange and address implementation challenges. Creating coherence between government divisions handling climate-vulnerable sectors like water and agriculture is crucial for effective implementation. Additionally, breaking down state-level action plan targets into district, block, and village-level plans, alongside a decentralized integrated watershed management approach, can significantly boost

implementation efficacy, sustain rainwater, and rejuvenate lakes and ponds in Karnataka. Promoting bottom-up approaches in policy formulation will leverage the experience and knowledge of local stakeholders, enhancing transparency, participation, and cost-effective policy execution. Climate change schemes with specific sectoral linkages should undergo periodic review every three years to reflect on current climate stresses and build on achievements.

- **Capacity Building and Education**

Developing Gram Panchayats into key information and resource centres can provide farmers with essential information on water and agriculture-related policies and schemes from both central and state governments. Fostering regular interactions between farmers and departments, possibly through Water User Cooperative Societies (WUCS), will enhance communication and coordination. Strengthening farmers' knowledge and skills in understanding climate change impacts and adopting locally recognized adaptation and mitigation measures will improve climate-responsive behaviour. Additionally, capacity building on climate-resilient technologies, with a focus on renewable energy solutions and sensor-based micro-irrigation systems, will ensure sustainable water use and support long-term agricultural resilience.

- **Rainwater Harvesting and Ground Water Level Assessment**

Prioritizing aquifer mapping is essential for determining water levels and supporting the goal of improving water efficiency, especially since the current water

mission lacks specific guidance for achieving the targeted 20% efficiency improvement. Rainwater harvesting (RWH) methods should receive greater emphasis in future water management strategies, as they are a key means of achieving water efficiency. Post-RWH groundwater assessments are crucial to effectively evaluate recharge methods and monitor groundwater levels. Collaboration among water management organizations is vital for sharing expertise and enhancing water conservation efforts. Government intervention is necessary to install greywater treatment plants in every district, reducing water wastage and promoting sustainable water usage practices.

- **Improved Financial Mechanism**

Proper budget allocation and clear guidelines for reorienting existing funds within relevant departments are crucial for the effective implementation of sector-specific priority action points, with specified timeframes and responsible departments. Providing financial support or subsidies to farmers, particularly during periods of high labour costs, and rising prices for hybrid seeds, and chemical fertilizers, is essential given the uncertainties related to climate change. In addition, promoting intercropping is vital for de-risking farming and ensuring financial security for farmers.

- **Adaptation Strategies and Climate Resilient Crops**

Emphasizing the cultivation of climate-resilient crops like millet over rice can diversify the food basket and help bridge the gap between yield and income for

farmers. To effectively enhance farmers' livelihoods and adaptive capacity to climate change, strategies should focus on increasing both yield and income. Climate adaptation plans must incorporate approaches to address and bridge these disparities. Additionally, incentivizing organic farming by reducing chemical fertilizer usage should be considered, especially since carbon credits currently apply only to plantation crops.

- **Crop Insurance**

Carbon credits serve as an effective incentive for larger farmers but are often inaccessible to small and marginal farmers, limiting their benefits. The government should enhance income security for these smaller farmers by providing targeted incentives through crop insurance schemes. In Karnataka, crop insurance schemes have faced challenges, notably delays in claim processing, which undermine their effectiveness. To improve these schemes, it's crucial to process insurance claims as quickly as possible to provide timely support to farmers. The primary focus should be on effectively transferring risk and ensuring farmers receive prompt assistance and support when needed.

- **Need for a Legal Framework**

Environmental Management Policy & Research Institute (EMPRI) recommends integrating a legal framework into the revised Karnataka State Action Plan on Climate Change (KSAPCC) alongside an implementation plan. The current KSAPCC version presents data without a clear legal framework for execution. The Ministry of Environment, Forest and Climate Change (MoEFCC) aims to assess the implementation

status of actions at each departmental level within KSAPCC. Incorporating a legal framework will facilitate the evaluation and monitoring of action plan implementation, making it easier to enforce and execute climate change mitigation and adaptation measures across departments.

- **Risk and Disaster Management Plan**

Stakeholder consultation experts have emphasized the need for district disaster management plans, which are crucial roadmaps for reducing disaster risk. The Karnataka State Natural Disaster Monitoring Centre (KSNDMC) plays an active role in weather prediction, providing daily meteorological data to support disaster preparedness and response. There was discussion about involving educational institutions in climate change projects and weather data predictions. Additionally, KSNDMC's daily flood forecasting was highlighted, with a reminder that it is the responsibility of individuals and organizations to use this information to take appropriate actions.

- **Capacity Building and Implementation of Plan**

The Karnataka State Action Plan on Climate Change (KSAPCC) currently lacks capacity-building plans, which are essential for effective climate action. The implementation plan should prioritize capacity building in key areas such as organic farming and rainwater harvesting. Clarity from the Ministry is needed on these strategies, including defining departmental roles and enhancing public climate change literacy, especially concerning livelihood

and personal health. Identifying stakeholders is crucial before starting capacity-building training.

- **Inter-Departmental Coordination and Responsibilities**

Experts recommend enhancing inter-departmental coordination by developing a comprehensive work plan to minimize duplication of efforts between departments. Implementing robust reporting systems is suggested to track departmental activities and pinpoint areas of potential overlap. Active involvement of decision-makers in discussions is crucial for ensuring prompt action on identified issues. Responsibilities outlined in the KSAPCC assessment should be communicated to all relevant government representatives. Evaluating the implementation status at the departmental level is necessary for effective fund allocation based on performance.

- **Fund Allocation and Climate Budgeting**

Climate budgeting should allocate funds for mitigation, adaptation strategies, and disaster risk management at the state level. Vulnerability assessments need to be integrated with adaptation strategies and climate budgeting, with a focus on block, district, and village levels. To ensure effective use of resources, vulnerability assessment funds should be non-lapsable, allowing remaining funds to be carried over to the next financial year. Energy demand, particularly in high-consumption states like Karnataka, significantly impacts water and agriculture sectors and contributes to greenhouse gas emissions. Climate risk mapping, including multi-hazard vulnerability

mapping, should be made available through organizations like KSNDMC, which specializes in such mapping in Karnataka.

Conclusion

The Karnataka State Action Plan on Climate Change represents the state's inaugural effort to address climate change through scientific adaptation and mitigation policies. It outlines challenges, feasible action points across various sectors, and acknowledges shortcomings due to inadequate climate data and limited local policy-making capacity. This present policy analysis reveals gaps in implementing priority action points, emphasizing the importance of considering stakeholders' opinions. Major reasons for these gaps include minimal funds, lack of awareness, reluctance to adopt sustainable technologies, and limited coordination among government departments. Farmer awareness about climate change and the need for universally beneficial schemes are highlighted, alongside the necessity for periodic review and updating of the

plan to ensure effectiveness. Mainstreaming climate action at district and Panchayat levels offers significant opportunities for enhancing water security, achieving food security, and reducing hydro-meteorological disaster risks. These farmer-focused strategies provide a roadmap for efficiently localizing agriculture-related targets outlined in the KSAPCC, benefiting Karnataka's drought-prone and flood-affected districts.

Karnataka's proactive engagement with premier research institutions and universities underscores its commitment to a comprehensive approach in formulating the KSAPCC. Vulnerability assessments, shifting to climate-resilient crop varieties, and promoting organic agriculture are vital steps. Prioritizing aquifer mapping and greywater treatment installations, alongside increasing awareness about the KSAPCC and state schemes through targeted capacity building, are essential for sustainable implementation.



4

The Role of Stakeholder Engagement in the Karnataka's State Action Plan

The KSAPCC was the first policy document to tackle climate change in Karnataka comprehensively. It laid the ground for crucial mitigation and adaptation action. However effective implementation of the action plan depends on the actions of the stakeholders, their perspectives concerning the suitability and feasibility of the action points of the KSAPCC, and the issues and challenges faced in execution. In this context, the role of civil society organisations (CSOs), particularly NGOs, needs to be explored, and a roadmap for enabling their engagement in the effective implementation of the KSAPCC needs to be drawn up.

The Need for Civil Society Participation

CSOs are key stakeholders in national and international climate processes and play a crucial role in contributing to bringing ground-level vulnerabilities into decision-making processes, providing technical support and research, advocating for ambitious action, creating awareness, building capacities, and enhancing the resilience of the most vulnerable populations. In the words of UNECE: “The engagement of the public is vital for creating an environmentally sustainable future. Governments alone

cannot solve the major ecological problems of our time. Only through building partnerships within a well-informed and empowered civil society, within the framework of good governance and respect for human rights, can this challenge be met” (UNECE, 2002).

At COP21 in Paris in 2015, it was agreed that mobilizing stronger and more ambitious climate action by all Parties and non-party stakeholders is an urgent requirement for achieving the goals of the Paris Agreement. Paris' core decision (1/CP.21) recognises the need of commitments from all actors, including party as well as non-party stakeholders. Particularly on adaptation, the UNFCCC Guidelines on National Adaptation Plans (NAPs) also highlight the need for multi-stakeholder engagement in climate adaption and identify key stakeholders for engagement. Among these stakeholders, CSOs are highlighted as a key entity to be contributing to the process, at all levels, including the preparation, implementation, monitoring, and evaluation levels. As the National Adaptation Plans (NAP) activities are expected to align closely with the NDCs on climate adaptation at the country level, the inclusion of CSOs in the NDC process could also be facilitated through the alignment of NDC and NAP activities – but shall not be limited to adaptation and include also

CSO consultation on mitigation policy.

Increasingly, non-government organisations and other stakeholders have been coming together at the national level to form civil society networks in some of the countries that are most affected by climate change. These networks have been involved in a wide range of activities to raise awareness about climate change, support climate change adaptation activities that benefit the most vulnerable, develop low-carbon development pathways to help mitigate climate change and improve local livelihoods, conduct research and disseminate results, build capacity on climate change and influence government planning processes at a variety of levels through a multitude of advocacy activities.

To take the measures of the government forward and to ensure the success of the development agenda at the national as well as state level, it is critical that the government collaborate with various partners, viz., private players, and civil society organizations, who have played a key role in pushing climate concerns and the SDGs in the international arena. In particular, it is important that key players such as NGOs are engaged at the ground level, as they have a strong penetration at the grassroots level and can contribute to achieving Paris goals as well as the SDGs. The NGOs working at the grassroots level must be capacitated well to have a better understanding of the international, national and state-level climate goals and the SDGs and can work towards achieving these targets that fall within their purview.

CEE's Study on the Role of NGOs in KSAPCC Implementation

The Centre for Environment Education

(CEE) conducted a study to assess the potential role of NGOs in the implementation of the Karnataka State Action Plan on Climate Change (KSAPCC). The study highlights the significant contributions NGOs can offer, including fostering community participation, facilitating capacity building, and ensuring last-mile connectivity in implementing climate action strategies.

Despite their pivotal role in bridging policy and practice, the KSAPCC does not explicitly outline the involvement of NGOs in its framework. CEE's study underscores this gap and emphasizes the need to recognize and formalize the participation of NGOs. The findings advocate for a structured approach to integrate NGOs into the implementation process, leveraging their expertise and grassroots networks to enhance the effectiveness and inclusivity of the KSAPCC's climate initiatives. This study provides a roadmap for enabling NGO engagement, ensuring that their strengths are effectively harnessed to overcome challenges and drive sustainable, community-centric climate solutions in Karnataka.

NGOs in Karnataka can contribute significantly to implementing the water and agriculture sector action points of the KSAPCC on the ground, working towards sustainable water management, promoting climate-resilient agricultural practices, raising awareness, providing capacity building, and monitoring progress to ensure effective climate action in these crucial sectors.

The Centre for Environment Education (CEE) has identified specific action points in the water and agriculture sector, taking into account the capacity needs outlined in the Karnataka State Action Plan on Climate Change (KSAPCC). The roles of NGOs are briefly explained below in terms of their contribution to the effective

implementation of the identified action points in the water and agriculture sector.

The Role of NGOs on key action points

Agriculture

In the Agriculture Sector, for each priority action point, this study has identified specific roles for NGOs. This NGO involvement would strengthen the implementation of the action points essentially.

Establishing a state-level policy body for devising cropping shift

What KSAPCC says: Enhance farmers' capacities to understand the risks of climate change on current crops and the advantages of the alternative crops being promoted. Such capacity building programme may be conducted at the district level with sessions on climate change, its impact, and the need to shift the cropping pattern. The capacity building programme may also include intrastate or interstate field visits to well-equip the farmers on the implementation of shift cropping patterns.

Our suggested role for NGOs:

- Conduct workshops, training, and awareness campaigns to educate farmers on climate change and shifting cropping patterns.
- Provide technical support for implementing new cropping patterns, including best practices and accessing resources.
- Facilitate farmer networks to promote collaboration, knowledge sharing, and peer learning.
- Organize field visits for farmers to witness successful implementations and gain practical insights.

- Engage in advocacy efforts to promote policies supporting climate-resilient agriculture.
- Monitor and evaluate farmer progress, measure program effectiveness, and share success stories for inspiration.

Promotion of Dry Land Farming

What KSAPCC says: A capacity-building programme should include both government personnel and farmer communities. Such capacity building programme may also include intrastate or interstate field visits. Experts from different regions may be invited to share their experiences. Training programmes may also be conducted for Krishi Vigyan Kendra's (KVKs) and district-level officers.

Our suggested role for NGOs:

- Design and implement capacity building programs tailored to the training needs of government personnel viz., sustainable practices, water conservation, etc to district level officials.
- Organise training program for farmers on dryland farming techniques, soil management for farmers.
- Invite regional experts to share insights and success stories to enrich participants' learning experiences.
- Organize field visits for participants to observe successful dryland farming practices and water-efficient techniques.
- Facilitate workshops, group discussions, and knowledge exchange sessions to encourage sharing of experiences and innovative solutions.
- Mobilize resources through funding, grants, and partnerships

to support training activities and ensure sustainability.

Rendering theft of sprinkler pipes unviable

What KSAPCC says: The KSAPCC states that expansion of micro-irrigation is hampered due to security concerns of distribution pipes. This should be tackled through eradication of the market for stolen pipes by bringing the farmer's net cost of distribution of pipes below the black market cost.

Our suggested role for NGOs:

- Conduct awareness campaigns through workshops, training, and information dissemination programs for taluk and gram panchayat officers and farmers on micro-irrigation benefits.
- Provide information on financial assistance and government programs for micro-irrigation adoption, assisting with eligibility criteria and application processes.
- Conduct capacity-building programs to enhance farmers' understanding and skills in micro-irrigation techniques, including installation, operation, and maintenance.
- Collaborate with government agencies to design and implement awareness campaigns and advocate for supportive policies, including reduced prices for sprinklers to avoid theft.
- Monitor progress and impact of micro-irrigation adoption, assessing awareness campaigns and evaluating outcomes.
- Facilitate knowledge sharing and networking among farmers practicing micro-irrigation, promoting peer-to-peer learning and innovation.

- Participate in designing simpler, economically viable and farmer user friendly drip irrigation methods.

Creation of a market for indigenous agricultural crops

What KSAPCC says: Training programmes for farmers' on the benefits of conserving indigenous varieties. Department of Agriculture may conduct such training programme at block and Gram Panchayat level through Krishi Vigyan Kendra/ Agriculture Extension.

Our suggested role for NGOs:

- Document indigenous crop varieties and associated knowledge, contributing to their conservation and promotion.
- Raise awareness among farmers about conserving indigenous varieties through workshops, training sessions, and awareness campaigns by sensitising the benefits of indigenous from health, climate and market benefits.
- Conduct capacity-building programs to enhance farmers' knowledge and skills in conserving indigenous varieties, including seed-saving techniques and sustainable farming practices.
- Support farmers in developing sustainable livelihood models focused on indigenous crop conservation by providing training on value addition and marketing strategies.
- Facilitate knowledge exchange and collaboration, connecting farmers with markets and consumers interested in indigenous crops.
- Host and facilitate markets for indigenous crops, create demand for the same by various medium.

Water sector

Also in the water sector, for the four key action points, this study has identified specific roles for NGOs. This NGO involvement would strengthen the implementation of the action points essentially.

Enforcement of Karnataka Groundwater Act

What KSAPCC says: Training of relevant officials may be conducted on the Karnataka Groundwater Act and its implementation i.e. clause, rules, actions, penalty, prohibited activities, etc. A nodal officer/cell at the state level may be appointed for 1st year to resolve and address issues that emerged at the field level in implementation.

Our suggested role for NGOs:

- Organize workshops, seminars, and campaigns to educate communities, farmers, and stakeholders about groundwater conservation and the Karnataka Groundwater Act.
- Train government officials on the provisions, rules, and implementation strategies of the Karnataka Groundwater Act.
- Engage communities through meetings and workshops to promote participation in groundwater management and set up community-based monitoring systems.
- Monitor Act implementation, report violations, and collaborate with government agencies for enforcement.
- Establish pilot projects and demonstration sites to showcase sustainable groundwater management practices and provide technical support and training for

projects success.

- **Creation of Policy body for restricting groundwater use**

What KSAPCC says: Training and awareness programmes for large consumers (industries, farmers') on the importance of groundwater, introduction to water use efficiency and conservation, government's support for groundwater recharge including rebate and incentives. Local NGOs may be important partners. The numbers and contents of these training programmes may be finalised in close consultation with relevant departments and stakeholders.

Our suggested role for NGOs:

- Collaborate with large consumers to design tailored training programs for groundwater management.
- Develop informative content on water efficiency and conservation for training programs, incorporating practical examples.
- Empower large consumers through workshops on groundwater importance and conservation strategies.
- Foster dialogue and collaboration among large consumers through interactive sessions and forums.
- Advocate for policies promoting groundwater recharge and sustainable water use.
- Monitor and evaluate training programs for impact and effectiveness in promoting sustainable practices.
- Advocate with Government in creating fair rules for efficient ground water usage.

Introduction of a groundwater cess

What KSAPCC says: Since water has

been treated as a private resource the access on groundwater will need to be accompanied by large-scale media campaigns and necessary capacity-building activities. A nodal agency may be appointed to develop adequate capacity-building strategies in this regard.

Our suggested role for NGOs:

- Advocating with a state government department to redesign and execute the water access in fair manner for all consumers.
- Collaborate with nodal agency and stakeholders to design and implement media campaigns for water conservation.
- Support capacity building through training programs and workshops for stakeholders from groundwater department and water resource department.
- Engage with various stakeholders-district officials from the ground water department through dialogue and community meetings to promote awareness on the need and methodology to safe water.
- Monitor and evaluate media campaigns for effectiveness in promoting sustainable water management.

Revision of pricing policy for irrigation water

What KSAPCC says: With the help of local NGOs, awareness programmes for farmers to demonstrate the need for water tariffs may be conducted at block and Gram Panchayat levels. Participatory capacity-building programmes for farmers' need to be effectively planned.

Our suggested role for NGOs:

- Advocating with the state government department for fair pricing policy centralising farmers'

concern.

- Collaborate with farmers and gram panchayats to raise awareness about water tariffs through effective communication materials and community meetings.
- Implement capacity-building programs for farmers, providing training on water management and the benefits of water tariffs.
- Engage farmers and stakeholders in dialogue to ensure their perspectives are considered in water tariff implementation.
- Advocate for water tariff policies by collaborating with government departments and other organizations.

Conclusions and examples of ongoing NGO engagement

Governments play a crucial role in building community resilience through sustainable development policies, regulations, and priorities. Climate governance, supported by informed participation from various stakeholders, including NGOs, helps reduce climate risks. Indian NGOs have in the past played a significant and sometimes critical role in shaping the Indian Government's position and contribution towards the UNFCCC.

Similarly, NGOs are crucial in informing and executing the action points delineated in the KSAPCC that specifically address the water and agriculture sectors. Through community engagement, awareness campaigns, and grassroots initiatives, NGOs facilitate the adoption of sustainable practices such as rainwater harvesting, drip irrigation, and organic farming. They bridge gaps between government policies and local communities, offering technical

expertise, capacity building, and advocacy for inclusive and equitable climate resilience. By fostering collaboration among stakeholders and empowering marginalized groups, NGOs contribute significantly to the successful execution of KSAPCC's objectives, ensuring water and agricultural sustainability amidst climate challenges in Karnataka.

Several NGOs in Karnataka are actively engaged in addressing critical issues and promoting sustainable practices in water and agriculture sectors. Arghyam focuses on achieving safe, sustainable water for all through community-led approaches and generating trusted data. Ashoka Trust for Research in Ecology and the Environment (ATREE's) Water, Land, and Society program aims to address water issues by identifying causes and proposing solutions. Centre for Sustainable Development (CSD) conducts research on sustainable development, focusing on resource management and climate change impacts. Environmental Synergies in Development (ENSYDE) reduces environmental footprints through efficient resource use and awareness campaigns. Manuvikasa focuses on environment conservation, sustainable agriculture, livelihood promotion, and educational support. SankalpTaru

Foundation promotes sustainable development through tree planting projects. Sehgal Foundation supports communities in water management and agriculture development. SELCO Foundation develops energy-driven solutions for small farmers. Deshpande Foundation India enhances farmer livelihoods through various initiatives. Trust for Rejuvenation of Environment and Nature Development (TREND) focuses on environmental preservation and water management awareness. Climate actions are devised from existing schemes and plans from various government departments. The mentioned activities by NGOs directly contribute to climate action. These NGOs implement rainwater harvesting, water conservation, and efficient irrigation techniques. They also provide training on climate-smart interventions and promote ICT in agriculture. Collaborating with farmers and stakeholders, they raise awareness about climate change impacts and promote sustainable practices. Through their efforts, these NGOs contribute to building resilience and improving livelihoods in Karnataka's water and agriculture sectors.



5

Monitoring and Evaluation Framework for Karnataka's State Action Plan on Climate Change

Monitoring and evaluation (M&E) processes guide policymakers in assessing how a policy or intervention evolves over time (process and output monitoring), how effectively it has been implemented and whether shortcomings in planning have led to reduced outcomes (outcome evaluation), and whether changes or overall improvements in the concerned region have resulted from policy alone (impact evaluation).

A strengthened M&E system will help measure the performance of the state's plan for climate change by monitoring financial spending, outputs and outcomes. This will ensure transparency, outcome-based reporting, and effective oversight and will serve future improvements, including budget efficiency. In the long run, a national framework can be evolved for all the states in India for the monitoring of state action plans on climate change based on the favourable outcomes generated by the experience in leader states.

Establishing a robust M&E system is crucial for facilitating data-based reporting, evidence-driven decision-making, and highlighting the significant role of subnational climate policies in achieving national and international climate goals and linkages between climate action and respective SDGs. A

key prerequisite for developing an integrated information system is fostering interdepartmental coordination to provide real-time data, enabling visualization of concurrent progress in financial spending, outputs, and outcomes. Such comprehensive reporting mechanisms will facilitate effective decision-making for both the further KSAPCC implementation and potential adjustments in upcoming policies. These reporting mechanisms also underscore the valuable contribution of subnational climate policies to global climate objectives.

With this background and recognizing the critical importance of a Monitoring and Evaluation (M&E) Framework, the Centre for Environment Education (CEE) conducted a comprehensive study and developed a working paper titled "KSAPCC Monitoring Framework". This document focuses on the water and agriculture sectors, aiming to:

- **Assess Funding Patterns:** Analyze financial mechanisms and funding flows for climate change adaptation and mitigation efforts in Karnataka.
- **Evaluate Policy Implementation :** Examine the effectiveness of the Karnataka State Action Plan on Climate Change (KSAPCC) implementation.

- **Develop a Robust Monitoring Frame- work:** Design a frame- work to measure and report the state's performance in climate action, with a focus on financial expenditure, outcomes, and impacts, ensuring transparency, accountability, and data-driven decision-making.

The working paper serves as a critical tool to guide Karnataka's efforts in climate action, strengthen interdepartmental coordination, and align with national and international climate objectives and Sustainable Development Goals (SDGs).

Three key elements

Budget Monitoring

Budget monitoring is the most critical aspect of organizational and governmental financial management, ensuring adherence to budget plans and upholding accountability in expenditure. Monitoring and evaluation play a crucial role in ensuring accountability, assessing progress, and informing decision making processes for both climate financing initiatives and budget allocation in Karnataka – eventually leading to efficient spending. Climate financing in Karnataka lacks a predetermined allocation in the state budget for mitigation and adaptation initiatives, relying on fragmented funding from various central and state-level schemes. The State Government allocates funds for various agriculture schemes, but before these schemes can start being implemented, they require financial approval and thorough assessment to ensure effective implementation. This makes closely monitoring the allocated funds for each scheme crucial.

Process, Output Monitoring and Outcome Evaluation

The M&E process is essential for the success of climate change mitigation and adaptation activities, providing evidence-based assessment and efficient project management. Monitoring ensures project activities remain on track (process monitoring), while evaluation aids decision-makers in addressing outcome and impact challenges and improving project quality.

Water and Agriculture Governance and Monitoring Frames have for instance, identified several shortcomings. The water sector alone, dealing with issues concerning upkeep, maintenance, conservation, augmentation, deluge, re-charge, and re-use has over two dozen departments, Para-Stats, and line agencies managing the resource. Local Self-Government institutions, too, have a role in its management. They all have oversight over a host of activities that include irrigating farmlands, drinking water supply, groundwater, conserving and securing tanks, and lakes. The system does not yet operate in a coordinated way, and suffers from, a high degree of compartmentalization in organisation and function with overlapping and conflicting jurisdictions, and a lack of transparency and accountability leadership and a scattered mosaic in terms of management.

Outcome evaluation is measuring the results of the monitoring against the policy objectives. Were the measures of the policy plan well selected and designed? Were they sufficient and well implemented to fulfil their purpose?

Impact Evaluation

Impact evaluation of KSAPCC serve an accountability purpose to determine if and how the plan works. This will also play a key role in addressing climate change with corrective mode. Climate action requires a robust

mechanism that combines the synergies of all the sectors of governance. Eventually, impact evaluation tools assess the magnitude of impact that the interventions of a policy plan has had – measured against the objectives of the policy. Through impact assessments, it is understood which improvements have been achieved (and what did not change), through which activities the objectives were met and how much impact was achieved over a certain period of time – and for which budget. With a careful impact evaluation, it is also understood, how the policy has interacted with other developments and how much if the achieved changes can be attributed to the policy.

For the water and agriculture objectives of KSAPCC it will – amongst other impacts - be interesting to understand to what extent water management has improved, and cropping has become more climate resilient in Karnataka. These improvements will also have to be set in context of the ongoing climate change patterns. Proper water management is more easily achieved under stable weather conditions than under drought. To improve water management and achieve climate-resilient agriculture in Karnataka, the KSAPCC should focus on promoting efficient irrigation, climate-resilient crops, community capacity building, and robust monitoring systems aligned with climate change patterns. Ideally, impact evaluation includes stakeholder feedback on the achievements in the wider context of community and ecosystem developments, reduced vulnerabilities, agricultural livelihood improvements and many other linked aspects of the KSAPCC.

The benefits of the proposed KSAPCC Monitoring Framework

The implementation of the suggested Monitoring and Evaluation (M&E) framework for the Karnataka State Action Plan on Climate Change (KSAPCC) offers several benefits. It allows for systematic tracking of progress in climate change adaptation and mitigation activities, ensuring goals and targets are met within specified timeframes. Regular monitoring facilitates the early identification of challenges, enabling timely interventions to address issues before they escalate. The framework provides insights into resource utilization, ensuring efficient allocation and identifying areas needing additional support. By promoting accountability and transparency, it fosters stakeholder trust and public confidence in climate action initiatives. Furthermore, the framework supports learning and adaptation through the identification of best practices and lessons learned, allowing for evidence-based refinements in future efforts. It also enables the evaluation of the effectiveness of interventions, helping decision-makers assess their impact and plan strategically. Overall, the M&E framework is crucial for driving effective progress, enhancing accountability, and contributing to climate resilience and sustainable development.

Design of the Framework

The Karnataka State Action Plan on Climate Change (KSAPCC) requires a robust monitoring framework to effectively track and evaluate its implementation progress and impact. This framework should encompass key indicators related to climate change mitigation and adaptation measures outlined in the plan. It should include mechanisms for data collection, analysis, and reporting at regular intervals. Additionally, the

framework should facilitate stakeholder engagement and feedback loops to ensure transparency, accountability, and continuous improvement of KSAPCC implementation. Integration of technology such as remote sensing, GIS mapping, and digital platforms can enhance the efficiency and accuracy of monitoring efforts. Regular review meetings involving government agencies, research institutions, civil society organizations, and other relevant stakeholders are essential to assess progress, identify challenges, and adjust strategies as needed. Overall, a comprehensive monitoring framework will be crucial for the successful implementation of KSAPCC, enabling informed decision-making and fostering resilience to climate change in Karnataka.

Schemes like ATMA, MGNREGA, and Jal Jeevan Mission have achieved notable success, largely attributed to effective monitoring. A primary study by State Agriculture Department underscores the pivotal role of a robust monitoring framework in ensuring the success of various schemes. A M&E framework can help overcoming challenges faced in implementing the KSAPCC at the district level like administrative or environmental-related hurdles such as uncertainties in weather e.g., failure of southwest monsoon.

The Government of Karnataka's initiative, through the Karnataka Monitoring and Evaluation Authority (KMEA), underscores the significance of evaluation in assessing project progress and promoting accountability. EMPRI being a nodal agency for the climate change plan in Karnataka, the State Government has decided to host the data in their Green Index portal. By developing unified monitoring dashboards as a G2G e-governance initiative and adhering to evaluation policies, the government

can enhance transparency and improve the quality of service delivery across sectors, including water and agriculture. In line with these efforts, EMPRI is currently working on a digital platform, a Monitoring Portal in coordination with Additional Chief Secretary (ACS)/ Development Commissioner, with the aim of hosting monitoring data on their web portal called the Green Index Portal.

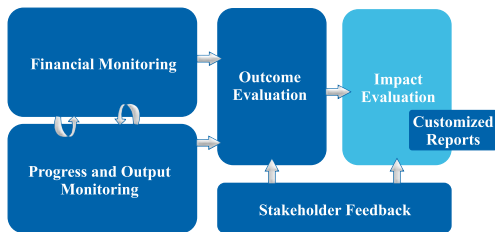


Fig 1.: Suggestive elements-order of the M&E Framework

To enhance monitoring and evaluation, agriculture and water resources departments should establish M&E committees at the state level, along with steering committees and technical cells. These committees should finalize strategies and action plans in consultation with relevant departments. Additionally, a working group focused on Monitoring, Reporting, and Evaluation process can facilitate transparency, coordination, and learning.

The M&E framework should reflect decentralization and engage multiple stakeholders for participatory progress assessment, social audit, and quality control. It should enable learning from experience and build local capacity for analysing and proposing solutions. Recommendations for effective KSAPCC implementation include recruitment of sufficient staff, improvement of technical skills, and enhancement of labourers' daily wages. Extensive capacity-building training programs focusing on

monitoring and evaluation aspects of climate action are crucial, along with incorporating climate actions into departmental mandates and ensuring timely budget releases.

Further, other considerations include disaster-preparedness programs, the usage of modern technology for addressing climate-related issues, construction of climate-resilient infrastructure, and implementation of water conservation and agriculture-related programs. These efforts aim to ensure the effective implementation of climate actions and mitigate the risk of scheme/program failure due to the absence of a comprehensive framework.

Integration of stakeholder feedback

The integration of stakeholder feedback from e.g. civil society organisations, academia, private sector, and the public with a web-based interface will significantly enhance transparency in government operations, bolster policy implementation effectiveness, and stimulate policy discussions. Implementing monitoring and evaluation practices through a multistakeholder approach embodies a collaborative effort across society. A dedicated section on the dashboard should be allocated for gathering feedback from the public, ensuring inclusivity and responsiveness in governance.

Establishing a monitoring and evaluation cell in each of the government departments to constantly provide the data for updating the dashboard is required. For data analytics, an expert organization of the state or centre can be included. Customized reports can be produced as per the stakeholders' interests and needs.

Analysis and reports should not have limited scopes to financial outlays and programmatic outputs but go way beyond them. Monitoring and evaluation at the outcome level are critical to knowing the impact of the project implementation on the target groups.

Framing proper indicators holds the key to the successful monitoring of the outcomes. Stakeholders can provide useful insights in the indicator selection.

The KSAPCC is being implemented through a multitude of schemes, often in a sectoral manner, by various departments. In this situation, outcome reporting can become a challenge. To ease the process of the outcome reporting, the indicators to measure outcomes of the KSAPCC implementation must be aligned with the indicators of Sustainable Development Goals (SDGs) and the government-framed indicators which are further aligned with the SDG indicators. For example, one or more schemes can be brought under one indicator of the SDGs. Such reporting will help in underlining the contribution of a subnational climate policy towards the national and international climate goals.

Operationalizing the Monitoring and Evaluation Framework

The CEE-HSS Working Paper (2023), titled “Evolving a Monitoring Framework for the KSAPCC Implementation in Water and Agriculture Sectors,” recommended the development of a unified Monitoring Dashboard for the Karnataka State Action Plan on Climate Change (KSAPCC) as a G2G e-governance initiative by the Government of Karnataka. Building on this recommendation, in 2024, the

government expressed interest in adopting a web-based dashboard to facilitate effective monitoring and evaluation.

To guide the development process, the concept note on the KSAPCC Monitoring Framework, prepared by CEE, was shared with the developers as a reference document.

Additionally, the Environmental Management and Policy Research Institute (EMPRI) provided a comprehensive list of Key Performance Indicators (KPIs), developed by various government departments, to track the implementation of the KSAPCC effectively.

This collaborative approach aims to establish a robust, technology-driven framework for monitoring progress, enabling data-driven decision-making, and enhancing transparency in Karnataka's climate action initiatives.

Use of the Dashboard

The dashboard functions as a government-to-government (G2G) tool with an integrated citizen engagement corner, offering the following capabilities:

- Real-time tracking of progress on outlay spending, outputs, and outcomes.

- Centralized collation and visualization of data across sectoral schemes, including water and agriculture.
- Enhanced decision-making through data-driven insights and outcome-based reporting.

Key Features

- **Real-Time Monitoring:** Facilitates real-time tracking of - outlays, outputs, and outcomes to ensure timely progress updates.
- **Inter-Departmental Integration:** Promotes synergy by enabling departments to upload and share data seamlessly through an integrated system.
- **Advanced Data Analytics:** Supports data visualization and customized reporting for actionable insights.
- **Citizen Engagement:** Incorporates a dedicated feedback mechanism to enhance inclusivity and responsiveness.
- **Outcome-Based Indicators:** Aligns with KSAPCC objectives to effectively measure impacts and assess performance.



The Dashboard was successfully developed and unveiled during the Policy Dialogue jointly organized by CEE, EMPRI, and HSS on November 21-22, 2024, in Bengaluru. It was officially inaugurated on November 21, 2024, by Shri Eshwar Khandre, Hon'ble Minister for Forest, Ecology, and Environment, Government of Karnataka.

Government Uptake

- The basic dashboard has been developed and officially adopted, as demonstrated by its launch by the Hon'ble Minister.
- The KSAPCC Dashboard will be hosted on the EMPRI website as part of a unified platform that also includes EMPRI's Green Index Portal. This integration ensures government ownership and the hosting of KSAPCC monitoring data on a government server in the near future.

- Capacity-building programs for government officials at state and district levels are underway to strengthen effective monitoring and data reporting, thereby ensuring the sustainability of data sources.

Future Outlook

- Expand the monitoring framework to include additional sectors beyond water and agriculture for comprehensive climate action tracking.
- Enhance data analytics capabilities by collaborating with expert organizations to deliver more advanced reporting and actionable insights.
- Strengthen public engagement mechanisms to promote greater policy accountability, transparency, and inclusivity.

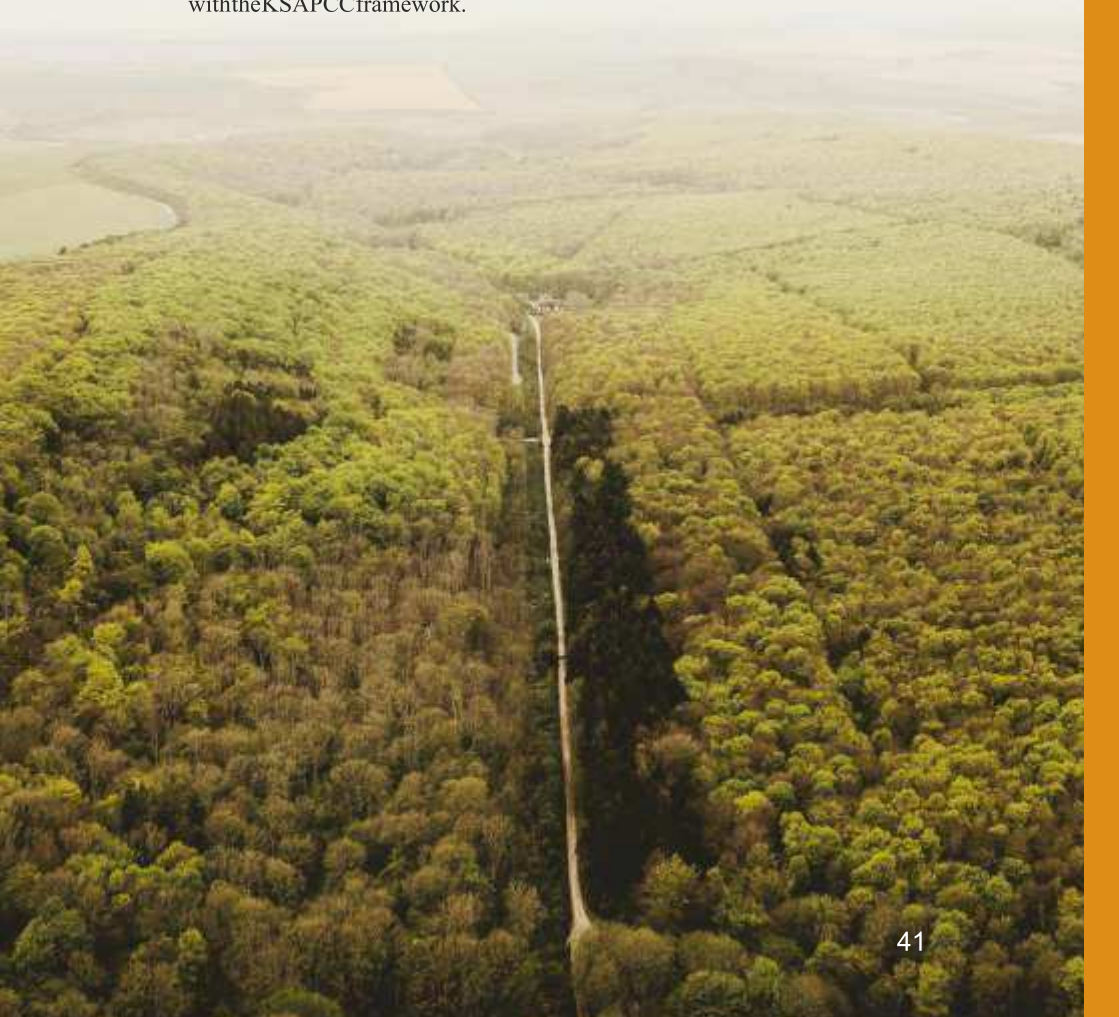


Next Steps

- Populate the dashboard with all departmental Key Performance Indicators (KPIs), a task to be undertaken by EMPRI starting next year. Departments that have not yet submitted their KPIs need to expedite the process.
- Integrate the KSAPCC Dashboard with EMPRI's Green Index into a unified platform for seamless monitoring and reporting.
- Conduct training sessions for the remaining departments to ensure comprehensive data collection, visualization, and reporting aligned with the KSAPCC framework.

- Engage with state-level departments to initiate data input into the dashboard for effective implementation.
- Migrate the dashboard from the developer's server to the government server to ensure long-term ownership and sustainability.

The KSAPCC Monitoring Dashboard represents a pivotal advancement in promoting effective climate governance and accelerating progress toward global climate goals.



6

Concluding Remarks



As climate change is progressing at an unprecedented pace, climate policies need to be more ambitious by targeted. Accordingly, the Government of India has developed its strategies from its first comprehensive National Action Plan on Climate Change (NAPCC) towards State Level Action Plans on Climate Change, Nationally Determined Contribution and Long-term Strategies (LTS). This analysis has reviewed the agriculture and water sectors in the Karnataka State Action Plan on Climate Change (KSAPCC), developed by the Environmental Management & Policy Research Institute (EMPRI) and The Energy and Resources Institute (TERI) supporting the Government of Karnataka (KSAPCC VI, 2013). As discussed earlier, following the Paris Agreement and the NDC goals and LTS targets, states are required to assess their climate actions based on domestic priorities under the SAPCC and align them with key metrics that reflect India's NDC objectives (KSAPCC V2, 2021).

This policy analysis and synthesis highlights progress while revealing key challenges, such as limited awareness generation, insufficient stakeholder engagement, weak coordination mechanisms, inadequate budgetary provisions, resource

constraints, and the pervasive uncertainty surrounding climate impacts. This document who provides recommendations aimed at strengthening the statewide climate action plan through more robust bottom-up approaches in policy development, improved fiscal management, enhanced scientific decision-making for greater resilience, capacity-building across all levels, and fostering widespread awareness of climate change and its effects. Additionally, this study offers specific recommendations for district-level management committees to ensure localized, effective implementation.

This analysis underscores the critical role of NGOs in driving climate action, both globally and in Karnataka, through case studies that highlight the importance of multi-stakeholder collaboration, equity, transparency, and accountability. NGOs play a pivotal role in policymaking, research, and evidence generation for climate action, bridging knowledge gaps and advocating for inclusivity. In Karnataka, several NGOs are actively working in the analysed sectors of water and agriculture, addressing critical climate-related issues and promoting sustainable practices alongside local communities, government bodies, and other stakeholders. Their efforts not only

contribute to building resilience, improving livelihoods, and fostering environmentally friendly practices but also support policy development, foster joint action, and enhance accountability in decision-making. Globally and in India, NGOs have historically influenced climate policy, playing a significant role in shaping the Indian Government's position during the UNFCCC. While there has been a marginalization of NGOs in more recent climate negotiations, they continue to champion justice, low-carbon development pathways and climate resilience, ensuring that these principles remain central to climate action.

Successful climate action rests on robust monitoring and evaluation for continuous improvement of policies and their implementation. The proposed Monitoring and Evaluation (M&E) framework for the water and agriculture sectors has the potential to be extended to all KSAPCC sectors over time, enabling comprehensive monitoring of progress and evaluation of total impact. This framework aims to enhance the impact of the KSAPCC. The suggested M&E framework can play a crucial role by localizing and making the implementation of the KSAPCC more measurable and effective. This framework would not only ensure better tracking of progress but also enable timely adjustments based on real-time data and insights. Additionally, it has the potential to inspire other states to develop customized M&E frameworks tailored to their State Action Plans on Climate Change (SAPCCs) and local contexts. The framework could also serve as a blueprint for an envisioned pan-India M&E system, drawing inspiration from Karnataka's approach to managing climate action.

Involving relevant stakeholders in developing the KSAPCC monitoring dashboard will be essential for refining

indicators and establishing efficient data collection methods. This collaborative approach will ensure that the framework remains practical, inclusive, and responsive to the diverse climate challenges faced across different regions of Karnataka while setting a standard for other states to follow.

Key Learnings

The fight against climate change can only be effectively tackled through local-level preparedness and well-structured action plans. The localization of subnational action plans, like the KSAPCC, presents unique challenges that require a comprehensive, multi-faceted approach. For successful implementation, a whole-of-government and whole-of-society strategy is essential, with multi-stakeholder engagement and bottom-up thinking at its core. Collaborative partnerships with government agencies are crucial for ensuring policy uptake and impactful change. NGOs and Civil Society Organizations play a vital role, and their responsibilities must be clearly defined within these subnational action plans to enable coordinated efforts.

Moreover, real-time monitoring through the suggested Monitoring and Evaluation (M&E) framework will be key in tracking progress, facilitating timely course corrections, and making data-driven decisions. By involving relevant stakeholders in shaping the KSAPCC monitoring dashboard, indicator formulation, and data collection methods, this framework not only strengthens the implementation of the KSAPCC but also serves as a model for other states to develop tailored M&E frameworks. Ultimately, Karnataka's approach can inspire the creation of a pan-India M&E system, promoting localized, effective climate action across the country.

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- KSAPCC: Karnataka State Action Plan on Climate Change
- NAPCC: National Action Plan on Climate Change
- MoEF&CC: Ministry of Environment, Forest, and Climate Change
- I(NDC): Intended Nationally Determined Contributions
- NGO: Non-Governmental Organization
- M&E: Monitoring and Evaluation
- IPCC: Intergovernmental Panel on Climate Change
- GIS: Geographic Information System
- UNFCCC: United Nations Framework Convention on Climate Change
- GIM: Green India Mission
- NSM: National Solar Mission
- EMPRI: Environmental Management & Policy Research Institute
- TERI: The Energy and Resources Institute
- KMEA: Karnataka Monitoring and Evaluation Authority
- ATREE: Ashoka Trust for Research in Ecology and the Environment

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- Financial Incentives for Climate-Smart Agriculture Adoption
- Carbon Credit Programs for Farmers and Small-Scale Landholders
- Public-Private Partnerships for Climate Investment

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- Capacity Building for Farmers on Sustainable Practices
- Training Modules for Government Officials on M&E Frameworks
- Community Awareness Programs on Climate Change Impacts
- Digital Literacy Programs for Farmers Using AI and GIS for Weather Predictions
- School-Based Programs for Climate Education and Sustainability

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- Use of Artificial Intelligence in Weather Prediction for Agriculture
- GIS-Based Crop and Water Management Tools
- Renewable Energy Technologies for Sustainable Agriculture
- Adoption of Precision Agriculture Technologies for Resource Efficiency
- Smart Irrigation Systems and IoT Applications in Water Management

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- Development of the KSAPCC Monitoring Portal
- Integration of Real-Time Data into Decision-Making Tools
- Customizable Reports for Stakeholders on Climate Action Progress
- Digital Platforms for Public Feedback on Climate Projects
- Transparent Reporting Mechanisms for Government Accountability

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