

# **Finding the Finance: A guide to identifying Centrally Sponsored Schemes to fund heat resilience solutions**

Initiative on Climate, Energy and Environment  
Centre for Policy Research, New Delhi

December 2023

Working  
Paper



**About CPR:** CPR is a non-profit, non-partisan, independent institution dedicated to conducting research that contributes to high quality scholarship, better policies, and a more robust public discourse about the issues that impact life in India. The Centre for Policy Research (CPR) has been one of India’s leading public policy think tanks since 1973. For more, visit [www.cprindia.org](http://www.cprindia.org)

**Acknowledgement:** We are grateful to Dr. M.M Ali (Meteorologist, Andhra Pradesh State Disaster Management Authority), Yogesh Kumbhejkar (District Magistrate, Bhandara) and Dr. Dukam Taipodia (Public Health Specialist, Government of Arunachal Pradesh) for their valuable feedback. We thank Avani Kapur (CPR) for her insightful comments and Sonali Verma (Sustainable Futures Collaborative) for feedback on the working paper.

This work was carried out in collaboration with the South Asia Climate Adaptation Cluster at the Salata Institute of Climate and Sustainability, and the Lakshmi Mittal and Family South Asia Institute, both at Harvard University.

**Suggested citation:** Shekhar, S., T. Dalal, S. Santhosh, A. V. Pillai & B. Krishna. 2023. “Finding the finance: A guide to identifying Centrally Sponsored Schemes to fund heat resilience solutions.” Working Paper. Initiative on Climate, Energy and Environment, Centre for Policy Research, New Delhi, December 2023.

For feedback and questions, contact Aditya Valiathan Pillai at [aditya@cprindia.org](mailto:aditya@cprindia.org)



## Table of Contents

A. Executive Summary .....	4
B. Introduction .....	7
C. How to use this guide? .....	11
D. Methodology .....	11
E. Complementarities between CSS interventions and solutions from HAPs .....	13
F. Conclusion .....	26
<i>Endnotes</i> .....	27
<i>Annexes</i> .....	31

## A. Executive Summary

This guide helps officials implementing Heat Action Plans (HAPs) identify Centrally Sponsored Schemes (CSSs) that could fund heat resilience solutions.

Solution in Heat Action Plans (HAPs) <sup>a</sup>	Relevant CSS <sup>b,c</sup>
<b><i>Infrastructure solutions</i></b>	
Provide shelter and water to reduce livestock heat stress and deaths	Rashtriya Krishi Vikas Yojana (MoAFW), Mahatma Gandhi National Rural Employment Guarantee Scheme-MGNREGS (MoRD)
Prepare firefighting equipment to allow for rapid responses to forest fires	Forest Fire Prevention and Management Scheme (MoEFCC)
Prepare water sources including tubewells, ponds, and irrigation systems to reduce the risk of water scarcity during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (MoAFW)
Ensure drinking water supply to mitigate the risk of dehydration and other effects of heat stress	Jal Jeevan Mission (MoJS), MGNREGS (MoRD), Nagar Van Yojana (MoEFCC), Pradhan Mantri Jan Vikas Karyakram (MoMA), Smart Cities Mission (MoHUA), Atal Mission for Rejuvenation and Urban Transformation-AMRUT (MoHUA)
Implement mixed-use planning to mitigate heat island effect in urban areas	Smart Cities Mission (MoHUA)
Design/facilitate green, vernacular or geo-climatically appropriate housing to facilitate passive cooling	Pradhan Mantri Awas Yojana - Urban (MoHUA), Pradhan Mantri Awas Yojana - Gramin (MoRD)
Promote rainwater harvesting to reduce the risk of water scarcity during periods of extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (MoJS), Mission Saksham, Anganwadi and Poshan 2.0 (MoWCD), MGNREGS (MoRD), Nagar Van Yojana (MoEFCC), Pradhan Mantri Jan Vikas Karyakram (MoMA), PM-Young Achievers Scholarship Award Scheme for Vibrant India (MoSJE)

Promote green energy technology for greater system resilience during extreme heat and reduced risk of maladaptation	Pradhan Mantri Awas Yojana - Urban (MoHUA)
<b><i>Nature-based solutions</i></b>	
Prevent forest fires	Forest Fire Prevention and Management Scheme (MoEFCC), Compensatory Afforestation Fund Act (MoEFCC), Green India Mission (MoEFCC)
Create temporary shade structures to reduce the risk of heat stress and deaths during extreme heat, especially for outdoor workers	Atal Mission for Rejuvenation and Urban Transformation-AMRUT (MoHUA)
Construct/maintain water bodies to reduce the risk of water scarcity during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (MoRD), MGNREGS (MoRD), AMRUT (MoHUA), Jal Jeevan Mission (MoJS)
Create shade/green cover to reduce the risk of heat stress/deaths during extreme heat and reduce overall ambient temperatures	Pradhan Mantri Gram Sadak Yojana (MoRD), MGNREGS (MoEFCC), Green India Mission (MoEFCC), Nagar Van Yojana (MoEFCC), Compensatory Afforestation Fund Act (MoEFCC), National Afforestation Programme (MoEFCC), Smart Cities Mission (MoHUA), AMRUT (MoHUA)
<b><i>Technological solutions</i></b>	
Promote energy efficiency in heat resilience measures including energy efficient buildings and renewables to reduce future heat	Smart Cities Mission (MoHUA), Jal Jeevan Mission (MoJS), Pradhan Mantri - Young Achievers Scholarship Award Scheme for Vibrant India-YASASVI (MoSJE)
<b><i>Information-based solutions</i></b>	
Increase community awareness on groundwater recharge and judicious use of water to reduce the risk of water scarcity during extreme heat	Jal Jeevan Mission (MoJS), Atal Bhujal Yojana (MoJS)



<i>Behavioural solutions</i>	
Promote heat resilient agricultural practices and efficient irrigation practices to maintain crop health during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (MoRD), Rashtriya Krishi Vikas Yojana (MoAFW)
<i>Institutional capacity building</i>	
Capacity building for structural engineers, civil engineers and architects to help them better understand heat-responsive built spaces	Pradhan Mantri Awas Yojana - Urban (MoHUA)

<sup>a</sup>Solutions in this column have been taken directly from Indian HAPs. Neither their efficacy nor suitability has been tested by the authors; this should be done through stringent, peer-reviewed research and is beyond the scope of this paper. Refer to Annex 2 for more details on these solutions.

<sup>b</sup>In the order of appearance: MoAFW (M/o Agriculture and Farmers Welfare), MoRD (M/o Rural Development), MoEFCC (M/o Environment, Forest and Climate Change), MoJS (M/o Jal Shakti), MoMA (M/o Minority Affairs), MoHUA (M/o Housing and Urban Affairs), MoWCD (M/o Women and Child Development), MoSJE (M/o Social Justice and Empowerment).

<sup>c</sup>Find more detailed descriptions of all linkages with CSS scheme in 'TABLE 2'.



## B. Introduction

This analysis attempts to address a pressing problem at the heart of India's plans to combat extreme heat: financing. Indian Heat Action Plans (HAPs) contain a welcome diversity of adaptation solutions spanning many sectors, but generally fail to identify viable sources of public and private finance to implement these solutions. In a previous study published in March 2023<sup>1</sup>, we found that only two of the 37 state, district and city heat action plans reviewed had cited specific sources of finance for at least some of their interventions.

In this analysis, we map heat-resilience solutions proposed across 37 Indian HAPs<sup>2</sup> against interventions in India's Centrally Sponsored Schemes (CSSs)<sup>3</sup>, Central-Sector Schemes (CSs), and an Act, all implemented by states with significant financial support from the Union government. These cover areas as diverse as the creation of low-cost affordable housing, the construction of artificial water bodies, urban greening, and changing the way settlements are built, among others.

CSSs carry a lot of financial firepower and if creatively utilised, could help solve some of India's climate finance shortfalls.<sup>4</sup> In Financial Year 2023-2024 (FY 2023-24), CSSs were allocated ₹ 4,76,104.59 crores<sup>5</sup> or 10.57% of the total Union budget (₹ 45,03,097 crores)<sup>6</sup>.

We reviewed a total of 72 schemes which includes 67 CSSs, one CS, one Act and three national missions/action plans<sup>7</sup> related to heat action and with budgetary allocations for FY 2023-24. We found that a quarter (18 schemes) contained interventions that directly correspond to heat resilience solutions identified in the HAPs. Overall, these 18 schemes (16 CSSs, an Act and a CS) could potentially support the implementation of 16 different types of heat solutions.

### Box 1: What are HAPs?

Heat Action Plans (HAPs) are guidance documents prepared by state, district, and city governments to help prepare for, respond to and recover from the impacts of extreme heat. One of their most important functions is to direct scarce healthcare, financial, informational, and infrastructural resources to those most vulnerable to extreme heat in their jurisdiction. For more on what HAPs generally contain, see Pillai and Dalal 2023.<sup>1,8</sup>

On average, each heat solution could be supported by three different CSSs. Some solutions enjoy greater alignment than others, for example, there are eight schemes that link to creation of shade, six that link to rainwater harvesting, and six that link to ensuring drinking water supply.

A handful of schemes comprise the bulk of the convergence with heat resilience objectives: seven of the 18 heat-relevant schemes reviewed<sup>9</sup> constitute nearly two-thirds of all links between the schemes and heat solutions. This suggests that targeted modifications to the design of a few schemes could yield major gains for national heat resilience objectives.

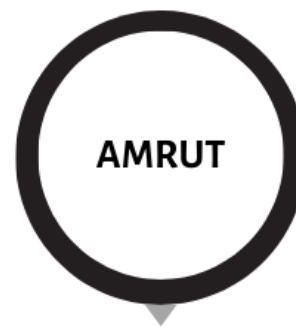
This exercise helps demonstrate what climate mainstreaming would look like in practice, showing how notionally ‘non-climate’ policies and schemes can be deployed in service of climate goals.



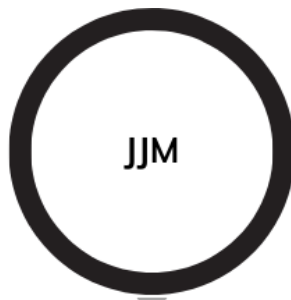
DIAGRAM 1: Schemes with significant convergence with heat resilience objectives



- Provide shelter and water to reduce livestock heat stress/deaths
- Ensure drinking water supply to mitigate risk of dehydration/heat stress effects
- Promote rainwater harvesting to reduce risk of water scarcity in extreme heat
- Construct/maintain water bodies to reduce risk of water scarcity in extreme heat
- Create shade/green cover to reduce risk of heat stress/deaths during extreme heat
- Roadside plantations for green cover to reduce risk of heat stress and reduce ambient temperatures



- Ensure drinking water supply to mitigate risk of dehydration/heat stress effects
- Design/facilitate green, vernacular or geo-climactically appropriate housing for passive cooling
- Create temporary shade structures to reduce risk of heat stress/deaths during extreme heat
- Construct/maintain water bodies to reduce risk of water scarcity in extreme heat



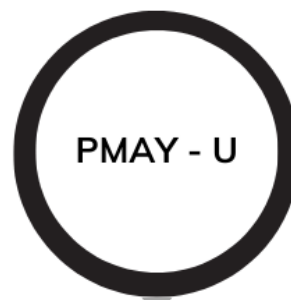
JJM

Ensure drinking water supply to mitigate risk of dehydration/other effects of heat stress

Construct/maintain water bodies to reduce risk of water scarcity in extreme heat

Promote energy efficiency in heat resilience measures including energy efficient buildings and renewables

Increase community awareness on groundwater recharge and judicious use of water to reduce the risk of water scarcity during extreme heat



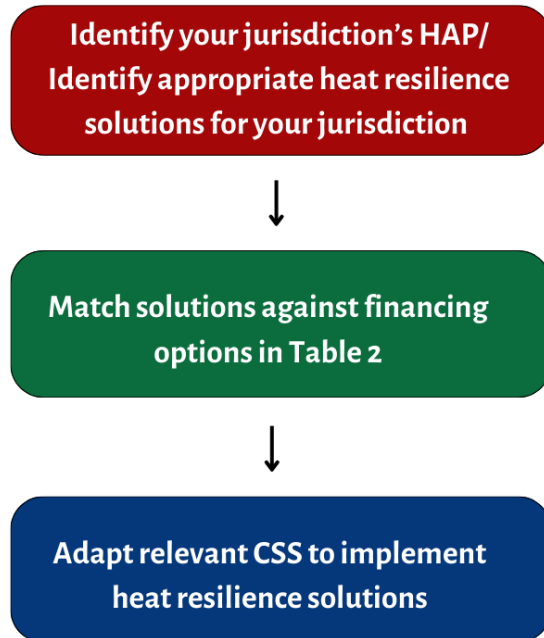
PMAY - U

Promote green energy technology for greater system resilience during extreme heat and reduce risk of maladaptation

Design/ facilitate green, vernacular or geoclimatically appropriate housing for passive cooling

Capacity building for structural engineers, civil engineers and architects to help them better understand heat-responsive built spaces

## C. How to use this guide?



This guide shows how CSSs can be used to fund some of the solutions listed in India's HAPs. It is meant for officials tasked with implementing HAPs in municipal corporations, district governments and state governments across departments such as health, revenue, disaster management, and urban planning among others.

**This document is not a substitute for a localised HAP,** as the solutions listed here have been mechanically drawn from a composite database of HAPs across the country. Individual HAPs and interventions must be tailored to the local heat threats and vulnerability profile, matched against existing evidence on efficacy (where available), and tested and iterated upon.

Once locally appropriate heat solutions have been identified, HAP implementers could use this guide to match solutions against possible sources of public finance, as listed in Table 2. Implementing such solutions would involve adapting existing scheme to make it more heat-relevant, such as directing tree planting drives to heat-stressed areas. Targeting is best done through vulnerability assessments, which identify where the most heat-vulnerable populations are located. For example, see the Jodhpur, Rajkot, and Bhubaneswar HAPs.

## D. Methodology

To match CSSs with HAP interventions, we prepared an exhaustive list of CSSs with allocations for FY 2023-24. We also included an Act, a CS and three national missions/ action plans in the preliminary analysis. These schemes were identified as heat-relevant in a prior study (see Pillai and Dalal, 2023<sup>1</sup>) and are included for their potential utility to HAP implementers. On the heat solution side, we created a comprehensive database of HAP solutions by sourcing 37 HAPs from the internet and various state and sub-national agencies (for more on this process, see Pillai and Dalal, 2023<sup>1</sup>).

Scheme guidelines were then reviewed to identify linkages with HAP solutions. The most recent guideline or annual circular available at the time was used. Each scheme was reviewed independently by two different authors to ensure all possible links to HAP solutions had been unearthed (see Table 1 for final list of CSSs reviewed).

An important limitation of the study is that we were unable to identify how much money had been allocated to a specific heat-relevant intervention within each CSSs' overall outlay. For example, it was unclear what proportion of funds allocated to the Pradhan Mantri Gram Sadak Yojana (PMGSY) could be used for tree plantation along roads. We tried to solve this by reviewing additional sources of information beyond scheme documents, including all notes on demands for grants, dashboards and parliamentary questions but were unable to establish further clarity on disaggregated, intervention-level CSS funding. Additionally, related documents such as training manuals and guidelines that pertain to implementation of these schemes have not been reviewed in this study.

**TABLE 1:** Heat-relevant CSSs and other programmes along with allocations for FY 2023-24

S.No.	Heat-relevant CSSs and other programmes	Total budgetary allocation in ₹ Crores (FY 2023-24)
1	Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	8000
2	Smart Cities Mission (SCM)	8000
3	Jal Jeevan Mission (JJM)	70000
4	Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	60000
5	Green India Mission (GIM)	220
6	National Afforestation Programme (NAP)	167 (Under GIM)
7	Forest Fire Prevention and Management Scheme (FFPM)	51 (Under GIM)
8	The Compensatory Afforestation Fund Act	Channelled through a national fund and state contributions
9	Nagar Van Yojana (NVY)	Under Compensatory Afforestation Fund Management and Planning Authority (CAMPA)
10	Pradhan Mantri Awas Yojana - Urban (PMAY-U)	25103

11	Pradhan Mantri Awas Yojana - Gramin (PMAY-G)	54487
12	Pradhan Mantri Krishi Sinchai Yojana (PMKSY)	2200 (under MoRD) 8587 (under MoJS)
13	Pradhan Mantri Gram Sadak Yojana (PMGSY)	19000
14	Rashtriya Krishi Vikas Yojana (RKVY)	7150
15	Saksham Anganwadi and POSHAN 2.0 (Umbrella ICDS - Anganwadi Services, Poshan Abhiyan, Scheme for Adolescent Girls)	20554
16	Pradhan Mantri Jan Vikas Karyakram (PMJVK) (Under Umbrella Programme for Development of Minorities)	600
17	PM Young Achievers Scholarship Award Scheme for Vibrant India (PM YASASVI) for OBCs, EBCs and DNTs	1588
18	Atal Bhujal Yojana	1000 (CS allocation)

## E. Complementarities between CSS interventions and solutions from HAPs

The following table illustrates complementarities between HAP solutions and specific CSS interventions. The table is divided into six categories of broad HAP solution types: infrastructure solutions, nature-based solutions, technological solutions, information-based solutions, behavioural solutions, and institutional capacity building. Column 1 contains specific heat resilience solutions under each category type. Scheme documents referenced are in Column 2, and Column 3 contains direct quotes from these documents to allow the readers to assess the degree of complementarity and for ease of verification.

**TABLE 2:** Complementarities between CSS interventions and heat solutions from HAPs

Solutions in Heat Action Plans (HAPs) <sup>10</sup>	Relevant CSS (with ministry)	Relevant CSS intervention (direct quotes)
<b><i>Infrastructure Solutions</i></b>		
Provide shelter and water to reduce livestock heat stress and deaths	Rashtriya Krishi Vikas Yojana ( <b>RKVY</b> ), MoAFW <sup>11</sup>	Under Illustrative List of Projects that can be funded under RKVY-RAFTAAR "(Infrastructure & Assets): Dairy -Establishment of <b>cattle-shed for milch animals</b> ", p.19
	Mahatma Gandhi National Rural Employment Guarantee Scheme ( <b>MGNREGS</b> ), MoRD <sup>12, 13</sup>	"Paragraph 1B of amended Schedule I provides that the focus of the Scheme shall be on the following works and the order of priority shall be determined by each Gram Panchayat (GP) in meetings of the Gram Sabha and Ward Sabha. The works included in para 1B are- xi) <b>livestock related works, such as, poultry shelter, goat shelter</b> , construction of pucca floor, urine tank and fodder trough for cattle-shed, azolla as cattle-feed supplement..." <i>Operational Guidelines 2013</i> , p.55
Prepare firefighting equipment to allow for rapid responses to forest fires	Forest Fire Prevention and Management Scheme ( <b>FFPM</b> ), MoEFCC <sup>14</sup>	Items of funding for the state sector- " <b>Procurement of firefighting equipment[s]</b> " p.03, 04
Prepare water sources including tubewells, ponds and irrigation systems to reduce the risk of water scarcity during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana ( <b>PMKSY</b> ), MoAFW <sup>15</sup>	"Strategy and focus areas- a) <b>Creation of new water sources; repair, restoration and renovation of defunct water sources</b> ; construction of water harvesting structures, secondary & micro storage, groundwater development, enhancing potentials of traditional water bodies at village level like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc." p.02

Ensure drinking water supply to mitigate the risk of dehydration and other effects of heat stress	Jal Jeevan Mission (JJM), MoJS <sup>16</sup>	<p>"In this backdrop, Jal Jeevan Mission (JJM) has been launched which aims to provide <b>Functional Household Tap Connection (FHTC)</b> to every rural household by 2024." p.08</p> <p>"Jal Jeevan Mission is to assist, empower and facilitate: States/UTs in planning of <b>participatory rural water supply strategy for ensuring potable drinking water security</b> on long-term basis to every rural household and public institution, viz. GP building, school, Anganwadi centre, Health centre, wellness centres, etc." p.14</p> <p>"A <b>dedicated mini water supply system</b> with solar panels and battery back-up, storage tanks of adequate capacity with sensors like motor on-off sensors, dry-run sensor and water level sensor, steel stages can be set up" p.53</p>
	Smart Cities Mission (SCM), MoHUA <sup>17</sup>	"The core infrastructure elements in a Smart City would include: i. <b>adequate water supply</b> " p.05
	MGNREGS, MoRD	"Worksite facilities (medical aid, <b>drinking water</b> and shade) are to be provided at the worksite" <i>Operational Guidelines 2013</i> , p.66
	Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0), MoHUA <sup>18</sup>	Under functional outcomes: "Providing <b>universal piped water supply</b> with household water tap connection with consideration of informal settlements and low-income household groups" p.10
	Nagar Van Yojana (NVY), MoEFCC <sup>19</sup>	"Following items of work may be undertaken in a Nagar Van/Nagar Vatika: 6. Establishment and maintenance of public conveniences, <b>drinking water facilities</b> , benches, walkways/footpaths, jogging and cycle track etc." p.05
	Pradhan Mantri Jan Vikas Karyakram (PMJKV), MoMA <sup>20</sup>	"...priority will also be accorded to emerging sectors of national importance like ... <b>drinking water projects</b> in the urban areas etc. Projects like Sadbhav Mandaps/ Common Service Centres, etc. will continue to be covered under the scheme." pg.05

Implement mixed-use planning to mitigate heat island effect in urban areas	Smart Cities Mission (SCM), MoHUA	"Some typical features of comprehensive development in Smart Cities are described below: i) <b>Promoting mixed land use</b> in area-based developments - planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change" p.07
Design/facilitate green, vernacular or geo-climatically appropriate housing to facilitate passive cooling	Pradhan Mantri Awas Yojana - Urban (PMAY-U), MoHUA <sup>21</sup>	"A Technology Sub-Mission (TSM) under the Mission would be set up to facilitate adoption of modern, innovative and green technologies and building material for faster and quality construction of houses. Technology Sub-Mission will also <b>facilitate preparation and adoption of layout designs and building plans suitable for various geo-climatic zones</b> " p.17
	Pradhan Mantri Awas Yojana - Gramin (PMAY-G), MoRD <sup>22</sup>	<p>"PMAY-G encourages <b>adoption of, as far as possible, green designs and technologies, appropriate to the local culture and geo-climatic conditions</b> (including multi-hazards), use of local material minimising carbon footprint and that the houses are comfortable." p.76</p> <p>"To provide technical support in achieving the target of Housing for All, a National Technical Support Agency (NTSA) is being set up at the national level. The activities of the Agency, inter-alia, would include ensuring quality construction, <b>promoting green housing, supporting the Ministry and States for adoption of green construction norms</b>, monitoring of implementation, management of extra budgetary resources, Information Education and Communication (IEC) activities, development and management of e-Governance solutions, data analytics, organise trainings &amp; workshop, and coordinate/monitor/facilitate the functioning of Technical Facilitation Centres identified by the State/UT Governments, <b>transition towards greening on PMAY-G houses</b>, reporting towards India's Sustainable Development Goals" p.ii</p>



		"The beneficiary to be assisted by States/UTs in house construction with a <b>bouquet of house design typologies inclusive of disaster resilience features that are suitable to their local geo climatic conditions</b> " p.iii
Promote rainwater harvesting to reduce the risk of water scarcity during periods of extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), MoJS	"Strategy and focus areas- a) Creation of new water sources; repair, restoration and renovation of defunct water sources; <b>construction of water harvesting structures, secondary &amp; micro storage, groundwater development, enhancing potentials of traditional water bodies</b> at village level like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc." p.02
		"B. PMKSY (Har Khet ko Pani)- b) Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, <b>construction of rain water harvesting structures</b> (Jal Sanchay)" p.03
	Mission Saksham, Anganwadi and Poshan 2.0, MoWCD <sup>23</sup>	"One of the important features in Saksham Anganwadi is installation of Rainwater Harvesting System. Keeping in view the increasing pressure on natural water resources, limited availability of potable water, contamination of freshwater ecosystem from developmental activities and to make the 'Jal Shakti Abhiyan: Catch the Rain' campaign successful, it has been approved to <b>install Rain Water Harvesting Structures in 2 lakh AWC buildings</b> as Saksham Anganwadi across the country in 5 years. RWHS shall be constructed as per local need/expertise as advised by local Central Ground Water Board (CGWB) Office" p.28
	MGNREGS, MoRD	Under lists of permissible works: " <b>Rooftop rain water harvesting structures in Govt. or Panchayat building</b> " <i>Annual Circular 2021-22</i> , p.40
	Nagar Van Yojana (NVY), MoEFCC	"Following items of work may be undertaken in a Nagar Van/Nagar Vatika - 5. Irrigation/ <b>rain water harvesting facility</b> " p.05

	Pradhan Mantri Jan Vikas Karyakram (PMJVK), MoMA	"States/ UTs shall also ensure that <b>provision for water harvesting</b> is made in all the buildings being constructed under PMJVK" p.10
	PM-Young Achievers Scholarship Award Scheme for Vibrant India (PM-YASASVI), MoSJE <sup>24</sup>	Under the fifth component of the umbrella scheme- "(E) Centrally Sponsored Scheme of Construction of Hostels for OBC Boys and Girls - 8.2 Essential Features to be incorporated while planning and executing hostel building, under the scheme - It is important that hostels which are constructed under the scheme satisfy the following criteria: (v) Water harvest and water-use efficiency: <b>The building should have system of harvesting rain-water</b> and also recycling waste-water optimally." p.45
Promote green energy technology for greater system resilience during extreme heat and reduce risk of maladaptation	Pradhan Mantri Awas Yojana - Urban (PMAY-U), MoHUA	"A Technology Sub-Mission (TSM) under the Mission would be set up to facilitate adoption of modern, innovative, and <b>green technologies</b> and building material for faster and quality construction of houses" p.17

### *Nature-based Solutions*

Prevent forest fires	Forest Fire Prevention and Management Scheme (FFPM), MoEFCC	"Long-term objectives- a. <b>To minimise forest fire incidences</b> and assist in restoring productivity of forest in affected areas"p.02
	Compensatory Afforestation Fund Act, 2018 <sup>25</sup>	"Not less than eighty percent of the monies referred to in sub-rule (1) *shall be used for following activities for the forest and wildlife management in a State, namely: (f) <b>forest fire prevention and control operations</b> " <i>Rules 2018</i> , p.27

		<p>"Not more than twenty per cent. of the monies referred to in sub-rule (1)* shall be utilised for strengthening of the forest and wildlife related infrastructure, capacity building of the personnel involved in utilisation of State Fund namely: (c) purchase and maintenance of equipment or devices used for communication and information technology for the purpose of protection of forest and wildlife; (d) construction, up-gradation and maintenance of inspection paths, forest roads in forest area, <b>fire lines</b>, watch towers, check posts and timber depots" <i>Rules 2018</i>, p.28</p> <p><i>*Sub-rule (1) defines how the monies received towards net present value deposited in the State Fund shall be used in the above two points.</i></p>
	<p>Green India Mission (GIM), MoEFCC<sup>26</sup></p>	<p>"Some of the key adaptation measures that would be factored in across various Sub Missions include: <b>Effective fire prevention and fire management</b>, weed management, sustainable harvesting of timber and non-timber products, securing corridors for species migration across Protected Areas (PAs)..." p.04</p>
<p>Create temporary shade structures (such as open parks) to reduce the risk of heat stress and deaths during a heatwave, especially for outdoor workers</p>	<p>Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0), MoHUA</p>	<p>"...the purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to (ii) increase the amenity value of cities by <b>developing greenery and well-maintained open spaces (e.g. parks)</b>" p.05</p> <p>Under Mission Components: "3.1.6 Green Spaces and Parks: i. <b>Development of green space and parks</b> with special provision for child-friendly components" p.07</p>

Construct/ maintain water bodies (such as ponds, lakes, streams) to reduce the risk of water scarcity during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), MoRD	"B. PMKSY (Har Khet ko Pani)-b) <b>Repair, restoration and renovation of water bodies;</b> strengthening carrying capacity of traditional water sources, construction of rain water harvesting structures (Jal Sanchay)" p.03
		"Strategy and focus areas- a) <b>Creation of new water sources; repair, restoration and renovation of defunct water sources;</b> construction of water harvesting structures, secondary & micro storage, groundwater development, <b>enhancing potentials of traditional water bodies</b> at village level like Jal Mandir (Gujarat); Khatri, Kuhl (H.P.); Zabo (Nagaland); Eri, Ooranis (T.N.); Dongs (Assam); Katas, Bandhas (Odisha and M.P.) etc." p.02
	Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0), MoHUA	"iii. <b>Rejuvenation of water bodies</b> specifically for drinking water supply and recharging of groundwater" p.06
		" <b>Rejuvenation of water bodies</b> to augment water and enhance amenity value and development of green spaces- <b>rejuvenation of wetlands</b> , diverting the polluting drains to treatment plants, harvesting the rainwater through storm water drains into water body (which is not receiving sewage/ effluent), strengthening/ rejuvenation of the aquifers/ community wells" p.10,11
		"8. <i>Reforms</i> - <b>8.3.3 Rejuvenation of water bodies</b> with area preferably one acre: ULBs which take up projects for rejuvenation of water bodies will be incentivised based on the number of water bodies taken up for rejuvenation as per the city population" p.27
	MGNREGS, MoRD	"Paragraph 1B of amended Schedule I provides that the focus of the Scheme shall be on the following works and the order of priority shall be determined by each Gram Panchayat (GP) in meetings of the Gram Sabha (GS) and the Ward Sabha. The works included in para 1B are- v) <b>renovation of traditional water bodies including desilting of tanks;</b> xiv) rural drinking water related works, such as, soak pits, recharge pits" <i>Operational Guidelines 2013</i> , p.55

	Jal Jeevan Mission (JJM), MoJS	"SAP will develop strategies for <b>state-wide rejuvenation and cleaning of village water bodies/ traditional water harvesting structures</b> . Greywater treatment and reuse will form an integral part of the water security strategy. Protection and preservation of water bodies will be helpful in achieving drinking water security. For this purpose, SWSM has to decide convergence of activities and funds from different sources, viz. MGNREGS, IWMP, SBM(G), MPLAD, MLALAD, DMDF, etc." p.22
Create shade or green cover (in urban areas, along roads, water bodies, near habitations) to reduce the risk of heat stress/ deaths during extreme heat and reduce overall ambient temperatures	Pradhan Mantri Gram Sadak Yojana (PMGSY), MoRD <sup>27</sup>	"The committee (State Level Standing Committee) shall also- f. Ensure convergence of development programmes including planning and transport facilities on constructed roads and <b>afforestation (greening alongside the roads)</b> " p.14
	Smart Cities Mission (SCM), MoHUA	"iv. <b>Preserving and developing open spaces — parks, playgrounds, and recreational spaces</b> in order to enhance the quality of life of citizens, <b>reduce the urban heat effects</b> in areas and generally promote eco-balance" p.07
	Green India Mission (GIM), MoEFCC	" <i>Sub Mission 3: Enhancing tree cover in Urban and Peri-Urban areas</i> (including institutional lands): 0.20 m ha [million hectares]; Urban forests emerge as an exciting opportunity to e) <b>provide shade and reduce ambient temperatures and the heat island effect.</b> " p.10  "Recorded or notified forest patches which are threatened by expanding urban/industrial development. Such notified <b>forest patches in urban and especially in peri-urban zones will be secured by appropriate fencing</b> " p.11  "Mission Objectives: 3.2.1 <b>Increased forest/tree cover on 5 m ha</b> [million hectares] <b>of forest/non- forest lands</b> and improved quality of forest cover on another 5 m ha of non-forest/ forest lands (a total of 10 m ha)" p.03

	Nagar Van Yojana (NVY), MoEFCC	<p>"The Revised Nagar Van Yojana aims at developing 400 Nagar Van and 200 Nagar Vatika with the objective to <b>significantly enhance tree outside forests and green cover in cities</b> leading to better environment...to the urban and peri-urban areas...(by 2024-25)"</p> <p>"10. All Nagar Van/Vatika must be open to public subject to suitable restrictions" p.03</p> <p>"B. Objectives: <b>Creating green spaces</b> and aesthetic environment in an urban set up" p.01</p>
	MGNREGS, MoRD	<p>"Paragraph 1B of amended Schedule I provides that the focus of the Scheme shall be on the following works and the order of priority shall be determined by each Gram Panchayat (GP) in meetings of the Gram Sabha (GS) and the Ward Sabha. The works included in para 1B are- ii) drought proofing including <b>afforestation and tree plantation.</b>" <i>Operational Guidelines 2013</i>, p.55</p> <p>Under lists of permissible works - "<b>Trees- line plantation, block plantation, restoration, afforestation</b>" <i>Annual Circular 2021-22</i>, p.37</p> <p>"Roadside plantation along PMGSY roads and other roads: <b>Roadside tree plantations</b> under Mahatma Gandhi NREGA are to be taken up along PMGSY roads, on priority" <i>Annual Circular 2021-22</i>, p.54</p>
	Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0), MoHUA	<p>"4.1 <i>These admissible projects/ need to be prioritised as per functional outcomes:</i></p> <p>3. Rejuvenation of water bodies to augment water and enhance amenity value &amp; development of green spaces- <b>development of the community green spaces</b> linked to a clean waterbody" p.11</p>

	<p>Compensatory Afforestation Fund Act, 2018</p>	<p>"... the monies available in a State Fund shall be disbursed and utilised in the following manner, namely: (b) the monies received towards net present value and penal net present value shall be used for <b>artificial regeneration (plantation), assisted natural regeneration, forest management, forest protection, forest and wildlife related infrastructure development</b>, wildlife protection and management, supply of wood and other forest produce saving devices and other allied activities in the manner as may be prescribed" <i>Rules 2018</i>, p.05, 06</p> <p>"Not less than eighty percent of the monies referred to in sub-rule (1) shall be used for following activities for the forest and wildlife management in a State, namely: (a) <b>assisted natural regeneration</b>; (b) <b>artificial regeneration</b>; (d) <b>protection of plantations and forests</b>; (j) <b>planting and rejuvenation of forest cover on non-forest land falling in wildlife corridors</b>" <i>Rules 2018</i>, p.27</p>
	<p>National Afforestation Programme (NAP), MoEFCC<sup>28</sup></p>	<p>"Short term objectives: - <b>Regeneration and eco-development of degraded forests</b> and adjoining areas on a watershed basis - Develop water resources through <b>plantation</b> and water harvesting programme" p.01</p>

### Technological Solutions

Promote energy efficiency in heat resilience measures including energy efficient buildings, renewables to reduce future heat	Smart Cities Mission (SCM), MoHUA	"Application of smart solutions will enable cities to use technology, information and data to improve infrastructure and services for core infrastructure elements. Illustrative List of 'Smart solutions': (4) Energy management- <b>a) Renewable sources of energy; b) Energy efficient &amp; green buildings</b> " p.06
	Jal Jeevan Mission (JJM), MoJS	"A <b>dedicated mini water supply system with solar panels and battery back-up, storage tanks</b> of adequate capacity with sensors like motor on-off sensors, dry-run sensor and water level sensor, steel stages can be set up" p.53
	PM-Young Achievers Scholarship Award Scheme for Vibrant India (PM-YASASVI), MoSJE	Under the fifth component of the umbrella scheme - "(E)Centrally Sponsored Scheme of Construction of Hostels for OBC Boys and Girls - 8.2 Essential Features to be incorporated while planning and executing Hostel building, under the Scheme- It is important that hostels which are constructed under the scheme satisfy the following criteria: (iii) Energy – efficiency: <b>The building should have low energy requirements and should make maximum possible use of natural lighting, solar energy,</b> natural ventilation, etc." p.45

### Information-based Solutions

Increase community awareness on ground-water recharge and judicious use of water to reduce the risk of water scarcity during extreme heat	Jal Jeevan Mission (JJM), MoJS	"Jal Jeevan Mission is to assist, empower and facilitate capacity building of <b>the stakeholders and create awareness in community on significance of water</b> for improvement in quality of life" p.14
	Atal Bhujal Yojana, MoJS <sup>29</sup>	"...this is the first scheme of its kind which will involve community-based planning, monitoring, sharing and use of ground water and related data; <b>capacity building of all stakeholders,</b> community led groundwater management through a combination of demand/ supply side management measures" p.06





### *Behavioural Solutions*

Promote heat resilient agricultural practices and efficient irrigation practices to maintain crop health during extreme heat	Pradhan Mantri Krishi Sinchayee Yojana ( <b>PMKSY</b> ), MoRD	"B. PMKSY (Har Khet ko Pani): a. Creation of new water sources through <b>minor irrigation</b> (both surface and groundwater)" p.03
		"C. PMKSY (Per Drop More Crop): d) <b>Construction of micro irrigation structures</b> to supplement source creation activities including tube wells and dug wells (in areas where groundwater is available and not under semi critical /critical /over exploited category of development) which are not supported under AIBP, PMKSY (Har Khet ko Pani), PMKSY (Watershed) and MGNREGS as per block/district irrigation plan." pg.04
	Rashtriya Krishi Vikas Yojana ( <b>RKVY</b> ), MoAFW	"RKVY-RAFTAAR (Special Sub-Schemes): This will comprise of sub-schemes based on national priorities as notified by the Govt. of India from time to time. The inter-se allocation of funds across various components should suitably <b>incentivise micro irrigation</b> , post-harvest management and immediate attention to districts which are prone to drought and are predominantly rainfed." p.05

### *Institutional Capacity Building*

Capacity building for structural engineers, civil engineers and architects to help them better understand heat-responsive built spaces	Pradhan Mantri Awas Yojana -Urban ( <b>PMAY-U</b> ), MoHUA	"Centre and State would also partner with willing IITs, NITs and Planning & Architecture institutes for <b>developing technical solutions, capacity building and handholding of States and Cities</b> " p.17
--	--	--

## F. Conclusion

This guide has been drafted with the aim of identifying links between prescribed interventions in CSSs and other select schemes with budgetary allocations in FY 2023-24, and the solutions prescribed in India's HAPs. It aims to help government officials tasked with HAP implementation identify sources of public finance for India's chronically underfunded HAPs. These linkages are an actionable path to implementing urgently needed solutions. They also demonstrate a path to mainstreaming climate priorities in public policy.

The scope of this work could be expanded to go beyond CSS to systematically include all central sector schemes and state schemes, taking a step towards mainstreaming heat-related planning and policy making at different tiers of governance. A similar analysis for state schemes might be particularly salient as they are more easily adaptable to local needs.

The present analysis is a stepping stone to better understanding how governments could adapt existing schemes to mainstream climate adaptation objectives, identify gaps in implementation frameworks, and forge better policy convergence pathways. Further, it also facilitates integration of CSs and CSSs with policies like the India Cooling Action Plan (ICAP) and missions under the National Action Plan on Climate Change (NAPCC)<sup>30</sup>. The work of identifying specific changes in the language and design of existing schemes will require a separate analysis.



## Endnotes

<sup>1</sup>Pillai, A. V. and Dalal, T., 2023, Centre for Policy Research (CPR), New Delhi, *How is India adapting to heatwaves? :An assessment of heat action plans with insights for transformative climate action*, Available at:

[https://cprindia.org/wp-content/uploads/2023/03/Heat-Report\\_27March-23\\_Updated-Table.pdf](https://cprindia.org/wp-content/uploads/2023/03/Heat-Report_27March-23_Updated-Table.pdf)

<sup>2</sup>This comprehensive list of solutions was collated from a self-assembled database of 37 Indian HAPs used in Pillai, A. V., and Dalal, T., 2023, Centre for Policy Research (CPR), New Delhi, *How is India adapting to heatwaves? :An assessment of heat action plans with insights for transformative climate action*

<sup>3</sup>Apart from CSSs, this analysis includes the Atal Bhujal Yojana (a central-sector scheme that was formerly a CSS) and CAMPA (Compensatory Afforestation Act). See the section on Methods for more.

<sup>4</sup>Pillai, A.V., Dubash, N., and Bhatia, P., 2021, Centre for Policy (CPR), New Delhi, *Unlocking Climate Action in Indian Federalism*. Available at: [https://cprindia.org/wp-content/uploads/2021/12/Pillai-Dubash-and-Bhatia\\_Unlocking-Climate-Action-in-Indian-Federalism\\_Policy-Brief\\_Jul21.pdf](https://cprindia.org/wp-content/uploads/2021/12/Pillai-Dubash-and-Bhatia_Unlocking-Climate-Action-in-Indian-Federalism_Policy-Brief_Jul21.pdf)

<sup>5</sup>Expenditure Profile 2023-24, Ministry of Finance, Government of India <https://www.indiabudget.gov.in/doc/eb/stat4a.pdf>

<sup>6</sup>Budget at a Glance 2023-24, Ministry of Finance, Government of India [https://www.indiabudget.gov.in/doc/Budget\\_at\\_Glance/budget\\_at\\_a\\_glance.pdf](https://www.indiabudget.gov.in/doc/Budget_at_Glance/budget_at_a_glance.pdf)

<sup>7</sup>The full list of all 72 schemes used for this analysis is available in Annex 03.

<sup>8</sup>For the full list of solutions prescribed within the HAPs, please refer to the diagram in Annex 01, sourced from Pillai and Dalal (2023). The specific design or phrasing of these solutions could differ slightly among various HAPs. Lighter shades within a category indicate short-term measures (effective for one heat season), while darker shades represent long-term solutions (extending beyond one heat season).

<sup>9</sup>Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Smart Cities Mission (SCM), Jal Jeevan Mission (JJM), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Pradhan Mantri Awas Yojana - Urban (PMAY-U) and Nagar Van Yojana (NVY).

<sup>10</sup>The table in Annex 02 shows the edited 'Solutions' from the Indian HAPs, against the full unedited text taken from all 37 HAPs

<sup>11</sup>Ministry of Agriculture & Farmers Welfare, Government of India. 2017. *Rashtriya Krishi Vikas Yojana Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR) Operational Guidelines*. Available at:

[https://rkvy.nic.in/static/download/pdf/RKVY\\_14th\\_Fin\\_Comm.pdf](https://rkvy.nic.in/static/download/pdf/RKVY_14th_Fin_Comm.pdf)

<sup>12</sup>Ministry of Rural Development, Government of India. 2013. *Mahatma Gandhi National Rural Employment Guarantee Act, 2005. Operational Guidelines 2013*. Available at:

<https://ruraldev.gujarat.gov.in/writereaddata/images/pdf/mnrega/nrega-operational-Guidelines-4thedition-eng-2013.pdf>

<sup>13</sup>Ministry of Rural Development, Government of India. 2022. *Mahatma Gandhi National Rural Employment Guarantee Act, 2005. Annual Master Circular 2021-22*. Available at:

[https://nregaplus.nic.in/netnrega/writereaddata/Circulars/2448Annual\\_Master\\_Circular\\_2021-22\\_English.pdf](https://nregaplus.nic.in/netnrega/writereaddata/Circulars/2448Annual_Master_Circular_2021-22_English.pdf)

<sup>14</sup>Ministry of Environment, Forest and Climate Change(Forest Protection Division), Government of India. 2017. *Operational Guidelines for the CSS of Forest Fire Prevention and Management (FPM)* .

Available at: <http://moef.gov.in/wp-content/uploads/2018/03/POST-2.pdf>

<sup>15</sup>Ministry of Agriculture & Farmers Welfare, Government of India. n.d. *Operational Guidelines of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)*. Available at:

[https://pmksy.gov.in/pdflinks/Guidelines\\_English.pdf](https://pmksy.gov.in/pdflinks/Guidelines_English.pdf)

<sup>16</sup>Ministry of Jal Shakti, Government of India. 2019. *Operational Guidelines for the Implementation of Jal Jeevan Mission*. Available at: [https://jalshakti-](https://jalshakti-ddws.gov.in/sites/default/files/JJM_Operational_Guidelines.pdf)

[ddws.gov.in/sites/default/files/JJM\\_Operational\\_Guidelines.pdf](https://jalshakti-ddws.gov.in/sites/default/files/JJM_Operational_Guidelines.pdf)

<sup>17</sup>Ministry of Housing and Urban Development, Government of India. 2015. *Smart Cities Mission Statement and Guidelines*. Available at:

[http://164.100.161.224/upload/uploadfiles/files/SmartCityGuidelines\(1\).pdf](http://164.100.161.224/upload/uploadfiles/files/SmartCityGuidelines(1).pdf)

<sup>18</sup>Ministry of Housing and Urban Affairs, Government of India. 2021. *Atal Mission for Rejuvenation and Urban Transformation 2.0. Operational Guidelines 2021*. Available at:

<https://mohua.gov.in/upload/uploadfiles/files/AMRUT-Operational-Guidelines.pdf>

- <sup>19</sup>Ministry of Environment, Forest and Climate Change, Government of India. n.d. *Nagar Van Yojana (Revised Guideline Version)*. Available at: [https://mpforest.gov.in/img/files/Nagar\\_Van\\_Scheme\\_Guidelines\\_English.pdf](https://mpforest.gov.in/img/files/Nagar_Van_Scheme_Guidelines_English.pdf)
- <sup>20</sup>Ministry of Minority Affairs, Government of India. 2022. *Guidelines for Revised Pradhan Mantri Jan Vikas Karyakram (PMJVK scheme)*. Available at: [https://www.minorityaffairs.gov.in/showfile.php?lang=1&level=4&ls\\_id=308&lid=240](https://www.minorityaffairs.gov.in/showfile.php?lang=1&level=4&ls_id=308&lid=240)
- <sup>21</sup>Ministry of Housing and Urban Affairs, Government of India. 2021. *Pradhan Mantri Awas Yojana (Urban). Housing for All Mission. Scheme Guidelines 2021*. Available at: <https://pmay-urban.gov.in/uploads/guidelines/62381c744c188-Updated-guidelines-of-PMAY-U.pdf>
- <sup>22</sup>Ministry of Rural Development, Government of India. 2022. *Framework for Implementation of Pradhan Mantri Awas Yojana- Gramin (PMAY-G) (2022)*. Available at: [https://pmayg.nic.in/netiayHome/Uploaded/Guidelines-English\\_Book\\_Final.pdf](https://pmayg.nic.in/netiayHome/Uploaded/Guidelines-English_Book_Final.pdf)
- <sup>23</sup>Ministry of Women and Child Development, Government of India. 2022. *Mission Saksham Anganwadi and Poshan 2.0 Scheme Guidelines*. Available at: <https://wcd.nic.in/sites/default/files/Final%20Saksham%20Anganwadi%20and%20Mission%202.0%20guidelines%20July%2029%202022.pdf>
- <sup>24</sup>Ministry of Social Justice & Empowerment, Government of India . 2021. *PM Young Achievers Scholarship Award Scheme for Vibrant India for OBCs and Others (PM – YASASVI) (2021-2022 to 2025-26)*. Available at: <https://socialjustice.gov.in/public/ckeditor/upload/65661651839791.pdf>
- <sup>25</sup>The Compensatory Afforestation Fund- Rules, 2018. (Managed by the Compensatory Authority Fund Management and Planning Authority (CAMPA), under the M/o EFCC).
- <sup>26</sup>Ministry of Environment, Forest and Climate Change, Government of India. 2010. *National Mission for a Green India (Under the National Action Plan on Climate Change)*. Available at: [https://www.jkforest.gov.in/assets/pdf/gim/GIM\\_Mission-Documents-1.pdf](https://www.jkforest.gov.in/assets/pdf/gim/GIM_Mission-Documents-1.pdf)
- <sup>27</sup>Ministry of Rural Development, Government of India. 2019. *Pradhan Mantri Gram Sadak Yojana. Programme Guidelines (PMGSY-III)*. Available at: <https://pmgsy.nic.in/sites/default/files/pdf/PMGSY3gl.pdf>
- <sup>28</sup>Ministry of Environment, Forest and Climate Change, Government of India. *Operational Guidelines for the Tenth Five-Year Plan. National Afforestation Programme (NAP)*. Available at: <https://moef.gov.in/wp-content/uploads/2017/09/OPERATIONALGUIDELINES.pdf>

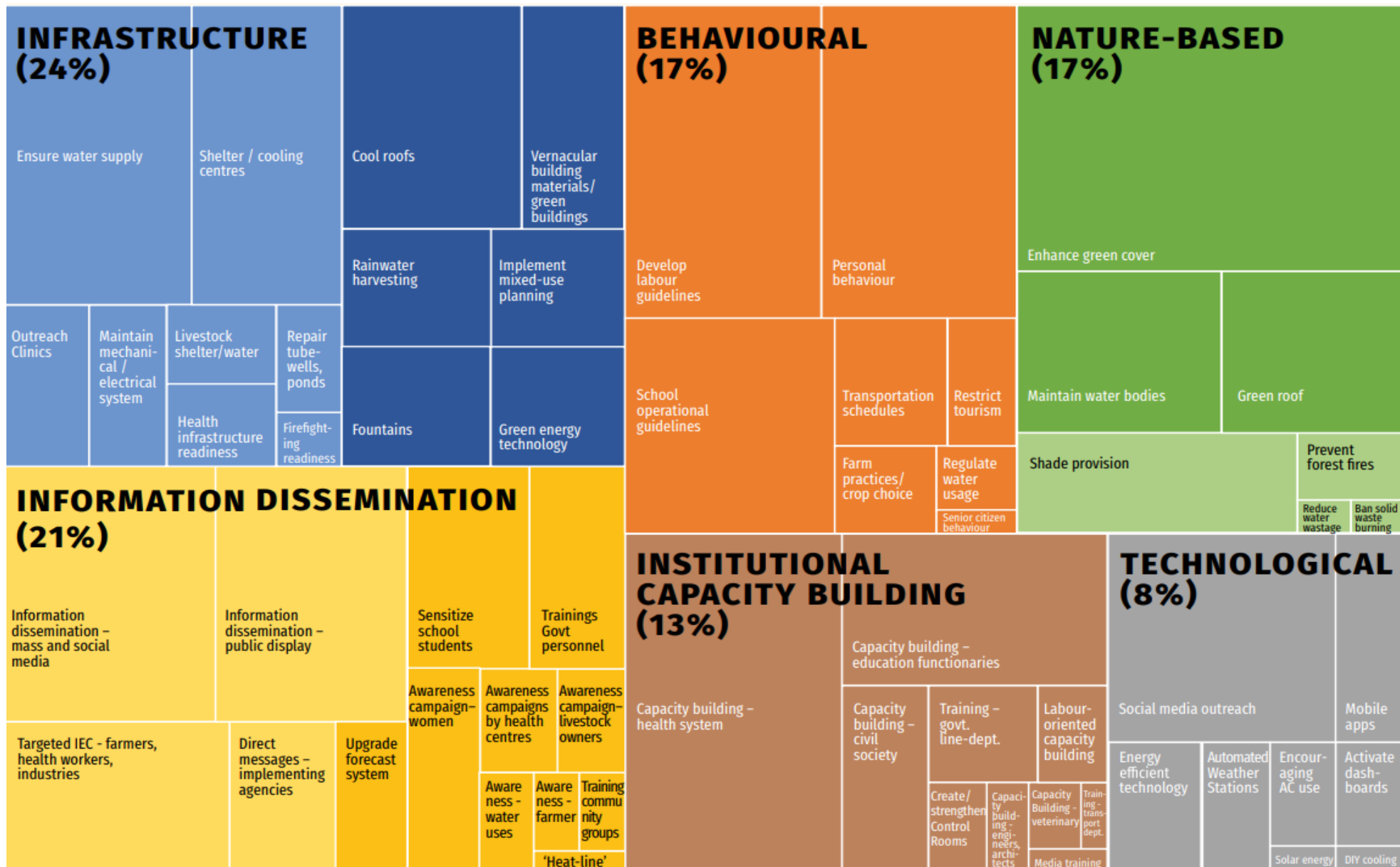
<sup>29</sup>Ministry of Jal Shakti, Government of India. n.d. *Atal Bhujal Yojana Program Guidelines (Version 1.1)*. Available at:

[https://ataljal.mowr.gov.in/Ataljalimages/Atal\\_Bhujal\\_Yojana\\_Program\\_Guidelines\\_Ver\\_1.pdf](https://ataljal.mowr.gov.in/Ataljalimages/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf)

<sup>30</sup>Table in Annex 04 shows existing CSS/ National Missions and Plans that have linkages with heat resilience solutions, but lack financing.

# Annexes

## Annex 1: List of all the solutions prescribed within Indian HAPs





## Annex 2: Abridged heat solution text from HAPs

The list of heat solutions in Table 2 (column 1) synthesises multiple solutions worded differently across HAPs.

Solutions in Heat Action Plans	Unabridged text collated from the HAPs
<b><i>Infrastructure solutions</i></b>	
Provide shelter and water to reduce livestock heat stress and deaths	Ensure safe shelter and water for livestock and animals.
Prepare firefighting equipment to allow for rapid responses to forest fires	Ensure the readiness of firefighting equipment and vehicles to face any emergency.
Prepare water sources including tubewells, ponds and irrigation systems to reduce risk of water scarcity during extreme heat	Repair/maintenance of mechanical/electrical faults of tube wells, ponds, <i>gorhat</i> on priority basis to ensure water storage for irrigation.
Ensure drinking water supply to mitigate the risk of dehydration and other effects of heat stress	Ensure water supply: Arrange drinking water supply at all common place and nearby habitation and promptly respond to water scarcity; release of canal water to the affected areas for public use to increase the underground water level; water supply in the slums by utilising tanks, distribution of fresh drinking water to the vulnerable communities in the form of pouches of water, <i>pyau</i> or water kiosks near the public concentrated places depending upon the issuance of heat alert; provision for drinking water in public places (highways, bus and train stations, etc.) and at sites of vulnerable communities.
Implement mixed-use planning to mitigate heat island effect in urban areas	Ensure implementation of mixed-use planning in heat wave affected cities.
Design/ facilitate green, vernacular or geo-climatically appropriate housing to facilitate passive cooling	Call for vernacular building materials, construction of the green building, Energy Conservation Building Code (ECBC) etc. related to heat wave risk mitigation.
Promote rainwater harvesting to reduce the risk of water scarcity during extreme heat	Promote rainwater harvesting.
Promote green energy technology for greater system resilience during extreme heat and reduce risk of maladaptation	Promote green energy technology.





<i>Nature-based Solutions</i>	
Prevent forest fire	Prevention of forest fire.
Create temporary shade structures to reduce the risk of heat stress and deaths during extreme heat, especially for outdoor workers	Ensure shade: Open parks/open areas during daytime for providing spaces with shade; open public spaces: leave parks, zoos, swimming pools open for longer hours.
Construct /maintain water bodies such as ponds, lakes, streams to reduce the risk of water scarcity during extreme heat	Maintain water bodies: construction of ponds and artificial lakes for evaporative cooling; deepening water bodies through MGNREGS; rejuvenation of streams, reservoirs etc to improve water retaining capacity; altering of land-use and land-cover; all the water bodies in and around urban areas should be renovated, restored and repaired and these should be made free from pollution to make them usable and increase access to general public; construct water trough for animals in strategic location; watershed development; maintain water bodies in the forest area for wild animals & birds; water ponds maintenance in reserves.
Create shade/ green cover (in urban areas, along roads, along water bodies, near habitations) to reduce the risk of heat stress and deaths during extreme heat and reduce overall ambient temperatures	Enhance shade/green cover: Green cover activity, tree-plantation campaign in hotspot areas such as roadsides and during the plantation festival in June. Incorporate student volunteers or incentivize builders to plant trees to help effect this effort; urban forestry, avenue plantation; create small, accessible green spaces by using vacant spaces such as side lots, parking medians, spaces between buildings and roads; increase forest cover; develop a strategy to incorporate the green belt concept in urban planning, evaluate the efficacy of these initiatives and the highest priority locations for intervention; tree plantation on large scale and identify caretaker agencies for their sustenance e.g. SAIL, CSTP; plantation of trees with higher LAI (Leaf Area Index) bordering the pavements of national highways, state highways and newly proposed roads have also been included under the urban planning section; special focus on hillocks and canal bunds to be fully covered with vegetation in the city – help in absorption of heat and reduce reflection; developing vertical gardens and small parks; the animal husbandry department should promote plantation of banyan/ <i>peepal</i> tree on water/government land in cattle populated area; the forest and environment department is responsible for plantation of shelter trees/wind breakers near



	habitation; promote greeneries in urban areas.
--	--

<b><i>Technology</i></b>	
--------------------------	--

<p>Promote energy efficiency in heat resilience measures including efficient buildings and renewables to reduce future heat</p>	<p>Promotion of technologies such as Energy Conservation Building Code (ECBC), energy efficient buildings, green energy technology, green transport etc for heat wave risk mitigation; energy efficient systems in usage of coolers, air conditioners and refrigeration units in the cities which may result in reduction of emissions from these units.</p>
---	--

<b><i>Information-based Solutions</i></b>	
---	--

<p>Increase community awareness on groundwater recharge and judicious use of water to reduce the risk of water scarcity during extreme heat</p>	<p>Community awareness on groundwater recharge, judicious use of water; energy conservation.</p>
---	--

<b><i>Behavioural Solutions</i></b>	
-------------------------------------	--

<p>Promote heat resilient agricultural practices and efficient irrigation practices to maintain crop health during extreme heat</p>	<p>Change crop choice: Promote short duration and heat resisting crops. Changing agricultural practices: Popularising crops needing less water like maize, ragi, pulses etc and short duration varieties of crops; popularising PUSA Hydrogel especially in crops like mung, biri to retain the soil moisture by preventing evaporation from soil and releasing water in slow phases based on the need of the crop; promoting adoption of mulching technique for soil moisture conservation; ensuring timely weeding, inter-cultural operation and application of herbicides as well as spraying of need-based pesticides during morning or afternoon hours ; improving water-use efficiency by advocating usage of micro irrigation; use of methylo bacterium during water stress situation; use of NAA, KCL and CYCLOCEL to mitigate water stress; use of Kaolin spray to minimise the damage of crops due to water stress; popularising the use of Pusa Hydrogel especially for crops like red gram and other pulses to retain soil moisture by preventing evaporation from soil and by releasing water in slow phase based on the need of the crop.</p>
---	---



### ***Institutional Capacity Building***

Capacity building for structural engineers, civil engineers and architects to help them better understand heat-responsive built spaces	Capacity building of structural engineers, civil engineers and architects for cool roof installation.
--	---

### **Annex 3:**

The table below shows all schemes analysed (CSSs as given in the *Notes on Demand for Grants FY 2023-24*) with highlights to indicate those with direct links.

<b>Centrally Sponsored Schemes</b>	
01	Rashtriya Krishi Vikas Yojana (RKVY)
02	National Mission on Natural Farming
03	Krishionnati Yojana
04	National AYUSH Mission- ( <i>Under National Health Mission</i> )
05	Assistance to States Agencies for Intra-State Movement of Foodgrains and FPS Dealers Margin under NFSA
06	Computerization of Primary Agricultural Credit Societies
07	Prosperity through Cooperatives
08	National Education Mission
09	Pradhan Mantri Poshan Shakti Nirman (PM POSHAN)
10	Strengthening Teaching-Learning and Results for States (STARS)
11	PM Schools for Rising India (PM SHRI)
12	New India Literacy Programme (NILP)
13	Transfer to Prarambhik Shiksha Kosh (PSK)
14	Rashtriya Uchhatar Shiksha Abhiyan (RUSA)
15	Green India Mission (GIM)/National Mission for a Green India (NMGI)
16	Nagar Van Yojana (NVY) ( <i>Under CAMPA</i> )
17	Forest Fire Prevention and Management (FFPM) ( <i>Under GIM</i> )
18	Integrated Development of Wildlife Habitats (IDWH)
19	Conservation of Natural Resources and Ecosystems
20	Fisheries and Aquaculture Infrastructure Development Fund
21	Pradhan Mantri Matsya Sampada Yojana (PMMSY)

22	Dairy Development
23	Rashtriya Gokul Mission
24	Livestock Census and Integrated Sample Survey
25	National Livestock Mission
26	Dairying Through Cooperatives (EAP)
27	PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME)
28	Flexible Pool for RCH & Health System Strengthening, National Health Programme and National Urban Health Mission ( <i>Under National Health Mission</i> )
29	Infrastructure Maintenance ( <i>Under National Health Mission</i> )
30	Strengthening National Programme Management of the NRHM ( <i>Under National Health Mission</i> )
31	Human Resources for Health and Medical Education ( <i>Under National Health Mission</i> )
32	National Cyclone Risk Mitigation Project
33	Modernisation of Police Forces
34	Border Area Development Program
35	Pradhan Mantri Awas Yojana – Urban (PMAY-U)
36	Deendayal Antyodaya Yojana -National Urban Livelihood Mission (NULM)
37	Urban Rejuvenation Mission (AMRUT)- 500 Cities
38	Mission for Development of 100 Smart Cities (SCM)
39	Swachh Bharat Mission (SBM) - Urban
40	Swachh Bharat Mission (SBM) - Gramin
41	Pradhan Mantri Krishi Sinchai Yojana (PMKSY), M/o Jal Shakti
	Pradhan Mantri Krishi Sinchai Yojana (PMKSY), M/o Rural Development
42	National River Conservation Plan- other basins
43	Interlinking of Rivers
44	Jal Jeevan Mission (JJM) / National Rural Drinking Water Mission
45	Employment Generation Programmes
46	Infrastructure Facilities for Judiciary
47	Pradhan Mantri Jan Vikas Karyakram (PMJVK) ( <i>Under Umbrella Programme for Development of Minorities</i> )
48	Rashtriya Gram Swaraj Abhiyan (RGSA)
49	National Social Assistance Programme (NSAP)
50	Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)
51	Pradhan Mantri Gram Sadak Yojana (PMGSY)
52	National Rural Livelihood Mission (NRLM)
53	Pradhan Mantri Awas Yojana – Gramin (PMAY-G)
54	Skill Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP)

55	Skill Strengthening for Industrial Value Enhancements (STRIVE)
56	Strengthening of Infrastructure for Institutional Training
57	Umbrella Scheme for Development of Scheduled Castes
58	PM Young Achievers Scholarship Award Scheme for Vibrant India (PM YASASVI)-Under Umbrella Programme for Development of Other Vulnerable Groups
59	Umbrella Programme for Development of Other Vulnerable Groups
60	Safe Tourist Destination for Women
61	Umbrella Programme for Development of Scheduled Tribes
62	Mission for Protection and Empowerment for Women
63	Saksham Anganwadi and POSHAN 2.0 (Umbrella ICDS - Anganwadi Services, Poshan Abhiyan, Scheme for Adolescent Girls)
64	Mission VATSALYA (Child Protection Services and Child Welfare Services)
65	Mission for Protection and Empowerment for Women
66	Mission Shakti
67	National Afforestation Programme (NAP)
<b>Others</b>	
68	National Compensatory Afforestation Fund
69	National Mission for Sustainable Agriculture (NMSA)
70	National Mission for Sustainable Habitat (NMSH)
71	National Action Plan for Climate Change and Human Health (NPCCHH)
72	Atal Bhujal Yojana (Central-Sector Scheme)

**Annexure 04:**

Policies/Schemes with direct links to heat resilient action but lack funding.

Policy	Statement	Comments
<b>National Mission for Sustainable Habitat (NMSH)</b> [No Direct Financial Allocation]		
"NMSH has identified five thematic areas, namely (i) Energy and Green Building, (ii) Urban Planning, Green Cover and Biodiversity, (iii) Mobility and Air Quality, (iv) Water Management, and (v) Waste Management" p.xv		Despite being relevant for covering the umbrella issue of sustainable habitat building, NMSH as a mission has no direct financial allocation as of now.

<p><i>National Mission on Sustainable Habitat 2021-2030, M/oHUA, 2021, Available at:</i>  <a href="https://mohua.gov.in/upload/uploadfiles/files/NMSH-2021.pdf">https://mohua.gov.in/upload/uploadfiles/files/NMSH-2021.pdf</a></p>	
<p><b>National Action Plan for Climate Change and Human Health (NPCCHH)</b>          [No Direct Financial Allocation- but for certain sub components]</p>	
<p>"Climate change may have various impacts, but most commonly observed negative effects on human health are seen as rise in illnesses and deaths." p.11  <i>The policy talks about 'Direct &amp; Indirect Impacts' of climate change on health-such as heat stress, vector and water borne diseases, etc.</i></p>	<p>Although the document talks explicitly about the health impacts of climate change, differences in vulnerabilities, etc., NAPCCHH has no direct financial allocation as of now.</p>
<p><i>National Action Plan on Climate Change and Human Health, M/oHFW, 2018, Available at:</i>  <a href="https://ncdc.gov.in/WriteReadData/l892s/27505481411548674558.pdf">https://ncdc.gov.in/WriteReadData/l892s/27505481411548674558.pdf</a></p>	
<p><b>National Mission for Sustainable Agriculture (NMSA)</b></p>	
<p>"On Farm Water Management (OFWM):          i. OFWM will focus on enhancing water use efficiency by promoting appropriate technological interventions like drip &amp; sprinkler technologies, efficient water application &amp; distribution system, secondary storage and drainage development.          vii. Training on appropriate water management technologies, judicious use of water and agronomic &amp; land development measures for effective water management" p.14,15</p>	<p>Although the NMSA discusses the importance of preserving water bodies, regulating water use, and using efficient irrigation methods, which remain crucial interventions for agriculture during extreme temperatures, it does not have any funding for FY 2023-24.</p>
<p><i>National Mission for Sustainable Agriculture, M/oAFW, 2014, Available at:</i>  <a href="https://nmsa.dac.gov.in/pdfdoc/NMSA_Guidelines_English.pdf">https://nmsa.dac.gov.in/pdfdoc/NMSA_Guidelines_English.pdf</a></p>	