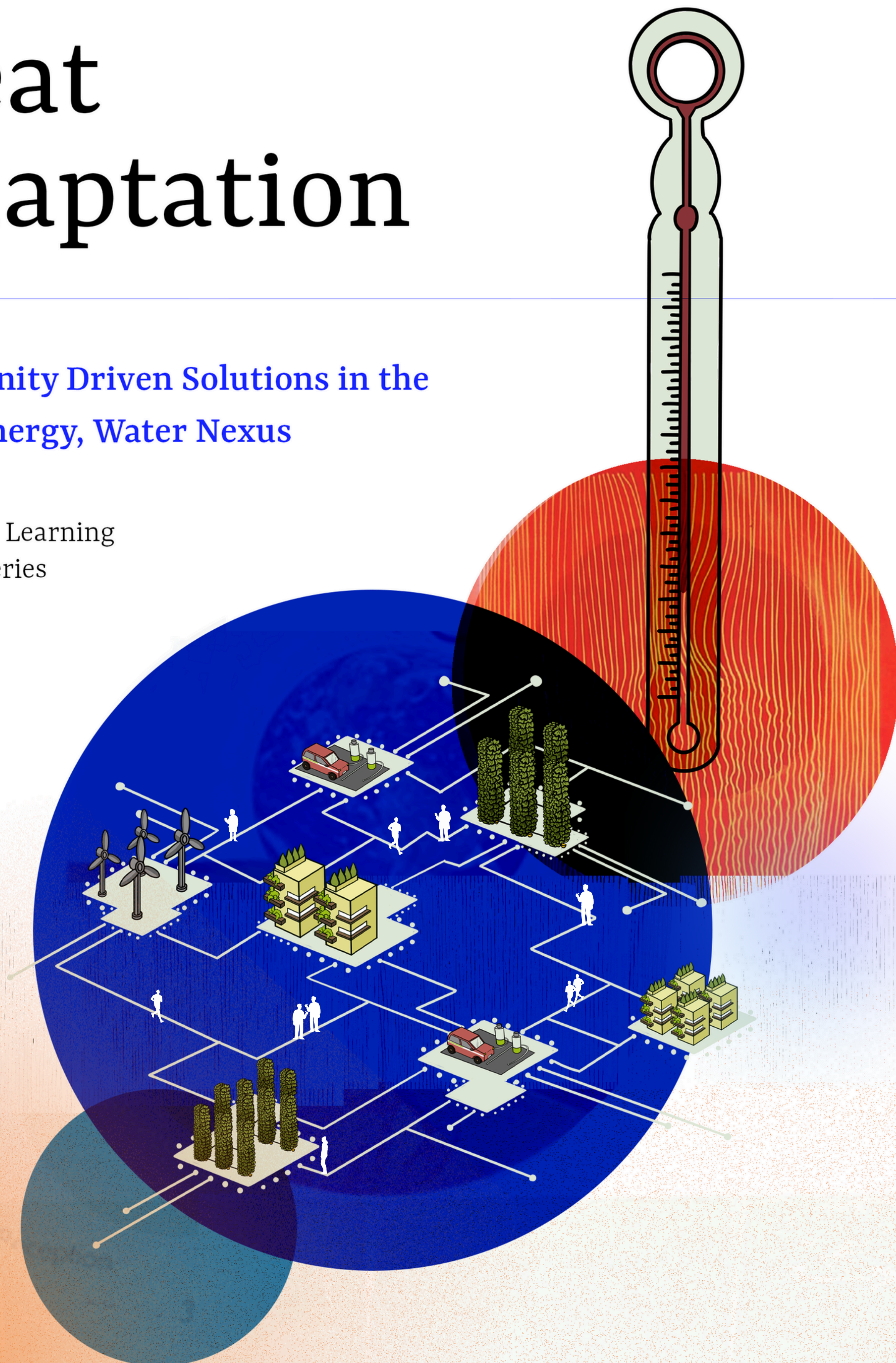


Heat Adaptation

Community Driven Solutions in the
Food, Energy, Water Nexus

ARA - TLS Learning
Journey Series



About the authors

The report is developed collectively by the ARA TLS team, including Prerna Singh, Abhipsha Ghosh, and Diksha from Transitions Research.

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About the Adaptation Research Alliance

The Adaptation Research Alliance (ARA) is a global coalition responding to the urgent challenges faced by vulnerable communities from climate change. Their membership is made up of researchers, funders, policymakers, development bodies and community-based organisations committed to action-oriented research for adaptation that supports climate resilient futures.

About Transitions Research

Transitions Research is a social science research collective. We examine radical transformations shaping our future, including both urbanisation and the emergence of a climate-resilient society. Our research on urban resilience foregrounds social vulnerability, the differential impact on marginal social groups and communities. Our expertise is focused on driving climate action that's inclusive and participatory by engaging with diverse stakeholders to co-create and test resilience solutions that address challenges of the most vulnerable.

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Overview

As **global warming continues to escalate at 0.2° C per decade**, the frequency and severity of extreme heat events are intensifying worldwide.

Facing the highest risk are regions experiencing record-breaking heatwaves in terms of intensity or duration, as well as those previously unaccustomed to extreme temperatures. **Developing and least developed countries especially are highly vulnerable due to higher population densities, limited resources and lower socio-economic capabilities.** Extreme heat is a major stressor for communities worldwide, most critically **impacting the food-water-energy nexus and public health.**

Given its increasing criticality and relevance in the context of climate change, the theme of 'Heat Adaptation - Water, Food & Energy Nexus' was prioritised by members of Adaptation Research Alliance as part of its 'Tracking, Learning, Sharing (TLS)' programme.

It has been widely recognised that stewardship and the leveraging of local knowledge can play a major role in building community level resilience. The TLS programme provides an opportunity for ARA members to exchange knowledge and ideas on heat resilience and pave way for collaborative approach to challenges posed by heat worldwide.

Broad insights from ARA community

Localised context: Recognising extreme heat as a context-specific challenge with impacts across sectors, the focus should be on developing interventions that address local-level exposure to heat risks as well as local communities' needs and vulnerabilities.

Community engagement: Case studies and individual inputs suggest the importance of involving local communities in planned adaptation measures for long-term success.

Monitoring and evaluation: Heat action plans need robust data collection and monitoring systems for periodic reporting on indicators and targets to maintain transparency.

Collaboration and sharing of best practices: Knowledge exchange and peer learning is valued by the ARA community, with members actively collaborating on addressing heat-related challenges and sharing best practices.

Need for higher engagement in vulnerable regions: Overall member engagement in addressing heat-related challenges is low (24%), especially so in the Global South including Africa and Oceania. The ARA community's outreach can be potentially expanded by documenting ongoing efforts as well as scaling up interventions in vulnerable regions, in alignment with larger adaptation goals.

What has worked so far?

Published Perspectives:

- Holistic focus by ARA members on different sectors impacted by heat including agriculture and food security, water, health, energy, natural resources and education.
- ARA members currently address heat-related challenges through multi-faceted engagement in research, capacity building, community engagement, etc.

Voices from the Ground (Interviews & FGDs):

- Through action-oriented research, members have developed tools to assess local climate trends and heat risks to inform policy
- Ensuring community engagement and participation in heat adaptation measures to address local needs & vulnerabilities
- Focused initiatives targeting vulnerable groups such as street vendors and outdoor workers, children, elderly & others

Key Challenges

Published Perspectives:

- Downscaling national/state action plans to city or community level context
- No record of ARA member involvement in heat action plans in two highly vulnerable regions - Africa and Oceania
- Low ARA member engagement on heat-related work in the Global South, low visibility of efforts in terms of documented or published literature

Voices from the Ground (Interviews & FGDs):

- Lack of dedicated agency/department and personnel for drafting and implementing heat action plans effectively
- Lack of awareness about heat risks
- In some regions, extreme heat is not yet recognised as a disaster or a priority, which would be crucial to mobilise action
- Official measures tend to be taken up post-heatwave and usually aim at improving infrastructure, instead of prioritising preventive measures and community preparedness

Way Forward

Members acknowledged the need to bridge gaps in heat-related policymaking through external partnerships, collaborative problem-solving and ensuring alignment with local context. Member organisations may benefit from leveraging key drivers of positive impact and documenting experiential learning, while actively collaborating within the ARA community and beyond.

Method & Insights

This chapter presents the details of the data collection, analysis, synthesis, and emerging results for this specific learning journey. To better understand the ARA community's work we undertook three different approaches: Literature Review, One-on-One Interviews, and Focus Group Discussions (FGDs).

Literature Review

A comprehensive review of literature published by the ARA community (234 members as of March 2024) was undertaken to acquire a deeper understanding of the published perspectives of members on heat-related adaptation and resilience work.

Insights from Literature Review:

1. Engagement of member organisations in heat adaptation and resilience

- Only 24% (n=56) of the 234 members are engaged in work directly related to heat, the majority of them located in the Global North
- 75% (n=55) of 73 member organisations that are not involved in addressing heat in any capacity are located in the Global South

2. Types of member organisations working on heat

Among the 56 members directly engaged in heat adaptation and resilience, most were found to be research/educational institutions, NGOs and international organisations, with limited representation from government institutions, social enterprises, funding agencies and the private sector.

3. Nature of work being conducted on heat adaptation

Only 10 ARA members from India, Bangladesh, Brazil, Germany, Japan, UK and USA have worked on designing, developing and/or implementing Heat Action Plans. No record of ARA member involvement in heat action plans was found in Africa and Oceania.

Most members are involved in research and capacity building, with relatively sparse engagement in technology development and policy planning. The latter may need to be prioritised for advancing comprehensive and innovative heat adaptation measures.

Sub-themes within the broader thematic areas where ARA members are focused include the following:

- Agriculture & food security (124 members) - Resource efficient agricultural practices, soil health improvement, cultivation of heat-tolerant crops, green infrastructure, addressing food shortage.
- Water (80 members) - Sustainable water management practices, water-efficient infrastructure, addressing access and availability challenges of communities.

- Health (60 members) - Developing early warning systems, public health infrastructure, community awareness
- Energy (55 members) - Addressing socio-economic barriers to energy access, promoting renewable energy technologies, cooling infrastructure, urban design
- Natural resource management (50 members) - Sustainable land management practices, biodiversity conservation, blue-green infrastructure
- Education (19 members) - Community awareness, training and capacity building of practitioners, integration of local and indigenous knowledge in adaptation measures

Despite commendable efforts undertaken by ARA members across heat-affected sectors, our study found a lack of published information on initiatives and experiences. This underscores the need to increase visibility of these efforts, which may in turn foster funding opportunities, greater collaboration, sharing of knowledge and best practices.

In-depth Interviews

For a more in-depth understanding of individual actions being taken by ARA members, semi-structured interviews were conducted. A preliminary survey was shared with the ARA member community to gauge interest in members to interview for in-depth conversation on the topic of heat adaptation.

From survey responses, nine member organizations were identified for in-depth interviews on this topic. Semi-structured interviews were conducted with these ARA member representatives, focusing on the following questions:

- What are the different types of work that the organisation is involved in, as related to heat and its impact on the nexus of water, energy, food, health and social systems?
- Did the organisation face any challenge while working on heat-focused adaptation with local communities, and what were they?
- In line with the organisation's experience, what should be kept in mind to ensure an inclusive and contextual HAP that integrates with long-term development?

Results from interviews and individual reflections:

Key insights gathered from participants' responses to specific questions are shared below.

1. Deeper dive into the heat-related work carried out by organisations

- **Recognition of lived experiences and common understanding:** There is a need to understand local nuances, recognise local communities' lived experiences and establish a shared understanding of climate change.
- **Information collection and dissemination:** It is necessary to collect information on climatic trends and heatwave risk from verified sources such as national meteorological agencies, and communicate it to the public through interactive forums such as community events, routine publications, media (television, radio).
- **Development and review of heat action plans:** Member organisations reviewed heat action plans at national, state, district and city levels, identified gaps and provided suggestions.
- **Highlighting local challenges by involving communities:** Member organisations recognised the need to understand the criticality of heat issues and identify vulnerable groups (elderly, people with disability, outdoor workers) through community dialogues. These were deemed to help indirectly gain public attention and prompt governments to act to set up early warning systems.

2. Challenges in heat-focused adaptation

- **Technical and scientific knowledge:** Members were of the view that there were only a few organisations working on climate change. They pointed out that focused work on heat vulnerability and adaptation requires technical and scientific knowledge.
- **Scaling of pilot interventions:** There was a need for capacity and resources to secure funding for systematic research and for scaling up successful localised practices.
- **Lack of recognition of extreme heat as disaster:** Heat is not officially recognised as a disaster at the national level in many regions, posing a challenge for organisation looking to secure financial and institutional support for implementing heat action plans.
- **Limited scope of intervention:** Members pointed out that most interventions in heat adaptation are time-bound and infrastructure-based. They also prioritise addressing impacts post heatwaves, instead of preparedness and heat mitigation. In comparison, truly transformative solutions such as institutional changes and behavioural modification were limited.

3. Factors to be considered while developing localised Heat Action Plans

- **Detailed climate risk and vulnerability assessment:** Comprehensive city-level climate risk and vulnerability assessments were deemed crucial in creating baselines that ensured effective adaptation.
- **Approaches tailor-made for local context:** Heat action plans need to be contextualised to address the specific conditions and vulnerabilities of the local population.
- **Focus on heat hotspots and vulnerable populations:** Identifying heat-risk zones and hotspots were deemed crucial for planning interventions. If such interventions are to be appropriately targeted, vulnerable populations and their stressors also need to be identified.
- **Collaboration with knowledge partners:** Formulating heat action plans requires multiple stakeholders and a combination of expertise. In such exercises, external partnerships can be useful in securing funds, facilitating coordination and utilising specialised skills.
- **Regular reporting and evaluation:** The planning and effective implementation of heat action plans require dedicated agency and personnel, as well as monitoring and evaluation protocols for periodic reporting and management of interventions.

Case study 1: Innovative Green housing for heat adaptation - Julius Uchechukwu

Project:

To combat the effects of extreme heat in Northern Nigeria, local farmers used innovative green housing as an adaptation strategy.

Method:

- Insecticide-treated mosquito nets - farmers repurposed insecticide-treated mosquito nets originally intended for malaria prevention, to create canopies for greenhouses
- Clay Greenhouses - tomato farmers constructed greenhouses using thick clay walls
- Integrated Farming system - small-scale poultry provided additional income and overall sustainability of the farming system

Outcome:

These practices significantly mitigated the adverse effects of heatwaves. For example, clay structures were highly effective in maintaining a suitable microclimate for crop growth.

Case study 2 - Developing Heat Health Action Plans in India - Suzanne Carter

Project:

The city of Ahmedabad experienced high mortality during a severe heatwave, and in response, the team developed the city's first Heat Action Plan.

Outcome:

- Improvement in resilience and response - During a subsequent heatwave of similar magnitude, the city reported only one fatality.
- Replication across other cities - Following successful HAP implementation in Ahmedabad, other cities across India adopted similar plans.

Current Projects:

- Engaging with stakeholders for developing HAPs for cities in Africa and Bangladesh
- Specific focus on addressing vulnerabilities of street vendors in India

Learnings and Challenges:

- Lack of awareness about heat risks among local governments
- Lack of inter-departmental coordination
- Need for tailoring solutions to unique vulnerabilities and needs
- Inclusive plans that consider all vulnerable groups

Outcome:

These practices significantly mitigated the adverse effects of heatwaves. For example, clay structures were highly effective in maintaining a suitable microclimate for crop growth.

Heat Hacks Member Engagement

To build on the knowledge captured through desk reviews and individual interviews, and to leverage the collective strength of the community, various FGDs were conducted across the Global South regions. Here, we brought ARA members and broader adaptation community together to start the conversation on collective heat solutions.

- **Data collection (Engagement Sessions):** A mix of approaches were employed for ideation, such as the Troika consulting method (sharing of ideas followed by peer consultations) and the 15% solutions method (initial small steps not requiring additional resources) in the CBA conference session in Tanzania, along with Round Robin method (iteratively building on ideas through consecutive contributions by each participant) in the ARA-TLS Symposiums held in Bangkok and Rosario, as well as virtual group discussions during the ARA plenary. The ‘Heat Hacks’ were documented using A4 sized sheets, colour-coded sheets, as well as the virtual Miro Board tool.
- **Data processing:** Raw data collected from all sessions were translated (as required), cleaned, elaborated or contextualised (as required) and compiled into a database using Google Sheets.
- **Thematic analysis:** A preliminary analysis was conducted to identify diverse themes emerging from solutions suggested by members.
- **Heat Hacks Compendium:** A web-based, living repository of pilot ideas, case studies and resources on heat adaptation and resilience by the ARA community.

Insights from Member Engagement sessions (workshops and plenaries):

Mixed approaches of self-reflection and collaborative solutioning by members enabled the integration of unique perspectives in developing multi-faceted, implementable solutions. Heat solutions related to the food-water-energy nexus thus vary in scale and scope.

In the peer-learning exercise approach, the solutions emerging from the individual members went through a few rounds of enhancements through peer inputs. Some examples of what this process yielded are presented below.

Examples of multi-step heat solutions

1. A three-part solution for a selected residence at risk to extreme heat:

- Policy incentives for use of greener materials (e.g. compressed earth blocks) to increase thermal comfort as well as energy efficiency.
- Urban green infrastructure for external shade and cooling.
- Public access to water sources and hydration facilities.

2. A multi-step approach to efficiently use waste products in urban farming:

- Promote ‘best out of waste’ concept for using broken basins, etc. as planting pots in urban gardens.
- Promote home-grown fertilisers from food waste depending on plant requirements.
- Partial irrigation of kitchen/backyard gardens using household wastewater.

3. Localised and portable heat protection devices for vulnerable groups:

- Cost-effective, portable, ventilated & waterproof heat protection devices such as sun hats, umbrellas made from local materials for outdoor workers.
- Provision and usage of tarps/blankets/sun sheets by local government, commercial buildings, hotels & restaurants for shade on busy streets/markets.
- Using media and cultural activities to promote community participation in heat resilience.

Across all engagements, over 80 inputs were given into the heat hacks exercise. Main themes and suggestions on ‘heat hacks’ include the following:

- **Water management:** Majority (27%) of member inputs were related to development of water infrastructure, followed by conservation and restoration of existing water sources, rainwater harvesting and storage, wastewater recycling and reuse. Specific strategies reported include community-based management of water resources, and policy actions such as water budgeting as precaution for periods of water scarcity.
- **Green infrastructure:** It was recommended to increase the green

cover through various interventions (e.g. urban forests), for multiple ecosystem services such as water percolation, cooling and shade, food security etc.

- **Construction and urban planning:** To reduce urban heat island effect, member inputs recognised the need for open and green spaces to be mandated, as well as the need for improving insulation in building construction and design, especially in heat-risk zones.
- **Mitigation-focused action:** Members identified the phase-down/phase-out of fossil fuels through a mix of emissions reduction approaches, scaling cleaner and renewable energy, and energy efficiency measures (e.g. Development of public and non-motorised transport infrastructure), as potential strategies for lowering energy consumption during extreme heat.
- **Agricultural practices:** Corresponding to the ‘Food’ sector of the Food-Water-Energy nexus impacted by heat, diverse practices were suggested to adapt to rising temperatures. Specific inputs include the cultivation of heat-tolerant crop varieties, promoting regenerative agriculture among large-scale farmers and aquaponics for small spaces

The identified ‘heat hacks’ will subsequently be incorporated in a dynamic ‘Heat Solutions Compendium.’ currently being developed by Transitions Research as a continuation of this learning journey.

Concluding Remarks

Open discussions on first-hand experiences of member representatives, sessions on collaborative problem-solving, emerging pilot ideas and established case studies facilitated knowledge exchange among diverse organisations, and provided opportunity for future collaboration through replication and scaling of interventions.

The following observations from the learning journey on ‘Heat Adaptation - Water, Food & Energy Nexus’, were inferred to be significant from an advocacy point of view:

- **ARA member organisations felt the need for official recognition of extreme heat as a disaster across nations worldwide, the lack of which can act as a roadblock in mobilising resources and action by governments and stakeholders.**
- **ARA members also emphasised the need for developing localised heat action plans, prioritising vulnerable groups and heat-risk zones. The plans should have robust monitoring and evaluation protocols for periodic reporting on baselines to ensure transparency in impact measurement.**

The next step envisioned in line with this learning journey is the collaborative development of the Heat Solutions Compendium, envisioned as a web-based platform enabling access to a living repository of pilot ideas, case studies and resources on heat adaptation and resilience by the ARA community.

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