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Met Office

Regional Workshop on

FRAMEWORK & TOOLKIT DEVELOPMENT

for Impact-Based Forecasting of Temperature-Related Hazards

24-28 NOVEMBER 2025 | BANGKOK, THAILAND

SUMMARY REPORT

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ABBREVIATIONS

AA	Anticipatory Action
AI/ML	Artificial Intelligence / Machine Learning
AMFUs	Agrometeorological Field Units /
DAMUs	District Agrometeorological Units
ASEAN	Association of Southeast Asian Nations
BMD	Bangladesh Meteorological Department
CAP	Common Alerting Protocol
CARA	Climate Action for a Resilience Asia
CDIS	Climate Data Information System
COMET	UK Centre for Observation and Modelling of Earthquakes, Volcanoes and Tectonics
COP	Community of Practice
CREWS	Climate Risk and Early Warning Systems
DHM	Department of Hydrology and Meteorology (Nepal)
DLS	Department of Livestock Services (Bangladesh)
DMA	Disaster Management Agencies
DMH	Department of Meteorology and Hydrology (Myanmar)
DoM	Department of Meteorology (Sri Lanka)
DRM	Disaster Risk Management
DSS	Decision Support System
ECMWF	European Center for Medium-Range Weather Forecasts
ENSO	El Niño–Southern Oscillation
ER	Emergency Room

ESCAP	Economic and Social Commission for Asia and the Pacific
EW4All	Early Warnings for All Initiative
EWS	Early Warning Systems
FCHVs	Female Community Health Volunteers (FCHVs)
GEDSI	Gender Equality, Disability, and Social Inclusion
GHHIN	Global Heat Health Information Network
GLOF	Glacial Lake Outburst Flood
IBF	Impact-Based Forecasting
ICAR	Indian Council of Agricultural Research
IMD	India Meteorological Department
INSTANT	Integrated Forecast Dissemination Portal
LMS	Learning Management Systems
LOA	Letter of Agreement
MEL	Monitoring, Evaluation, and Learning
MMS	Maldives Meteorological Services
MOU	Memorandum of Understanding
NCDC	National Centre for Disease Control - India
NCHM	National Center for Hydrology and Meteorology (Bhutan)
NCOF	National Climate Outlook Forum
NDRI	National Dairy Research Institute
NDRRMA	National Disaster Risk Reduction Management Agency
NLAS	National Livestock Advisory System
NMHS	National Meteorological and Hydrological Service(s)
NSWWS	National Severe Weather Warning Service
NWP	Numerical Weather Prediction

PIN	People in Need
PMD	Pakistan Meteorological Department
RCRCCC	Red Cross Red Crescent Climate Centre
RDAS	Regional Resilience Data and Analytics Service
RIMES	Regional Integrated Multi-Hazard Early Warning System
SAHF	South Asia Hydromet Forum
SASCOF	South Asia Climate Outlook Forum
SKHub	SAHF Knowledge Hub
SOP	Standard Operating Procedure(s)
THI	Temperature-Humidity Index
ToT	Training-of-Trainers
UKMO	United Kingdom Meteorological Office
UN	United Nations
UTCI	Universal Thermal Climate Index
WFP	World Food Programme
WG	Working Group
WISER-AP	Weather and Climate Information Services for Early Action - Asia PAcific Programme
WMO	World Meteorological Organization

I. EXECUTIVE SUMMARY

South Asia is facing increased climate stress from intensifying heatwaves and cold extremes, which are already impacting public health, livelihoods, agriculture, livestock, water resources, and economic productivity. In response, RIMES and the UK Met Office, under the WISER AP Programme, convened a regional workshop to advance the development of the SAHF Regional Framework and Toolkit for Temperature Impact-Based Forecasting (IBF). The session brought together NMHS representatives, sectoral agencies, technical partners, and regional organizations to co-develop practical guidance for transitioning from traditional forecasts to impact-based, action-oriented climate services that protect lives and reduce socio-economic losses. The workshop served as a key milestone for shaping the initial structure of the Framework and Toolkit, building a shared understanding of data requirements, operational workflows, and sector engagement pathways.

The workshop set out to introduce the foundational design for Version 1 of the Temperature IBF Framework and Toolkit; map data availability and institutional roles; support countries in preparing initial national demonstration concepts; and establish processes for regional harmonization of thresholds, indicators, and early warning triggers. It also aimed to set the basis for long-term capacity strengthening, MEL integration, GEDSI mainstreaming, and knowledge sharing through the SAHF ecosystem.

It successfully delivered several of its targeted outputs, particularly around the development of the first draft of the Regional Framework and Toolkit for Temperature IBF, which was co-designed through group exercises and technical sessions. Countries collectively assessed data landscapes, mapped institutional responsibilities, and validated core components such as thresholds, indicators, modelling pathways and sector engagement mechanisms. A major milestone was the initial drafting of country demonstration plans, where each country identified its preliminary pilot locations, seasonal focus (heat and/or cold), sectors of engagement, and focal implementing bodies.

Beyond planned outputs, participants also documented vulnerability indicators, exposure datasets, dissemination formats, operational gaps, and priority support needs for RIMES and UK Met Office. The workshop facilitated peer-to-peer exchange between countries at different maturity levels, providing real examples of how IBF tools are being used in health, agriculture, and early action contexts. Collectively, the workshop produced practical reference materials, baseline assessments, and initial project designs that now form the groundwork for refinement in the coming months.

II. INTRODUCTION

A. Background and Rationale

One of the most pressing and rapidly worsening climate-related threats in South Asia is temperature extremes. Climate change is amplifying the frequency, intensity, and duration of temperature-related hazards, which include not only heatwaves but also cold spells and unseasonal low-temperature events. These extremes pose serious threats to public health, livelihoods, and infrastructure across the region. Rapid urbanization, widespread poverty, and a high dependency on climate-sensitive sectors – such as agriculture, water, health, and infrastructure – make the region exceptionally more sensitive to the growing impacts of climate change, particularly temperature extremes. These challenges highlight the urgent need to transition from conventional weather warnings to impact-based forecasting (IBF) that integrates hazard, exposure, and vulnerability information to provide actionable insights for decision-makers.

In response, the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), in partnership with the UK Met Office through the Weather and Climate Information Services for Asia and the Pacific (WISER-AP) Programme, is implementing the South Asia Hydromet Forum (SAHF) IBF Working Group (WG) Project. This initiative aims to support South Asian countries in developing the scientific, institutional, and operational frameworks required to deliver IBF services, with initial focus on temperature-related hazards such as heatwaves and cold waves.

This regional workshop contributes to the project by facilitating the co-development of a regional Framework and Toolkit for IBF of Temperature-Related Hazards – a crucial output that will form the foundation for national demonstration activities and regional harmonization in 2026.

B. Objectives of the Workshop

The workshop aims to:

a. Co-develop a regional framework and toolkit for IBF of temperature-related hazards, aligned with WMO service delivery principles.
b. Establish regional guidelines and selection criteria for national demonstration projects under the SAHF IBF initiative.
c. Support participating countries in designing draft national demonstration workplans, integrating MEL, GESI, and risk management components.
d. Consolidate outputs into a preliminary regional package (Framework v1, Toolkit v1, demo guidelines, and draft country workplans) to guide 2026 implementation.

C. Expected Outputs

By the end of the workshop, participants will have jointly produced:

- Draft Regional IBF Framework v1 outlining governance, data, thresholds, triggers, and communication pathways;
- Draft Toolkit v1, including methodological templates, data workflow models, and user communication materials;
- Agreed guidelines and selection criteria for country-level demonstration projects; and
- Draft national demonstration workplans integrating MEL, GEDSI, and risk components.

III. SESSION HIGHLIGHTS

Session 1: Baseline Assessment: Findings and Country Validations

Danna Valdez, Project Officer, RIMES

The session summarized consolidated findings from regional and national baseline assessments on impact-based forecasting (IBF) for temperature-related hazards in South Asia. These findings, initially validated with NMHS partners, provided a common understanding of current initiatives, country progress, and gaps.

Key Insights

- Regional cooperation platforms—such as SAHF, SASCOF, GHHIN, and CREWS—offer a strong foundation for advancing temperature-related IBF by providing technical capacity, practitioner networks, and opportunities for harmonized approaches.
- Implementation across countries is highly uneven. India and Sri Lanka have the most mature IBF systems, while Bangladesh, Nepal, Pakistan, and Myanmar show promising but fragmented pilots. Afghanistan, Bhutan, and the Maldives remain at early stages with hazard-based systems and limited data or institutional mandates.
- Temperature-related IBF generally lags behind systems for floods and cyclones. Many initiatives are recent, lack standardized SOPs, and face gaps in data, verification, expertise, and institutional coordination. Countries also use different methodologies and thresholds, highlighting the need for a harmonized regional framework.

Recommendations

- Strengthen regional governance by establishing a harmonized South Asia framework for temperature-related IBF aligned with WMO standards.
- Implement targeted technical training to address gaps in data systems, thresholds, verification, and sector-specific applications.
- Sustainable financing models—especially anticipatory financing linked to social protection—are needed to support long-term implementation.
- Foster stronger partnerships to document, adapt, and scale successful IBF practices.
- Gender, disability, and social inclusion (GEDSI) principles should be embedded throughout IBF development and implementation to ensure equitable and accessible services.

Session 2: Draft Regional Framework Outline and Structure

Dr. Anshul Agarwal, SAHF Team Lead, RIMES

The session introduced the draft outline of the proposed Regional Framework and Toolkit for temperature-related IBF under the SAHF-IBF Project. Dr. Agarwal emphasized that the framework will be co-produced with NMHSs, sector agencies, and technical experts throughout the workshop. While the draft offers an initial structure, its relevance depends on participant inputs on challenges, country needs, and operational constraints. The framework aims to guide regional

coordination, build capacity, harmonize tools and methodologies, and shape national demonstration activities. The session outlined the planned components, development steps, and required assessments and stakeholder contributions.

Key Insights

- The Regional Framework is envisioned as both a coordination platform and a practical guidance tool that brings national and regional actors into a shared process for strengthening temperature-related IBF. It will facilitate collaboration among NMHSs, sector agencies, and global partners by enabling shared data, methodologies, and lessons learned, supporting harmonized approaches while allowing country-level flexibility.
- Its effectiveness depends on strong co-production. Participants are expected to contribute insights on existing initiatives, national gaps, mandates, data constraints, and operational challenges, helping refine objectives, hazard profiles, impact assessments, and sector applications to ensure the toolkit is actionable and adaptable.
- The session highlighted the need to clarify institutional roles, governance structures, and communication pathways. Countries differ in responsibilities for data, analysis, dissemination, and decision-making; the framework aims to map these roles, identify coordination gaps, and strengthen accountability and cross-agency collaboration. Understanding current communication mechanisms and impact reporting systems will be key.
- The draft framework also outlines the shift from traditional forecasts to impact-based and impact-focused forecasting—integrating thresholds, heat index methods, exposure data, and sector impact information. Examples from Bangladesh showed how advisories can evolve into actionable, targeted products.
- The framework will include components on implementation, monitoring, financing, and national demonstrations to enable real-world testing, validation, and scaling. Monitoring and learning will support continuous improvement, while financing considerations will help identify national and international funding opportunities.

Recommendations

- Countries should actively contribute detailed information on institutional arrangements, data systems, sectoral needs, and communication challenges to refine the framework and toolkit.
- Strengthening governance, clarifying mandates, and improving coordination are essential.
- Development should prioritize detailed hazard and impact assessments, integration of vulnerability and exposure datasets, and creation of sector-specific advisory products.
- Strong communication mechanisms—within the project and with national stakeholders—will support learning, demonstrations, and future scaling.

Session 3: Training-Of-Trainors (ToT) Requirements, Cascading Model, and Technical Assistance

Helen Caughey, Expert Operational Meteorologist, UK Met Office
Peter Ferrer, Training Development Specialist, RIMES

The session introduced the concept and structure of the Training-of-Trainers (ToT) model for the SAHF-IBF Project, highlighting its role in ensuring sustainable, country-owned implementation of temperature-related IBF tools. It outlined the purpose of the ToT approach, expected roles and responsibilities, selection criteria, the cascading model from regional to national levels, and the support that RIMES and the UK Met Office will provide.

Key Insights

- The ToT model is central to sustaining and institutionalizing IBF practices across South Asia. While regional partners bring technical expertise, long-term success relies on developing national trainers who can contextualize the toolkit, support demonstrations, engage users, and reduce reliance on external support.
- Consistency in participation is essential. ToT representatives must remain engaged throughout all sessions and national demonstrations to ensure continuity, retain institutional knowledge, and build an internal core of expertise that strengthens cross-agency coordination.
- Selection criteria emphasize both technical and facilitation skills. Nominees should ideally have backgrounds in forecasting or disaster risk management, but must also be strong communicators capable of training others, engaging users, and interpreting IBF products for diverse audiences.
- The cascading model progresses from regional training to national roll-outs led by in-country ToT teams, eventually extending to sectoral and local actors. This ensures coherence while allowing adaptation to each country's data environment, institutional structures, and IBF maturity. The process is iterative, enabling national teams to seek continued guidance from regional experts.
- Insights from the Mentimeter activity highlighted countries' needs for stronger technical knowledge, improved user engagement skills, better coordination, senior-level support, and adequate resources for national roll-outs. Anticipated challenges include limited technical capacity, data gaps, uneven coordination, staffing constraints, lack of SOPs, and difficulties in scaling knowledge beyond a small group.

Recommendations

Countries should nominate ToT representatives who can commit to full participation across all sessions and cascading stages, prioritizing individuals with both technical expertise and strong facilitation abilities. To build sustainability, NMHSs should begin expanding IBF competencies beyond the ToT group. Regional partners should continue providing guidance through the SAHF Knowledge Hub, communities of practice, and standardized training materials. Countries should strengthen stakeholder engagement, secure institutional support, and identify early data and capacity gaps to prepare for national roll-outs. Consider opportunities for regional exchanges between NHMSs to further build skills and experience, especially if some countries aren't currently at a readiness stage for implementation of a demonstration activity.

Session 4: Regional and National Priorities

Participants met in sub-regional groups (Nepal–Bhutan; Maldives–Sri Lanka; India–Pakistan–Myanmar–Bangladesh; and an online group including Afghanistan, Bangladesh, Myanmar, and Nepal) to identify practical gaps, priorities, and support needs for temperature-related IBF. Building on the baseline assessment and framework discussions, the exercise surfaced on-the-ground constraints related to forecasting, thresholds, exposure and vulnerability data, missing IBF products, capacity needs, and opportunities for regional and national collaboration. Each group presented its priority challenges and support requirements in plenary.

Key Insights

- **Nepal-Bhutan Group**
  Both countries cited limited forecast reliability—1–2°C errors and complex mountainous terrain—as a major constraint and highlighted dependence on WRF and the need for additional inputs or ensemble approaches. Bhutan has heat thresholds but no cold thresholds; Nepal lacks formal thresholds and is exploring pilot work from the Red Cross. Exposure and vulnerability challenges include weak data-sharing systems (Nepal) and the need to integrate cold hazards, snow outlooks, and Glacial Lake Outburst Flood (GLOF) risks. Both noted the value of the SAHF and requested more frequent sessions with stronger emphasis on cold-related hazards.

- **Maldives-Sri Lanka Group**
  Maldives and Sri Lanka emphasized the importance of perceived temperature (heat stress) rather than absolute temperature, noting that even moderate highs (35–36°C) can generate significant risk when combined with humidity, rainfall and land-use patterns. They highlighted scattered island populations, sparse or partially operational AWS networks (e.g., only ~50% operational in Maldives), and the need for higher-resolution and locally tailored forecasts. Both countries lack comprehensive vulnerability and exposure data, especially for remote populations, and noted that social media communication only reaches literate groups, making verbal or graphical communication essential. They also emphasized the absence of stakeholder mapping, lack of real-time data flows, and gaps in data-sharing protocols across ministries. On sectors, they noted strong engagement channels in tourism but limited reach into agriculture, construction, fisheries and health. They stressed the need for satellite data, land cover data, and global datasets to fill gaps, and highlighted the need for improved feedback mechanisms and co-production guidance as part of demonstration design.

- **India-Pakistan-Myanmar-Bangladesh Group**
  This group emphasized the need for local-level forecasting, thresholds, and dissemination, noting that many IBF efforts fail because information does not reach vulnerable communities in time. They stressed that even when forecasts exist, last-mile communication remains a major obstacle. All countries emphasized the need for local and sector-specific thresholds, noting variability across regions, sectors, and even within the

same sector. Cross-institutional collaboration was identified as essential—both within countries (e.g., NMHS–DMA–sector agencies) and across borders, especially where hazards span boundaries. SOP development was highlighted as a key need, requiring both NMHS and user-sector inputs to align triggers, actions, and responsibilities. The group stressed the need for geospatial vulnerability mapping, multi-sector dashboards, and integrated decision-support tools. Capacity needs included high-resolution (e.g., 3 km) temperature forecasts, decadal climatology, AI/ML-based tools, and guidance on forecasting hazard "abandonment" (i.e., how heatwaves will end and what weather follows). They also emphasized the importance of pre-season and post-season consultations for preparedness, validation, and lesson-learning.

- **Online Group (Afghanistan, Bangladesh, Myanmar, Nepal, Stimson Center)**
  The online group highlighted significant foundational gaps in several countries. Myanmar lacks formal heat advisories and has limited collaboration with user sectors. Bangladesh struggles with incomplete documentation of sector-specific impacts and limited access to heat impact data. Afghanistan does not yet have IBF but has recently begun issuing high-temperature and cold-spell warnings. Nepal faces microclimatic complexity, sparse station networks, and very low community awareness. Across the group, exposure and vulnerability data—especially disability-disaggregated data, sector-specific thresholds, and geospatial datasets—were major needs. Participants noted that many countries lack impact translation capacity and sector-specific IBF tools. Most also require capacity building on threshold development, SOPs, impact matrices, and cold- and heat-related user engagement. Regional collaboration needs included access to shared datasets, DSS support, common methodologies, and guidance on co-production and GEDSI integration.

Table 1. Summary of Regional and National Priorities

Guide Questions	Nepal-Bhutan	Maldives-Sri Lanka	India-Pakistan-Myanmar-Bangladesh	Online Group
Key Challenges limiting the countries' IBF for temperature-related hazards	● Low accuracy of temperature forecasts (1–2°C error), largely due to complex topography and micro-climatic variability. ● Need for additional models/ensemble approaches to increase confidence. ● Spatial coverage gaps—official forecasts do not represent all valleys and elevations. ● Nepal: No defined temperature thresholds; weak data-sharing systems. ● Bhutan: Only heat thresholds exist (need for cold thresholds).	● Temperatures seldom exceed 35–36°C, but perceived vs actual heat is a major issue (humidity, rainfall influence). ● Low public awareness; insufficient funding for outreach. ● Sparse observational networks and poor maintenance (e.g., Maldives: only ~50% AWS stations operational). ● Forecasts not localized enough; national-level products insufficient for island-level needs. ● Vulnerability/exposure data gaps; limited satellite data use. ● Difficulty reaching vulnerable populations—social media mainly reaches literate groups.	● Lack of local/sector-specific thresholds; high spatial and sectoral variability. ● Weak last-mile dissemination—information fails to reach remote communities in time. ● Insufficient institutional collaboration; need for MOUs/LOAs for data and information exchange. ● Root-level forecasting and warnings missing. ● Need for SOPs for both NMHS and user agencies. ● Pre-season consultations often incomplete; some sectors overlooked.	● Myanmar: No heat warning system; only max/min temperature forecasts; lack of stakeholder collaboration. ● Bangladesh: Limited heat-impact documentation; limited access to impact data; urban heat island concerns. ● Afghanistan: IBF not yet implemented; only initiated temperature exceedance warnings in 2025; limited capability. ● Nepal: Microclimatic complexity; limited station network; minimal impact data; low public awareness.

Guide Questions	Nepal-Bhutan	Maldives-Sri Lanka	India-Pakistan-Myanmar-Bangladesh	Online Group
Exposure and vulnerability information that are missing to better translate temperature forecasts into impact scenarios and actionable triggers	● Exposure and vulnerability data—particularly around: ● Spring water depletion (Nepal). ● Cold-related hazards and GLOF risks. ● Need model diversity and more accurate local-scale products.	● High-resolution, location-specific forecasts. ● Land cover, topography, population distribution (e.g., WorldPop) to identify vulnerable groups. ● Satellite data to fill observation gaps. ● Stakeholder mapping—to identify where vulnerable communities are located.	● Local-scale geospatial datasets for: ● Health ● Agriculture ● Forest fire ● Transportation ● Energy ● Livestock/poultry/fisheries ● Sector-wise exposure/ vulnerability layers for dashboards. ● Need local-level thresholds and impact matrices.	● Crop phenology-specific thresholds (e.g., for flowering stages). ● Disability-disaggregated geospatial data—especially important for Nepal's mountainous regions. ● Sector-specific exposure and vulnerability datasets.
IBF products, advisories, DSSs still missing that the sector needs	● Bhutan previously piloted vector-borne disease advisories linked to temperature. ● Need: ● Cold-related thresholds and advisories ● More frequent/longer lead time forecasts (Nepal) ● Strengthen NCOFs; currently Bhutan only organizes it once a year, mainly for monsoon rainfall.	● Need customized, localized IBF products. ● DSS and advisories for: ● Tourism (already some channels) ● Agriculture (lack of reach) ● Construction/outdoor labor ● Health sector ● Better verbal/graphical communication formats for vulnerable communities.	● Integrated IBF dashboard with: ● Multi-sector hazard, exposure, vulnerability layers ● Impact scenarios ● Actionable triggers ● Feedback-enabled products to refine advisories. ● SOP-linked advisory products.	● Myanmar: No heat advisories despite frequent heatwaves. ● Bangladesh: Need specific IBF tools and decision support systems. ● Afghanistan: Need impact translation products. ● Nepal: Temperature-related IBF missing; research needed for thresholds.

Guide Questions	Nepal-Bhutan	Maldives-Sri Lanka	India-Pakistan-Myanmar-Bangladesh	Online Group
Needed capacity to implement temperature-related IBF more effectively	● Model capacity (ensemble forecasting, use of multiple models). ● Daily long-lead forecasts (Nepal). ● Further capacity for cold-related hazard forecasting. ● Bhutan: Dissemination via social media is strong; Nepal still improving dissemination.	● Strengthening observations (maintenance, expansion of AWS network). ● Long-term data and planning. ● Data-sharing protocols within government. ● Capacity for: ○ Satellite data use ○ High-resolution modeling ○ Co-production with stakeholders	● High-resolution (≈3 km) temperature forecasts. ● Integration of: ○ Decadal climatology ○ AI/ML tools for prediction and outlooks. ● Capacity to produce: ○ Outlook for heatwave “abandonment” (end of event + associated weather). ○ Stronger post-season validation and lesson learning mechanisms.	● Developing thresholds, SOPs, impact matrices ● Cross-sectoral engagement ● Local-level awareness programs ● Cold- and heat-related preparedness training
Mechanisms or support to help better collaborate regionally	● South Asia Hydromet Forum is highly valued; request: more frequent sessions, not only weekly. ● Participation in Third Pole Climate Forum important. ● Need for regional cold/snow outlooks.	● Need: ○ Data-sharing protocols ○ Regional guidance on co-production, training, and exposure mapping ○ Better feedback mechanisms, especially via sector agencies ● Interest in knowledge exchange with other island nations.	● CAP alert systems to be used across countries. ● Regional harmonization of: ○ Global products adapted to regional scale ○ Heatwave alert systems ● Support from RIMES for multi-agency heatwave alerts.	● Access to regional datasets and regional DSS. ● Shared regional thresholds for countries lacking research capacity. ● Continued regional training and technical support.

Session 6: Partner Presentations

Impact-Based Forecasting to inform WFP's Preparedness and Anticipatory Action Program

Dr. Jothiganesh Shanmugasundaram, Regional Technical Lead, World Food Programme

Dr. Shanmugasundaram demonstrated how the World Food Programme (WFP) utilizes climate and impact-based information in South Asia, highlighting how hazards—including increasingly frequent temperature extremes—affect food security and humanitarian response. He described how WFP currently uses regional climate outlooks and national forecasts for preparedness, anticipatory action, climate services, and agricultural advisories. Drawing on experiences from Pakistan, Nepal, Bangladesh, Sri Lanka, and Indonesia, Dr. Shanmugasundaram emphasized the strong potential for temperature-related IBF to improve planning and emergency operations.

Key Insights

- WFP highlighted that more precise, actionable IBF—especially for temperature, agricultural stress, and food security impacts—would significantly improve prioritization, prepositioning, and operational readiness. While SASCOF outlooks and national forecasts provide early signals, they lack the granularity needed for targeted interventions. Temperature anomalies increasingly influence crop yields, household food access, and emergency logistics, making temperature-related IBF critical for linking climate information with livelihood and food security outcomes.
- IBF is also essential for strengthening Anticipatory Action. WFP's Anticipatory Action (AA) programs in Bangladesh, Nepal, and Pakistan rely on science-based thresholds aligned with national hydromet services. Longer lead times support AA activation in some countries (e.g., Pakistan, Bangladesh), while rapid-onset floods pose challenges in Nepal. WFP noted that strong national IBF systems—with standardized categories and impact classifications, as seen in the Philippines—could directly reinforce AA protocols and improve trigger reliability.
- A recurring message was the need for closer convergence between NMHSs and sector agencies. Impact-based products are only fully usable when combined with socio-economic exposure and vulnerability data. WFP cited examples from Indonesia, Nepal, and Sri Lanka where hydromet agencies and disaster management institutions are beginning to integrate exposure datasets into IBF tools. WFP expressed willingness to support similar convergence processes across South Asia to strengthen IBF usability for humanitarian and sectoral decision-making.
- IBF is also central to WFP's climate services work for smallholder farmers. Translating temperature anomalies into actionable agro-advisories and decision-support can significantly strengthen existing programs in India and Sri Lanka. WFP emphasized that IBF is valuable across all timescales—from seasonal planning to short-term emergency logistics to immediate AA activation.

Recommendations

- Stronger integration of socio-economic exposure data and sector-specific thresholds into national IBF workflows.

- Develop temperature-related IBF products that clearly translate impacts to sectors such as agriculture, livelihoods, and food security
- Bringing together NMHSs, disaster management agencies, agriculture ministries, and local governments is essential for making IBF actionable at national and local levels.
- Alignment of IBF with AA protocols by co-developing triggers, improving lead-time reliability, and using harmonized impact categories.

Global Heat Health Information Network (GHHIN) South Asia

Dr. Janice Ying-en Ho, Regional Hub Manager, GHHIN

Dr. Ho presented GHHIN's regional work on heat and public health, highlighting the newly established Southeast Asia Regional Hub at the National University of Singapore. The presentation underscored that extreme heat is still treated primarily as a meteorological issue, despite its broad and often invisible health impacts. GHHIN aims to contextualize global heat-health knowledge for tropical climates, foster multi-sectoral collaboration, and strengthen countries' evidence, guidance, and governance on heat resilience.

Key Insights

- Heat as a Multi-Dimensional Health Risk: GHHIN stressed that visible outcomes—such as heatstroke and deaths—represent only a fraction of the true burden. Chronic and cumulative effects include worsening of noncommunicable diseases, increased hospitalizations, mental health impacts, pregnancy risks, cognitive impairment, injuries, reduced productivity, and long-term conditions like chronic kidney disease among agricultural workers.
- In Southeast Asia, high temperatures and humidity persist year-round, challenging temperate-region concepts like "summer heatwaves." IBF systems focused solely on thresholds may miss chronic exposure that affects sleep, recovery, work capacity, and long-term health.
- Priority Thematic Areas:
    - Heat at work: Elevated risks stem from metabolic heat, clothing, and poor ventilation, requiring tailored protections for indoor and outdoor workers.
    - Urban heat: Nighttime heat, urban design, and limited cooling infrastructure demand urban planning and community-level solutions.
    - Cultural practices: Indigenous and community heat-management strategies are valuable and should be integrated into resilience measures.
- GHHIN is developing a Heat Health Terminology Guide—including ASEAN-language translations—to harmonize communication among NMHSs, health agencies, media, and communities.
- A regional stocktake is underway to map policies, action plans, and institutional roles. The network remains voluntary, allowing countries and individuals to engage at their preferred level.

Recommendations

- Countries should integrate chronic and cumulative heat-health risks—including occupational heat, nighttime heat, and urban heat—into temperature-related IBF development.
- Co-develop early warning-to-action pathways that incorporate exposure and vulnerability information, and contribute to regional evidence-building.
- Utilize the Extreme Heat Risk Governance Framework and Toolkit to support multisector heat action plans, avoiding siloed approaches.
- Document and integrate traditional and cultural heat-management practices to enhance the cultural relevance and effectiveness of heat resilience strategies.
- GHHIN reiterated the principle of "progress over perfection": countries should begin developing heat-health systems even with imperfect data or institutional arrangements.

ESCAP Impact-Based Forecasting Tool and Plugin

Mr. Rahul Suman, Expert, Disaster Risk Reduction Section, ESCAP

Mr. Suman presented ESCAP's work on automated IBF and demonstrated the evolution of its geospatial toolset—from standalone scripts to an online portal and now a lightweight, fully offline QGIS plugin ("ESCAP IBF NEXT").

Key Insights

- Practical, low-barrier IBF approach: ESCAP's method uses simple geospatial overlays—rather than physical modeling—to translate seasonal, cyclone, or heat forecasts into exposure tables and maps that support fast decision-making.
- User-driven evolution of the tool: The shift from heavy scripts and online portals to a lightweight offline plugin reflects agency needs for easier installation, local data protection, and integration into existing QGIS workflows.
- Flexible and expandable platform: Users can import national hazard, exposure, and boundary datasets; customize thresholds; and run multiple hazards. Planned upgrades include vulnerability and demographic layers to better reflect at-risk groups.
- Heat-risk profiling demonstrates versatility: The same IBF method supports temperature-related analysis, using multiple heat indicators and thresholds to map emerging hotspots under future climate scenarios.
- Data and verification challenges remain: Outputs depend on the quality and availability of local data. ESCAP currently fills gaps with global datasets and is working toward better verification methods.

Recommendations

- Adopt the QGIS plugin as a practical starting point for countries building or strengthening IBF capacity, especially where modeling resources are limited.
- Integrate national data and progressively add vulnerability layers to tailor outputs to country contexts and improve hotspot identification.
- Collaborate on data access and validation, supporting ESCAP's efforts to refine exposure and vulnerability estimates and strengthen verification methods.

- Plan for future enhancements, including scenario exploration and more systematic validation with observed impacts.
- Use outputs as decision-support signals, communicating probabilistic uncertainty clearly, especially in data-limited settings.

Session 7: GEDSI Integration

Nina Karla Jaim, Program Officer, RIMES

RIMES presented how GEDSI must be embedded in temperature-related IBF and early warning systems (EWS). Extreme heat and cold amplify existing inequalities shaped by gender, disability, age, income, and social norms; therefore, IBF systems must be intentionally designed so that marginalized groups are not excluded from warnings, decision-making, or protective actions.

Key Insights

- Exposure and ability to act on warnings are shaped by unequal access to mobility, resources, information, and rights. Women, people with disabilities, the elderly, low-income households, minorities, and informal-settlement residents face overlapping barriers that heighten risk.
- Women's unpaid care roles, limited mobility, and concentration in informal labor heighten heat risks, while indoor heat poses additional dangers. Similar structural barriers affect persons with disabilities and marginalized communities in accessing and interpreting warnings.
- Different groups start from different positions, requiring differentiated support, inclusive planning, and accessible communication formats (visual, audio, local dialects).
- Key needs include disaggregated data, context and barrier analyses, co-design with community groups, dedicated budgets and capacity building, GEDSI-linked MEL indicators, and feedback systems enabling marginalized groups to shape EWS performance.
- Full translation may not always be feasible; however, trusted community representatives can effectively localize and disseminate warnings.

Recommendations

- Conduct GEDSI context and barrier analyses at the lowest operational level and engage marginalized groups early in IBF and EWS design.
- Use local languages, culturally appropriate formats, and dissemination channels that reflect ground realities. Mobilizing community intermediaries is essential in multilingual settings or where digital access is limited.
- Provide budgets, training, and institutional support to mainstream GEDSI within IBF operations and to tailor preparedness and response actions to diverse vulnerability profiles.
- Include GEDSI indicators in monitoring frameworks and establish mechanisms for continuous community feedback, ensuring systems "do no harm" and actively reduce inequalities.

Session 8: MEL, Learning Loops, and Demonstrating Transformational Change

Monitoring, Evaluation, and Learning

Thanut Rittichai, M&E Officer, RIMES

The session introduced the MEL approach for the SAHF-IBF project, outlining how MEL will track progress, assess effectiveness, and inform adaptive management. Participants were guided through the WISER results framework and how regional indicators will be converted into country-specific targets, especially for the five demonstration countries—Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka.

Key Insights

- MEL was presented as the project's pathway for linking activities to outputs, outcomes, and long-term impact, and as a tool for adaptive management. The session explained how the project aligns with the WISER results framework—strengthening IBF coordination, building producer capacity, and improving the enabling environment through knowledge products and inclusive training. GEDSI is embedded through targets for women and persons with disabilities.
- MEL will track how IBF is integrated into national plans and SOPs, how many organizations and practitioners use IBF tools, and evidence of transformational change captured through case studies in demonstration countries. Country-level targets include integrating IBF into at least one plan, engaging multiple agencies, and training around 60 users per country.

Recommendations

Countries should design demonstrations and trainings to directly contribute to MEL indicators, ensure cross-sector engagement, plan inclusive capacity building, embed MEL in workplans, and anticipate barriers by aligning efforts with national processes and policy windows.

Demonstrating Transformational Change

Caroline Hattam, MEL Coordinator, UK Met Office

The session clarified how "transformational change" fits into the WISER MEL approach, highlighting that unlike quantitative indicators, this impact measure focuses on the depth and quality of change resulting from IBF adoption. Transformational change is essential for achieving the WISER impact of strengthening community resilience, as it reflects shifts in how IBF is produced, shared, and used across systems. The presenter outlined five dimensions—innovation, evidence, replicability, scalability, and sustainability—which together describe how countries can move from pilots to lasting, system-wide adoption. Progress will be tracked through narrative progress markers ("expect to see," "like to see," "love to see") and captured through Stories of Change that document what shifted, why, and with what implications for long-term resilience.

Key Insights

- Transformational change is about *quality*, not quantity—showing how IBF leads to systemic, people-centred improvements.
- The five dimensions provide a practical pathway: innovation and evidence initiate change; replicability and scalability spread it; sustainability secures it.
- Progress markers offer a flexible way to track incremental steps toward deeper, lasting change.

Recommendations

Countries should design demonstrations to generate clear evidence of what works, document early signs of replication and scaling, and intentionally link IBF activities to long-term institutionalization (e.g., SOPs, budgets, policies). They should begin drafting Stories of Change early, using them to highlight how demonstrations contribute to broader climate-resilient development trajectories. If it isn't appropriate, not every country has to demonstrate every indicator/MEL component. Depending on approach and structure of demonstration activity, it may be more suitable for evidence and testing of some (but not all) components of the regional approach (e.g., Bhutan at a National Level, while other countries prefer localized pilots and upscaling from there).

Session 9: SKHub Community of Practice (COP) Demonstration

Surajan Shrestha, SAHF Web Developer, RIMES

Mr. Shrestha introduced the SAHF Knowledge Hub (SKHub), a dedicated online platform designed to consolidate learning resources, courses, tools, and collaboration spaces for hydrology, meteorology, and climate practitioners in South Asia. Participants received a full demonstration of the Hub's features—including courses, glossaries, quizzes, resource libraries, and user profiles—and an in-depth walkthrough of the newly developed CoP module.

Dr. Agarwal emphasized the importance of the Knowledge Hub for all participants, particularly as countries begin designing their national IBF demonstration projects. He encouraged everyone to create accounts, explore the platform, and actively join the Impact-Based Forecasting CoP, where discussions, technical queries, and peer-learning exchanges can take place with support from experts and resource persons.

Key Insights

A. Knowledge Hub as Centralized Learning Platform

- Provides structured courses, each with progress tracking, glossary-enabled learning, quizzes, and downloadable certificates.
- Courses were developed by regional experts and aligned with SAHF thematic areas, making the content relevant and practical for operational forecasting and climate services work.
- Users can save progress, return to modules later, and review key concepts through integrated interactive elements.

B. Rich Supporting Resources

- A growing library of articles, videos, podcasts, and documents supports broader continuous learning.
- Includes access to Forecasters Forum reports, DataEx documentation, and other SAHF tools.
- The Resource Persons directory helps users identify and connect with regional experts by thematic area or country.

C. Glossary and Quiz Features Strengthen Usability

- The glossary responds to requests from previous workshops and supports deeper comprehension of technical terms.
- Integrated quizzes help reinforce learning and allow users to self-assess their understanding of IBF and related topics.

D. CoP as a New Collaboration Environment

The CoP enables thematic discussion spaces—such as IBF, climate services, NWP, observational networks, public health, hydrology, and more.

Users can:

- Initiate discussions
- Reply to others
- Upload images and media for context
- Receive notifications on replies and updates

Threaded discussions aims to mimic user-friendly social media-style interaction, supporting active knowledge exchange among practitioners.

E. Growing Ecosystem Linking Platforms

- Knowledge Hub acts as a central “bridge,” providing access to other SAHF platforms like DataEx and Forecasters Forum.
- Future plans include integrating additional tools to strengthen the Hub as the main operational and learning environment for the region.

Recommendations

- All participants should register, explore the Knowledge Hub, and join the IBF CoP. This will help streamline Q&A, peer learning, and support during the development of national IBF demonstrations.
- Use the CoP as a living support forum for:
    - Troubleshooting IBF modeling or data issues
    - Sharing SOPs, forecasts, communication templates
    - Posting questions on methodology, thresholds, validation, and sectoral applications
    - Discussing terminology, translation challenges, or user engagement practices
- Countries should contribute training materials and links from their own NMHS or sectoral agencies to enrich the course inventory.

- Develop a CoP engagement plan for the project duration—assigning focal points to monitor discussions, initiate topics, and respond regularly.
- Leverage CoPs to bridge NMHS and end-user communities, including agriculture, DRM, public health, local governments, and civil society.
- Integrate CoP participation into national demonstration workflows (e.g., post updates, share draft products, ask for expert review).
- Explore future interoperability between external learning management systems (LMS) and the Knowledge Hub to reduce duplication and enrich available content.

Session 10: Governance, Roles, and Coordination Mechanisms

Helen Caughey, Expert Operational Meteorologist, UK Met Office
Dr. KJ Ramesh, SAHF Adviser, RIMES

The session focused on defining the governance structures, institutional roles, and coordination mechanisms needed to effectively implement temperature-related IBF across South Asia. It underscored that IBF can only function when strong, multi-level, cross-sectoral governance structures support co-production, iterative feedback, and continuous refinement. Ms. Caughey highlighted the need to clearly define the roles of RIMES as the Regional Secretariat, the Met Office as a technical partner, national meteorological services as primary custodians of IBF, and sectoral agencies as end users. Dr. Ramesh then presented RIMES' 15 years of operational experience establishing multi-hazard, multi-timescale, multi-purpose early warning systems, demonstrating how well-designed governance models, digital platforms, and country-driven coordination have enabled scalable and sustainable climate services across the region.

Key Insights

- Successful IBF requires more than forecasting capability—it depends on interconnected systems that bring together global model inputs, national modelling, decision-support tools, user-specific applications, and community-level communication mechanisms.
- RIMES' role is rooted in intergovernmental partnership, technical back-end support, and facilitating shared platforms such as DataEx, Knowledge Hub, Forecasters Forum, SASCOF, and a wide suite of sector-based decision-support systems.
- IBF governance must mirror this ecosystem approach: NMHSs remain at the center of national IBF delivery, but require structured support from RIMES and UK Met Office, plus formal mechanisms to exchange data with water, agriculture, health, disaster risk management (DRM), and local governance bodies.
- Robust governance depends on sustained cross-sectoral engagement, as exposure, vulnerability, and decision contexts evolve through time and require constant updates.
- IBF should function on multiple timescales—short-range, medium-range, monthly, seasonal, and climate-change horizons—each requiring its own governance processes, user interactions, and decision protocols.

Recommendations

- Establish a formal, multi-tiered governance structure that enables consistent IBF implementation.
- At the Regional level:
    - RIMES should maintain its role as the Secretariat coordinating technical backstopping, regional knowledge exchange, and integration of global forecasts and digital tools.
    - Countries should strengthen/establish national IBF steering committees or working groups bringing together NMHSs, DRM authorities, health, agriculture, water, transport, and local governance representatives for continuous co-production and review.
- Within countries, NMHSs must be formally positioned as the lead agency responsible for IBF production and dissemination, supported by structured feedback loops with sectoral agencies.
- At the operational level, countries should adopt governance mechanisms that allow iterative improvement of exposure/vulnerability datasets, update thresholds and triggers, formalize SOPs, and sustain user consultations across seasons and years.
- Finally, countries should leverage RIMES' existing platforms—DataEx, Knowledge Hub, Forecasters Forum, and existing decision-support tools—to ensure interoperability, institutional memory, and long-term sustainability of IBF systems even beyond project timelines.

A plenary discussion ensued to map the stakeholders for IBF implementation in South Asia across the regional, national, and local levels. These actors were then categorized using the RACI matrix to clarify functional roles and engagement expectations throughout the implementation process. In this structure, ***Responsible*** refers to agencies that will carry out activities and deliver outputs; ***Accountable*** designates the authority that oversees and owns decisions or approvals; ***Consulted*** includes technical partners and sector stakeholders who provide input, expertise, or validation; while ***Informed*** covers stakeholders who must be kept updated on progress, advisories, or decisions but are not directly involved in execution. The exercise helped establish clear coordination pathways and avoid overlap as demonstration projects move toward operationalization. Consider what sort of mapping process is suitable for the "actors" within the region, and then within each national demonstration programme. The RACI matrix may not be applicable to all, but was used here to demonstrate how different stakeholders will have differing levels of engagement and it is important to clearly define these.

Figure 1. RACI Chart of key actors identified during the Session 10 activities.

Session 11: Terminologies and Core Concepts of IBF/IF, Understanding the Implications for Temperature-Related Hazards

IBF Overview

Helen Caughey, Expert Operational Meteorologist, UK Met Office

This session provided a foundational refresher on what IBF means—particularly for the representatives from ministries of Health, Agriculture, Livestock, Water, and other sectors who will co-develop the IBF demonstrations. Using the UN ESCAP manual's definition as a reference, the session laid out the three essential components—hazard, exposure, and vulnerability—and how these combine to define risk. The framing emphasized that IBF shifts forecasting from *what the weather will be* to *what the weather will do*, enabling sectors to translate meteorological information into actionable decisions.

Key Insights

- A central insight was the need to distinguish hazard from its consequences: temperature alone does not define risk unless interpreted in context with exposure (who/what is located where) and vulnerability (the dynamic capacity to cope).
- Vulnerabilities are never static, rather dynamic —time of day, time of year, preceding events, recurring hazards, and special circumstances such as festivals or agricultural cycles all influence susceptibility and therefore the level of risk.
- Forecasters cannot determine impacts alone—requires contribution from sectors and communities to provide the nuanced understanding needed to interpret how a temperature hazard translates into health effects, livestock stress, crop damage, or operational disruptions.
- Risk matrices are essential tools for communicating likelihood and severity of impacts, stressing that the likelihood refers not to the hazard itself, but to the likelihood that the hazard will produce specific impacts.
- Identifying baseline conditions—impacts that systems can normally absorb without a warning—are also important as it helps avoid over-warning and ensures that IBF focuses on situations where action is truly required.

Recommendations

- The session recommended strong, continuous cross-sectoral collaboration, as effective IBF depends on stakeholders articulating their vulnerabilities, decision thresholds, and operational needs.
- Actively participate in co-production processes to ensure that IBF tools, matrices, and impact tables reflect real-world conditions and evolving vulnerabilities.
- Adopt dynamic approaches in monitoring vulnerability—considering temporal factors, cascading events, and local exposure patterns—to improve the precision of risk assessments.
- Establish feedback loops to enable sectoral users to report back on actual impacts, helping refine forecasts, adjust impact matrices, and strengthen services over time.
- IBF must become an iterative, collaboratively maintained service that evolves alongside community resilience, climate trends, and sectoral requirements.

Temperature-Related Hazard: Case of Bangladesh

Raihanul Haque Khan, Bangladesh Country Program Lead, RIMES

Mr. Khan highlighted how extreme heat has rapidly become one of Bangladesh's most widespread climate risks, now affecting sectors far beyond health. Focusing on heatwaves—the country's most severe temperature hazard—BMD reported increasing intensity, a westward concentration, and a seasonal shift extending into the late monsoon. These trends align with growing evidence of rising mortality, labour losses, and impacts on vulnerable groups. Bangladesh also showcased early foundations for future IBF services, including anticipatory action pilots, sub-seasonal advisories, and the National Livestock Advisory System (NLAS).

Key Insights

- Bangladesh's experience illustrates that extreme heat has already transitioned from an episodic hazard to a recurring, cross-sectoral stressor, generating compounding impacts across systems.
- Evidence shows rapidly rising heatwave days per person, record-breaking events in 2023–2024, and mounting economic losses from heat-induced labour disruptions, energy system strain, rail buckling incidents, livestock productivity decline, and crop sensitivity. These findings underscore a critical point: heat's impacts are not siloed—they cascade through interconnected sectors, affecting national planning, social safety nets, power supply, public health, and food systems.
- The country's recent pilots demonstrate the importance of integrating sub-seasonal forecasts, vulnerability mapping, localized indices (e.g., THI, Heat Index, UTCI) and anticipatory action models, particularly where vulnerable groups (children, farmers, livestock keepers) can benefit from timely advisories.
- While BMD has initiated a new colour-coded temperature alerting system and experimentation with heat-related indices, full operational IBF for heat is still emerging.
- Bangladesh has some strong foundational elements—such as detailed climatology, vulnerability data, satellite-based exposure analyses, and the NLAS decision-support system—but requires further strengthening to achieve an end-to-end IBF service that links hazard forecasts to sectoral impacts, user behaviour, and early action triggers.

Recommendations

- There is a need for a structured development of a full IBF framework for heat, starting with the standardization of vulnerability mapping, the operationalization of indices like UTCI, and the expansion of sector-specific advisory products beyond the livestock sector.
- Strengthening the feedback loop between national producers (BMD, DLS, Agriculture, Health) and local users—particularly farmers, livestock keepers, schools, and urban authorities—will be essential to ground-truth the risk matrices and co-produce impact tables.
- Bangladesh would benefit from testing IBF prototypes at the local level, using existing tools such as NLAS and anticipatory action models to generate field-level evidence of effectiveness.
- Over the medium term, integrating IBF for heat into sectoral SOPs and national plans (health, energy, agriculture) will support policy uptake, while continued refinement of hazard-exposure-vulnerability datasets will be necessary to move from advisory-style bulletins to a fully operational impact forecasting service.

IBF for Heat and Cold Wave

Dr. M Iyyappan & Dr. Priyanka Singh, Scientist D, IMD

This session outlined how IMD monitors, forecasts, and issues impact-based warnings for heatwaves and cold waves, and how these services are being adapted for agriculture and livestock. IMD presented its multi-hazard DSS, heat and cold definitions, composite risk mapping,

verification, and its growing suite of sectoral IBF products developed with agricultural and livestock institutions.

Key Insights

- IMD's DSS integrates observations, model outputs, climatology, geospatial layers, and socio-economic exposure data to generate district-level heat and cold risk. Heatwave classification uses IMD's absolute and anomaly thresholds, including warm-night criteria, supported by percentile diagnostics and NOAA-based heat index calculations. During discussion, IMD noted that its heat index categories—<40°C (no harm), 40–50°C (low), 51–60°C (moderate), >60°C (high)—reflect Indian humidity conditions but acknowledged the need to better align thresholds with human physiological limits as research evolves.

- The 2022 terminal heat event in wheat reinforced the need for crop-stage-specific thresholds. IMD and Indian Council of Agricultural Research (ICAR) have since developed district-level crop-weather calendars to support stage-based IBF. For livestock, IMD and National Dairy Research Institute (NDRI) are creating THI-based stress categories tailored to Indian breeds. Dissemination remains extensive through GKMS project, Agrometeorological Field Units (AMFUs)/District Agrometeorological Units (DAMUs) DAMUs, public-private partnership, and Panchayat-level channels.

Recommendations

India will continue refining its composite DSS by integrating more granular sectoral data and validating thresholds against observed impacts—including future adjustments to heat index categories based on physiological evidence. THI-based livestock products should be operationalized with clear guidance, and crop-stage interpretation should be automated within the IBF workflow. Strengthening feedback loops with farmers and sector agencies will help refine thresholds, impact tables, and communication strategies for heat and cold events.

Session 12: Terminologies and core concepts of IBF/IF, understanding the implications for temperature-related hazards

Raihanul Haque Khan, Bangladesh Country Program Lead, RIMES

The session explored approaches for improving impact-based forecasting of temperature-related hazards, with a focus on shifting from basic temperature thresholds to more advanced heat stress indicators like UTCI to better reflect human physiological response. Bangladesh's cyclone impact-forecasting work was presented as a successful model for integration of hazard, exposure, and vulnerability data, demonstrating strong correlation with reported damage and clear benefits for anticipatory action. Speakers showed evidence of increasing strong and very strong heat stress days and highlighted the need for bias correction, sensor calibration, and validation to ensure accuracy. The session concluded with interactive discussions on forecasting practices across countries and prioritization of indicators for operational use.

Key Insights

- Impact-based forecasting benefits from integrating hazard + exposure + vulnerability layers, rather than indicators alone.
- Cyclone IBF in Bangladesh shows high correlation with district-level damage, supporting use for early action and cost savings.
- Temperature hazards are rising, with increasing strong/very strong UTCI days, especially in western Bangladesh.
- UTCI gives more realistic human-heat perception than heat index, as it accounts for physiological and clothing response.
- Most countries still rely on max/min temperature and heat index, with UTCI emerging but not yet widely operational.
- Data and skill gaps remain around bias correction, calibration, real-time observation, and localized validation.

During the breakout session, participants identified and ranked key vulnerability indicators relevant to temperature and heat-related hazards, focusing on demographic sensitivity, socioeconomic factors, housing conditions, occupational exposure, and access to services. Representatives from Pakistan, Nepal, and Bangladesh were able to share their discussions:

- Across groups, children, elderly populations, chronic illness, poverty, and outdoor workers consistently emerged as high-priority risk factors, though data availability varied widely.
- Pakistan and Nepal reflected relatively structured data sources through statistics and health ministries, while Bangladesh emphasized housing type, population density, and socioeconomic conditions as core determinants of vulnerability, with most datasets reportedly available through national statistics offices.
- All groups highlighted the challenge of limited data on housing quality, disability, and real-time health vulnerability, pointing to the need for improved data systems and standardized vulnerability metrics.

Recommendations

- Prioritize operational adoption of UTCI and heat stress indices, especially where vulnerability is high.
- Strengthen calibrated sensor networks and develop bias-corrected forecast datasets for improved reliability.
- Expand impact-based forecasting toolkits to temperature hazards/parameters using cyclone modeling lessons.
- Promote community-level validation, consultations, and sector-tailored thresholds for actionable warning products.
- Encourage countries to move beyond static thresholds by incorporating wind, humidity, radiation, and urban heat island factors.
- Consider where and how to host data/toolkits which countries can access for the benefit of regional and national demonstration activities.

Session 13: From IBF/IF to Operational Scenario-Based Impact Forecasting: Case Studies and Way Forward

The sessions highlighted how countries across South Asia—and partners like the UK—are advancing IBF by strengthening coordination, refining thresholds, and ensuring that climate and weather information leads to real, protective action. India's NCDC showcased a mature heat-health system integrating IMD forecasts with health surveillance and community alerting, while Cambodia demonstrated how anticipatory action workflows link forecast triggers to pre-agreed early actions through scenario matrices and multi-agency SOPs. RIMES emphasized the importance of localized, sector-specific thresholds and uncertainty communication, as reflected in COMET training modules, and Bangladesh's ENSO-based anticipatory action pilot showed how multi-timescale forecasts can guide early advisories for agriculture, livestock, and heat preparedness. The UK Met Office's Action First initiative added a behavioral science dimension, demonstrating how co-produced, action-oriented messages can close the awareness–action gap—an approach highly relevant for IBF demonstrations across the region.

Climate Forecasts and Health Preparedness: India Perspective

Dr. Aakash Srivastava, National Centre for Disease Control (NCDC) - India

Key Insights

- India's heat-health system demonstrates strong institutional coordination between IMD and health authorities. Alerts are automatically disseminated through email, websites, and WhatsApp, activating state and district actions aligned with IMD's color-coded system (green–yellow–orange–red). These actions range from readiness measures and stockpiling to activating heat wards, ambulance services, and community-level outreach. Real-time surveillance via the electronic Integrated Health Information Platform supports monitoring of heat illness and post-season review of thresholds. Community communication tools—such as heat alert boards with simple visuals and local-language guidance—ensure warnings reach vulnerable and informal workers.
- The discussion highlighted an important technical concern: IMD's current heat-index danger levels begin at higher feels-like temperatures (~40°C) than those used in global health literature, where caution starts closer to 30°C. IMD explained that its thresholds follow NOAA's formula and reflect India's diverse humidity profiles, particularly low-humidity regions like Rajasthan. However, IMD acknowledged that physiological evidence warrants closer alignment and expressed readiness to refine thresholds in collaboration with health experts, incorporating research on temperature–humidity combinations and percentile exceedances.

Recommendations

- Countries planning IBF demonstration cases should establish predictable coordination mechanisms between NMHSs and health authorities, co-develop tiered heat-health action plans, and invest in simple, accessible communication tools for at-risk populations. Strengthening links between surveillance and forecasting, developing scenario-based impact guidance, and supporting intersectoral task forces will enhance preparedness.
- Given questions raised about heat-index thresholds, countries are encouraged to jointly review heat-risk categories with public health experts, ensuring they reflect both

meteorological contexts and human physiological limits. Small-scale heat-health pilots—especially in high-risk districts—can help validate thresholds, refine triggers, and improve communication before national scale-up.

Piloting Anticipatory Action for Floods in Cambodia

Peter Khalil Ferrer, Training Development Specialist, RIMES

Key Insights

- Cambodia's AA/IBF system relies on three core elements: risk information, pre-agreed SOPs, and pre-arranged resources.
- Detailed exposure–vulnerability mapping identified high-risk communes, while hydrological monitoring revealed data reliability challenges—only one station consistently functioned.
- A three-tier trigger system, calibrated to rainfall thresholds and return-period events, was developed and linked to sectoral actions through scenario matrices. Multi-agency validation ensured appropriate activation, while capacity building helped officials interpret forecasts and make informed decisions.
- Rainfall-based thresholds were used due to limited hydrological infrastructure.
- The Red Cross Red Crescent Climate Centre (RCRCCC) emphasized that trigger development is the most challenging component—especially for heat—because it requires linking thresholds to real impact data, which is often limited. Bangladesh's sector-specific heat triggers were cited as a model. Cold-wave AA examples from Mongolia and emerging work in Nepal and Bangladesh highlighted broader multi-hazard relevance.

Recommendations

Countries should develop evidence-based thresholds, strengthen observation networks, and jointly construct scenario matrices and SOPs with technical agencies and local governments. Sector-specific triggers should be recognized, and early action plans should consider livelihood- and exposure-based differences. Countries are encouraged to start with simple, actionable IBF products and expand into more advanced modeling over time.

RIMES: Experience on COMET

Dr. Shiromani Jayawardena, SAHF Adviser, RIMES

Key Insights

- There is a need for location- and sector-specific thresholds, as illustrated in COMET's "heat risk" approach, which integrates temperature, humidity, seasonality, and mortality data.
- Modules on heat index, WBGT, and EPS tools showed how NMHSs can communicate uncertainty more effectively.

- The session also stressed including cold extremes, referencing a case in Sri Lanka where atypical cold stress from Tropical Cyclone Mandous caused –7 to –8°C anomalies and mass livestock deaths—reinforcing the need for cold thresholds in tropical climates.

During discussion, participants noted the scarcity of South Asian examples in COMET's modules. COMET representatives confirmed that new IBF modules are in development and welcomed collaboration to co-create regionally tailored materials.

Recommendations
Countries should use COMET resources to strengthen foundational IBF skills, while developing localized, sector-specific thresholds that reflect regional climate and vulnerability patterns. Stronger NMHS–sector partnerships are essential for defining impact thresholds and actions. Collaboration with COMET and the SAHF Knowledge Hub can yield South Asia–specific training modules supporting long-term IBF capacity development.

COMET modules can also be a useful tool for ToT approaches and cascading of knowledge within national contexts.

COMET are always looking for additional ideas for future training modules, gaps and challenges which are faced in implementation of IBF, which aren't currently addressed in modules. If you have any ideas contact Helen (Caughey), UK Met Office.

Anticipatory Action focusing on Temperature-related Hazards: Bangladesh

Asif Uddin Bin Noor, Climate Service Expert, RIMES

Key Insights

- Forecasts validated by observed conditions: March–May saw rising temperatures, rainfall deficits, crop losses, water scarcity, and heat-health impacts.
- Early actions—drought-tolerant seeds, mulching, irrigation advice, shading, and health campaigns—helped households mitigate losses, especially low-income farmers.
- A parallel initiative using Bangladesh's NLAS delivered THI-based advisories and voice messages to over 80,000 farmers, prompting timely cooling, vaccination, and feeding practices and yielding USD 80–200 in avoided losses per household.
- The session highlighted the importance of multi-timescale monitoring, recognizing flash drought as a major risk for Bangladesh.
- Discussions emphasized the need to refine heat and drought triggers to reflect exposure, vulnerability, and livelihood differences, address misinformation (e.g., excessive salt intake), and leverage automated tools alongside human extension workers.

Recommendations
Bangladesh should institutionalize multi-timescale climate monitoring, integrate ENSO insights with sub-seasonal and short-range forecasts, and refine triggers based on exposure and vulnerability. Multi-indicator drought monitoring and simple, localized communication products are

crucial. Scaling AA will require consistent impact documentation, harmonized data collection, and clear institutional guidelines to activate early actions rapidly and reliably across districts.

Incorporation of Advice into NSWWS Warnings

Helen Caughey, Expert Operational Meteorologist, UK Met Office

This session presented the United Kingdom's experience in transforming its IBF warnings into action-oriented public advisories, addressing the persistent gap between public *awareness* of warnings and their *willingness or ability to act*. Ms. Caughey outlined how the UK Met Office redesigned its National Severe Weather Warning Service (NSWWS) in 2023 to incorporate behaviorally informed "*What should I do?*" guidance co-developed with key sectoral partners. The presentation also explained how the UK manages temperature-related hazards through a combination of extreme heat warnings, health sector alerts, and winter hazard warnings, ensuring clear roles between meteorological and health agencies.

Key Insights

- *The Awareness–Action Gap*
  UK surveys consistently showed high awareness of warnings (often 90%+) but a significant drop in actual protective action. This highlighted that knowledge alone does not lead to behavior change, prompting the move toward explicit, evidence-based action statements.
- *Behavioral Science as a Core Component of IBF Communication*
  The Met Office incorporated established behavioral frameworks to improve public response:
  - Kin Framework – people act when advice is framed as protecting someone they care about or their property or livelihood.
  - Loss vs. Gain Framing –
    - *Gain framing* used for lower-level warnings ("Give yourself the best chance to avoid delays…").
    - *Loss framing* reserved for severe warnings ("Being outside in high winds makes you vulnerable to injury…").
  - Capability, Opportunity, Motivation – ensuring messages answer: *Should I (why should I) pay attention? Can I act (and what can I do)? Do I want to act?*

Key psychological factors table

The **7 key behavioural areas** (or nudging techniques) to use for driving behaviour change are detailed here:

		Evidence-based and informed by:	
Behavioural frameworks:	**Description**	**Relevant academic paper**	**User information / reports**
Promote response efficacy	Messaging highlights that behaviour will have an impact	Van Valkengoed & Steg (2019)	B2B
Promote self-efficacy	Messaging highlights that behaviour is easy, achievable	Van Valkengoed & Steg (2019)	B2B
Clear and concrete	Messaging is clear and concrete	Taylor et al. (2019)	B2B, DJS, Met Office digital team
Self-relevant	Messaging highlights that highlights relevance to the people reading the warning	Bubeck et al. (2013)	B2B, DJS
Kin, protecting others	Messaging highlight impacts on family and friends	Van de Vyver et al. (2018)	
Loss frame	Messaging highlights possible losses of not taking action	Van Valkengoed & Steg (2019)	B2B
Gain frame	Messaging highlights possible gains of taking action	Van der Linden (2015)	

Figure 3. Key psychological factors that drive behaviour change

- *Co-Production with Sectoral Authorities*
  All action statements were developed jointly with emergency services, utilities, transport agencies, health institutions, and local governments. This ensured:
  - Accuracy and appropriateness of safety actions
  - Unified messaging regardless of where the public receives information
  - Reduced confusion and improved trust

- *Tailoring Actions to Warning Level & Lead Time*
  Different language is used depending on warning severity and confidence:
  - Yellow (lower-impact) – “easy wins,” simple preparedness, mostly gain framing
  - Amber (medium to high impact) – stronger, more directive statements
  - Red (high-confidence, high-impact) – urgent, loss-framed instructions (“Prepare to avoid travel…”)

  Warnings issued *with no lead time* omit action statements to avoid prompting unsafe behavior during ongoing hazards.

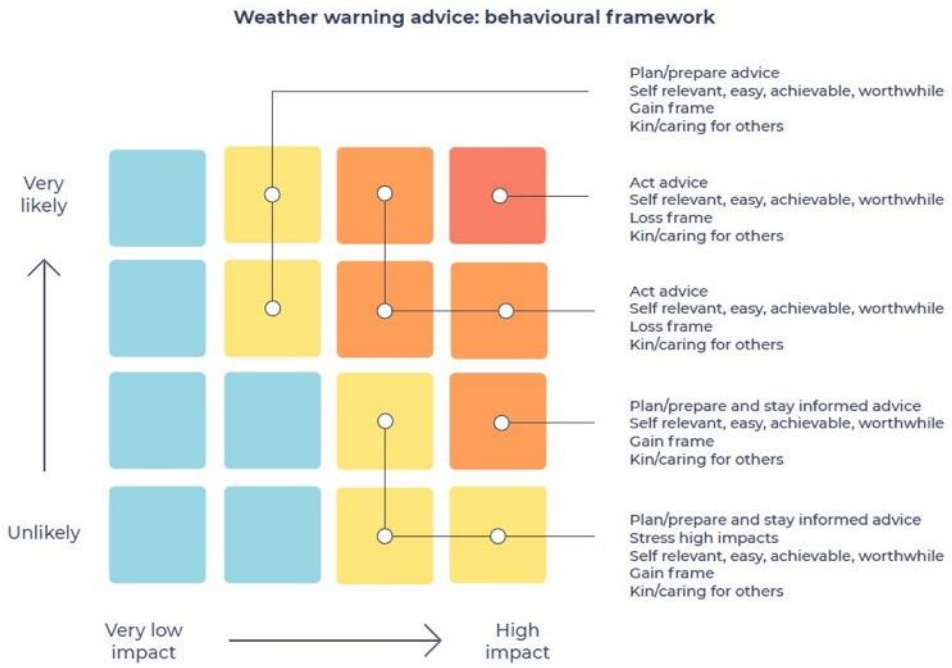


Figure 2. Behavioural Framework for weather warning advice

- *UK's Temperature Hazard System is Multi-Layered*
    - Extreme Heat Warnings (public-facing IBF) – issued only for the most severe events.
    - Heat-Health Alerts (co-issued with health agencies) – tailored to vulnerable groups and health infrastructure.
    - Cold Impacts – addressed through snow/ice/wind warnings and separate winter health alerts, rather than a standalone "cold IBF warning."

  This layered approach ensures each audience — public, responders, health sector — receives context-appropriate guidance.

Recommendations

- Use proven behavior-change methods when crafting IBF messages to increase protective action, especially for heat- and cold-related advisories.
- Develop standardized, sector-endorsed actions with agriculture, health, disaster management, and infrastructure agencies to ensure consistency and reduce mixed messaging.
- In public warnings, foreground action statements, followed by impacts and meteorological context. Ensure communities can immediately see "*what to do*."
- Strengthen directive language as confidence and severity increase. Lower-level advisories should emphasize "easy wins," while higher-level warnings should directly address risks and potential losses.

- *Consider Multi-Layered Alerting Systems for Temperature Extremes*
  Countries have complex warning landscapes for temperature-related hazards. Whichever the hazard, it is important to be clear on the impacts, actions which can be taken, and when/how to communicate the warnings.
  This avoids confusion and ensures each group receives the most relevant information.
- Testing in controlled pilot sites can help refine the design, framing, and placement of action-oriented messages before national scaling.

Bangladesh National Livestock Advisory System (NLAS) Demonstration

Raihanul Haque Khan, Bangladesh Country Program Lead, RIMES

The session provided a walkthrough of Bangladesh's NLAS, a digital platform jointly developed by the DLS and BMD. The presentation emphasized lessons from anticipatory action projects and demonstrated how NLAS supports weather- and climate-informed livestock management.

Key Insights

- The speaker noted that while some anticipatory actions helped farmers save resources during heat stress, other interventions—such as recommending drought-tolerant rice varieties—resulted in crop losses when unexpected flooding followed. This highlighted the need for a **multi-hazard, cascading-risk approach** and the importance of ensuring recommendations are feasible in real conditions, such as advising water-based cooling methods during periods of water scarcity.
- NLAS reflects six years of collaboration among meteorologists, livestock specialists, research institutes, and universities. It integrates 3-hourly forecasts, temperature–humidity indices, and five-day alerts, while an AI-driven chatbot—trained on over 70,000 real farmer queries—supports accessible information exchange in both English and local transliteration. Developers had to filter out inappropriate outputs, such as unsolicited medical prescriptions, demonstrating responsible use of AI.
- The system includes long-term projections up to 2100, district-level vulnerability assessments, and seasonal risk mapping for livestock diseases like Foot and Mouth Disease. It enables monthly advisories and special bulletins for heatwaves, cold waves, and floods, with differentiated guidance for commercial and backyard farmers. Extension officers can disseminate advisories through email or voice messages.
- A mobile app version exists but is mainly intended for extension officers, though commercial farmers can use it directly. In the Q&A, the presenter clarified that advisories are intentionally customized for different farmer types to enhance relevance—high-tech solutions for commercial farms and simple, low-cost actions for marginal farmers. Participants also raised questions on THI formulas, with the presenter noting that further refinement is needed for cold-wave conditions, especially for poultry due to limited research.

Recommendations

- Future improvements should prioritize multi-hazard analysis, avoiding one-hazard interventions that may create new vulnerabilities. Recommendations must remain

practical and context-appropriate, ensuring farmers are not advised to take actions that are unrealistic during resource shortages.

- More research is needed to refine livestock stress indices, particularly for poultry and cold-wave conditions. Scaling up extension training, improving app accessibility, and expanding voice-based dissemination can enhance the system's reach and support broader farmer adoption of climate-resilient livestock practices.

Session 14: Data, Modelling, and Forecast Data Flow

Mitesh V. Sawant, Agriculture Specialist and Project Manager, RIMES

The presentation introduced participants to the data modeling, forecasting workflows, and multi-layered systems used by RIMES to support anticipatory action across regional, national, and local levels. It aimed to help countries visualize how data, tools, and templates will operate during their national demonstration exercises.

Key Insights

- The IBF framework acts as a "blueprint" or recipe for action, while the toolkit provides ready-made methods and templates. Countries are expected to contextualize these tools by drawing from regional examples and tailoring them for national and local needs—moving from regional → national → local application.
- RIMES presented a seamless workflow where regional platforms like RDAS, DataEx, SKHub, and UN ESCAP's Regional Resilience Portal serve as upstream sources of climate, seasonal, and observational data. This data can then be stored or visualized at the national level (e.g., through a basic data server or a climate information system like CDIS), before being customized into sector-specific tools at the local level—such as livestock advisory systems or the INSTANT multi-hazard portal.
- RDAS hosts multisource, multiscale datasets and exposure/vulnerability layers, supporting impact-based forecasting at country level. DataEx enables two-way exchange of national observational data with ECMWF—countries provide observations, receive improved model outputs, and share feedback, creating a mutual benefit loop for better regional forecasting.
- Participants were encouraged to identify what regional datasets they currently access, what national datasets are available or missing, and what sectoral data will be required for IBF development. The presentation emphasized that country contexts vary widely—some advanced (e.g., India, Sri Lanka), others just beginning—so tools must be adapted rather than standardized. A strong feedback loop is essential as systems flow from global data to local action.

Recommendations

- Countries should design their national frameworks with clear data pathways: identify what regional datasets can be leveraged, determine national infrastructure needs, and define how local-level DSS tools can best use customized information for anticipatory action.
- Since countries are at different stages of capacity, the focus should be on selecting the most relevant tools from examples like RDAS, DataEx, INSTANT, or livestock DSS, then tailoring them to sectoral realities. Establishing a strong feedback loop—from local users back to national and regional systems—will be crucial for refining models and improving IBF services over time.

Session 15: Guidelines for National Demonstrations

Danna Valdez, Project Officer, RIMES

The session outlined how countries will design, plan, and implement national temperature-focused IBF demonstrations as part of the regional framework being developed under the project. The presentation walked participants through the purpose of national demos, the structure of the concept note template, and the expected workflow and timelines leading up to full implementation by 2027.

Key Insights

- National demos serve as real-world testing grounds for the regional temperature-IBF framework and toolkit being developed. Countries will identify thresholds, triggers, SOPs, workflows, and communication processes during their demonstrations, with lessons feeding into iterative refinement of regional resources. Demonstrations will focus on heat and/or cold seasons depending on national contexts and data availability.
- Countries are asked to develop a concept note covering:
    - A profile of the demo (proponent agencies, sector partners, pilot site, seasonal focus, duration).
    - A problem statement and measurable objectives that justify the chosen site and sector.
    - Governance structures, target groups, and stakeholders involved—including NMHS, sectoral agencies, local governments, civil society organizations (CSOs), and community partners.
    - Existing data and methodologies (meteorological, climate, exposure, vulnerability, impact data), current indices used for temperature hazards, and potential areas for improvement.
    - Current SOPs, communication products, dissemination channels, and how these will be strengthened through the demo.
- Countries must outline a full workflow—from planning, partner coordination, and forecasting, to dissemination, early actions, stakeholder engagement, post-season assessment, and lessons learned. Timing is critical: heat-season demos may begin as early as the first quarter of next year, with reviews feeding into cold-season demos and final regional resource consolidation by March 2027. An inception meeting must take place before implementation to align all stakeholders on triggers, thresholds, and expectations.

- The concept note should integrate MEL-GEDSI principles, ensuring dissemination methods, language, and actions are inclusive for vulnerable groups. Countries must identify risks, mitigation measures, and sustainability plans, aiming to scale up demos to national level.

Recommendations

- Countries should select pilot areas based on data availability, exposure, and operational feasibility, ensuring objectives are measurable and directly linked to temperature-related risks. Early identification of thresholds, indices, and SOP refinements will strengthen implementation readiness for the coming heat and cold seasons.
- NMHS should lead coordination with sector agencies, local authorities, and community actors. Countries are encouraged to leverage existing systems and in-kind resources, while relying on RIMES for technical assistance. Strong stakeholder mapping—supported by the RACI framework—will ensure smooth workflows, inclusive warning dissemination, and effective post-season evaluations for scaling and institutionalization.

Session 16: People in Need – Experience In Nepal

Sanchita Neupane, Program Manager, People in Need (PIN) Nepal

This session shared experiences from People in Need Nepal's RAIN project, focusing on the activation of heat early action in 2025 in hazard-prone municipalities in Madhesh and Lumbini Provinces. The presentation highlighted how forecast-based triggers, community targeting, and inclusive communication were used to pilot heat early actions, and how these lessons will feed into provincial early action protocols.

Key Insights

- The RAIN project operates in 26 high-risk local governments, addressing multiple hazards (floods, heat, cold, fire, drought) through early warning/early action, community resilience, inclusion, and shock-responsive social protection. Working closely with NDRRMA and DHM, and with technical partners UK Met Office and RCRCCC, the project is developing provincial early action protocols while also strengthening the end-to-end EWS system—installing meteorological and hydrological stations, piloting low-cost heat sensors, multi-hazard sirens, "smart flood towers," community trainings, and safe shelters.
- Because formal provincial protocols are still under development, the team used an internal SOP for heat early action (co-developed with RCRCCC) as an interim tool. Activation was based on DHM's forecast of a short heat spell (8–11 June); the organization triggered actions on 6 June using agreed pilot thresholds and its own readiness (trained staff, logistics, local coordination). Targeting focused on the most heat-exposed local governments (Gaur, Jaleshwar, Siraha), then on specific wards and vulnerable groups: outdoor workers (rickshaw drivers, street vendors, daily wage laborers, agricultural workers, traffic police, guards, street dwellers), landless and informal settlements in the Terai, and people in crowded public spaces (bus parks, markets).

- Interventions prioritized rapid, low-regret measures: deployment of Female Community Health Volunteers (FCHVs) for door-to-door awareness, health checks, and referrals; provision of drinking water; local-language public service announcements on FM/radio; and intensive consultations with local governments to align on targeting, DHM forecasts, and expectations. Over 1,800 marginalized people received health checks and awareness sessions. Post-action assessment showed FCHVs were highly effective community champions because of their existing trust, knowledge of vulnerable groups (e.g., pregnant and lactating women), and ability to simultaneously document heat-related signs and symptoms and refer severe cases to health facilities.
- The activation was framed as action research to collect impact data against piloted thresholds. Although the heat spell was brief, 58% of respondents reported heat stress symptoms (e.g., rashes, headaches, excessive sweating, loss of appetite), suggesting potential impacts even at 37–39°C, but more multi-year data are needed to robustly link impacts to thresholds and explore differential effects by vulnerability and housing type (CGI sheet vs. straw houses). Communities increasingly favored digital and social media channels over radio, while mural art combined with heat exposure mapping proved a powerful visual tool for risk communication. In the discussion, participants and experts commended the Nepal example as a strong illustration of how gender, equity, and social inclusion (through FCHVs and focus on the most vulnerable) can be operationalized within impact-based forecasting demonstrations and suggested drawing on these experiences when designing other country demos.

Recommendations

- Future work should formally embed structures like FCHVs and community groups into heat and multi-hazard early action protocols, recognizing their dual role in outreach and data collection. Heat early action should continue to be framed as part of a holistic resilience package—linked to longer-term adaptation measures such as water schemes, small ponds, agroecological practices, and ecosystem-based interventions—rather than as stand-alone short-term responses.
- The project should systematically collect multi-season impact data to refine temperature and heat-stress thresholds, including analysis of differential impacts by livelihood, gender, socio-economic status, and housing type. At the same time, communication strategies should increasingly blend digital tools, social media, and arts-based approaches (e.g., murals) with conventional channels to reach diverse groups. Lessons from the RAIN heat activation—especially on targeting, inclusion, and community engagement—can directly inform the development of provincial early action protocols in Nepal and serve as a reference model for similar IBF demonstrations in other countries.

IV. NATIONAL DEMONSTRATION PLANS

The session on national demonstration plans for temperature-related impact-based forecasting brought together country teams to present draft concepts for pilots on heat and cold extremes, using a common template to outline geographic scope, seasons, sectors, data and institutional arrangements. Facilitators emphasized that the exercise was meant as brainstorming rather than

a final proposal, with several slide elements optional and no expectation to fill every detail at this stage. Instead, the aim was to clarify each country's initial vision and needs so that, over the next 2–3 weeks, plans can be refined with additional internal consultation and supported by technical inputs from RIMES and the UK Met Office.

Country Summaries:

- **Bangladesh**
  Bangladesh proposes a demo on heat-related IBF and early action in the northwestern region, where both heat and cold waves severely affect dense populations, outdoor workers and agriculture/livestock. The plan aims to reduce illness and production losses through timely forecast-based actions and stronger institutional communication, with BMD as lead and health, city corporations and other sector agencies as co-leads.

- **Bhutan**
  Bhutan plans to cover all of its 20 districts during the IBF demonstration, recognizing three distinct temperature zones. The demo will focus on sector-specific advisories for health, agriculture, transport and vulnerable groups (farmers, outdoor workers, urban public), using existing thresholds but refining them with impact data. Strong emphasis is placed on technical support from RIMES/UKMO for IBF system integration, model review, and sector-specific impact matrices.

- **India**
  India's draft concept centers on scaling IBF for heat and cold waves with a national lens and pilots in selected states/districts. The idea is to translate forecast skill into simple, actionable public information and sector products (e.g., for schools, health, local authorities), supported by vulnerability assessment and multi-level coordination with state and district authorities.

- **Myanmar**
  Myanmar's first IBF step focuses on central dry zone heat extremes (Mandalay/ Magway/Sagaing regions and selected hot-spot townships). The goal is to assess heat risk and vulnerability, develop an IBF prototype and community-tailored advisories that do not depend heavily on grid electricity, targeting elderly people, low-income households in informal settlements and outdoor workers.

- **Nepal**
  Nepal plans an IBF demo for heat and cold waves in Dhanusha district (Madhesh Province), led by the Department of Hydrology and Meteorology. It targets health, agriculture, and water/energy risks (heat stress, crop failure, water scarcity), aiming to provide early temperature/heat index advisories, support actions like adjusting school hours and health facility preparedness, and reduce temperature-related illnesses and agricultural losses.

- **Pakistan**
  Pakistan's demo, titled Inclusive Climate Services for Heat and Cold Risk Reduction through IBF in Pakistan, will pilot IBF in Faisalabad (heat) and Chitral (heat & cold). It combines PMD forecasts with sectoral tools and SLMC platforms to support energy continuity (for hospitals, irrigation, schools), anticipatory actions and community-level DRR, with a strong network of provincial authorities, Food and Agriculture Organization (FAO), universities and CSOs.

- **Maldives**
  Maldives proposes a heat-focused demo in Hulhumalé, led by Maldives Meteorological Service, with strong health, agriculture and power sector co-leadership. The plan aims to develop SOPs for heat, reduce heat-related illness, improve public awareness and land-use (more green/heat-resistant design), and even lower household electricity demand through better behavior and planning.

- **Sri Lanka**
  Sri Lanka's pilot will start in Anuradhapura district (dry zone), addressing high temperatures affecting farmers, schoolchildren, elderly and low-income households. It builds on existing use of heat index and UTCI to issue warm weather bulletins, with clear outcome targets such as issuing actionable advisories 48 hours ahead and cutting heat-related ER admissions by 50% over three years, before expanding to other sectors and districts.

TABLE 2. SUMMARY MATRIX OF DEMONSTRATION PLANS

COUNTRY	GEOGRAPHIC SCOPE	SEASONAL FOCUS	DURATION	MAIN OBJECTIVE	TARGET OUTCOME(S)	KEY ACTORS
BANGLADESH	Northwestern region of Bangladesh (heat & cold hot-spot; densely populated municipalities/ pourashavas)	Both heat and cold	Heat: March–Sept 2026 Cold: Dec 2026–Feb 2027	Demonstrate heat-related IBF and early action for the northwest, also covering cold waves, to protect people and key sectors.	Reduced population illness; more timely forecasting; improved household and sector self-preparedness for heat/cold; stronger sectoral and institutional communication and coordination.	Lead: BMD Co-leads: - DG Health Services - City corporations / local governments - Possibly livestock/fisheries agencies Partners: RIMES, UDMC/DMC and other DRM actors
BHUTAN	All 20 districts (three temperature zones: cold, temperate, high humidity); later possibly 2 southern districts for heat + 1 northern/high-altitude district for cold as more focused pilots	Both heat and cold	Heat: July–Sept 2026 (hotspell 2026) Cold: Dec 2026–Feb 2027 (cold spell 2026/27)	Implement impact-based forecasting for temperature extremes at national level and translate into sector-specific advisories (health, agriculture, transport, urban public).	Temperature-related advisories and warnings issued; at-risk sectors and public informed about impacts and actions; and reduced temperature-related hazards through early information	Lead: NCHM/NMHS (Director General as focal) Co-leads/sectors: - Dept of Public Health - Dept of Agriculture & Livestock - Dept of Human Settlement, Ministry of Infrastructure and Transport - Disaster Management Office - Universities/Academe - Media - Bhutan Red Cross Society - National Statistics Bureau - Women's orgs

COUNTRY	GEOGRAPHIC SCOPE	SEASONAL FOCUS	DURATION	MAIN OBJECTIVE	TARGET OUTCOME(S)	KEY ACTORS
						Partners: RIMES, UK Met Office and other partners for technical backstopping
INDIA	Not fully fixed; selected states/districts providing "comprehensive coverage" and represent different climate/risk contexts; national-level framing by IMD	Both heat and cold	Not clearly pinned down; broadly next 2 years, with heat in pre-monsoon months and cold in winter months (to be finalized with authorities).	Scale up IBF for heat and cold waves, turning forecast skill into impact-oriented, sector-specific information and public warnings.	Better use of existing forecast skill for actionable public advisories; sector-tailored products (e.g., for schools, health, local authorities); vulnerability assessments feeding into risk calculations and early warnings.	Lead: IMD Co-leads: - State chief secretaries - District authorities/local bodies - Health and education sectors - Disaster management and power/utilities
MALDIVES	Hulhumalé (central island urban development linked to Malé)	Heat only	Demo: March–May (hot season); Review: Oct–Dec (year not explicitly fixed)	Implement inclusive heat-risk mitigation for Hulhumalé through early warning, planning and public awareness.	Strengthened heatwave preparedness and early warning; SOPs for heat; reduced heat-related illness; improved public awareness; better land-use planning (more green/heat-resistant landscaping); stronger institutional coordination; lower household electricity consumption via awareness and behavior change.	Lead: MMS Co-leads: - Health Protection Agency/Ministry of Health - Ministry of Agriculture & Animal Welfare - State Electric Company Partners: - Maldives National University - National Disaster Management Authority - Maldives Red Crescent - Malé City Council
MYANMAR	Central Dry Zone – semi-arid regions including Magway, Mandalay, Sagaing and selected hot-spot townships (e.g.,	Heat only (pre-monsoon)	Pre-monsoon March–May; precise demo window to be confirmed	Develop and pilot an IBF framework for extreme heat in the dry zone, based on climate and socio-economic	Temperature risk & vulnerability maps; IBF prototype that links forecasts with local vulnerability; improved communication and	Lead: DMH Co-leads: - Ministry of Health - Ministry of Education - Ministry of Transport & Communication

COUNTRY	GEOGRAPHIC SCOPE	SEASONAL FOCUS	DURATION	MAIN OBJECTIVE	TARGET OUTCOME(S)	KEY ACTORS
	town/cities with 47–48°C records)		based on final project plan.	data, to support early warning and community-level action.	preparedness; reduced heat-related health and livelihood impacts in target communities.	- Disaster Management Department Partners: - Myanmar Red Cross Society - Local authorities - Schools - Community organizations Technical support: RIMES & UKMO
NEPAL	Dhanusha district, Madhesh Province (lowland; Janakpur Sub-Metropolitan as key urban center)	Both heat and cold waves	Heat: April–June (frequent heat waves) Cold: Dec–Feb (winter cold waves)	Demonstrate IBF for heat and cold waves to support health, agriculture and water/energy management in Dhanusha.	Timely temperature/heat-index advisories (≥24h lead); improved warning dissemination; reduced heat/cold-related illnesses; early protective actions (e.g., adjusted school hours, ER preparedness); minimized agricultural productivity loss and better water management; increased awareness and feedback mechanisms.	Lead: DHM Co-leads: - NDRRMA - Ministry of Health & Population - Ministry of Agriculture & Livestock Development - NARC Partners: - Janakpur Sub-Metropolitan City - Nepal Red Cross - NGOs/INGOs (e.g., PIN) - community-based organizations

COUNTRY	GEOGRAPHIC SCOPE	SEASONAL FOCUS	DURATION	MAIN OBJECTIVE	TARGET OUTCOME(S)	KEY ACTORS
PAKISTAN	Two pilot districts: Faisalabad (Punjab) – heat waves; Chitral (Khyber Pakhtunkhwa) – cold waves	Both heat and cold (by district)	Heat: launch March 2026, review Sept–Nov 2026 Cold: Nov 2026–Feb 2027, review March 2027	Operationalize impact-based forecasting services for temperature extremes, linking PMD data with sectoral DSS (CARE ADVISE DSS and SLMC Portal) to support anticipatory action.	Operational IBF services in both pilots; early action protocols for heat/cold; improved energy management (e.g., continuity for hospitals, irrigation, schools), DRR preparedness and community response; reduced mortality and economic losses from heat/cold events.	Lead: PMD Co-leads: - Agriculture Dept (Faisalabad) - PDMA Khyber Pakhtunkhwa - FAO (anticipatory action) Partners: - local CSOs in Faisalabad & Chitral - University of Peshawar - University of Agriculture Faisalabad - Agriculture Research Institute - Faisalabad Electric Supply Co. - NDMA/Provincial DMAs Technical: RIMES
SRI LANKA	Anuradhapura district (dry-zone pilot)	Both heat and cold, with emphasis on heat	Heat: March–May 2026 (warm/pre-monsoon season), review Oct–Dec 2026 Cold: end-of-year cool period (Dec–Feb) for later phase	Pilot IBF for heat (and later cold) to protect vulnerable groups (farmers, outdoor workers, schoolchildren, elderly, low-income households) and eventually extend to agriculture, water and energy sectors.	Issue actionable advisories to vulnerable groups 48 hours in advance; ensure 100% of affected people in pilot district receive advisories; reduce heat-related ER admissions by 50% in three years; develop sector-specific thresholds and impacts/action guidance;	Lead: DoM Co-leads: - Ministry of Health - Disaster Management Center - Department of Agriculture - Dept of Irrigation - Ceylon Electricity Board Partners:

COUNTRY	GEOGRAPHIC SCOPE	SEASONAL FOCUS	DURATION	MAIN OBJECTIVE	TARGET OUTCOME(S)	KEY ACTORS
					use RIMES DSS for scaling.	- Selected universities - Provincial councils - Local governments - Media Technical support: RIMES

V. 5th ESCAP Disaster Resilience Week Side Events

Building Heat Resilience through Subregional and Regional Cooperation: Learning and Perspectives from South Asia

This session focused on strengthening regional and sub-regional cooperation for IBF on extreme heat and cold in South Asia. Presentations highlighted ongoing initiatives under SAHF, current regional frameworks, and pathways for linking national demonstration projects with regional mechanisms. A panel discussion then explored opportunities to integrate platforms, build multi-stakeholder collaboration, and ensure climate information effectively reaches vulnerable populations.

Presentation/Discussion Summaries

- *SAHF Overview & Learnings*
  Provided an overview of SAHF, tracing its journey since 2018 in strengthening hydrometeorological capacity, data systems, and cross-country collaboration across the region. The presentation highlighted SAHF's evolution into a platform that not only enhances forecasting capabilities but also supports Phase 2 plans to scale impact-based heat resilience initiatives, including the development of demonstration projects across member countries.

- *Enhancing Data & Information Exchange for Heat Resilience*
  Focused on improving data and knowledge exchange to support effective heat resilience. The speakers introduced the SAHF Knowledge Hub—designed as a digital repository and learning space for tools, datasets, and case examples—and emphasized how shared access to regional information can reduce duplication, expand analytical capability, and enable informed decision-making at national and local levels. Plans to connect this system with GHHIN heat-health platforms, SASCOF climate outlook mechanisms, and national DSS tools were discussed as pathways to closing information gaps and turning climate knowledge into action.

- *Regional Coordination for Extreme Heat & IBF Working Group*
  Outlined the structure and function of the SAHF IBF Working Group, which serves as a collaborative mechanism to guide countries in designing, refining, and operationalizing heat-focused IBF services. Presenters discussed how regional technical support under WISER, CREWS, and CARA investments is helping countries develop sector-specific thresholds, enhance early-warning chains, and integrate impact information into public advisories. The presentation underscored the importance of shared learning, sector engagement—particularly in health and agriculture—and opportunities to scale successful demonstrations across South Asia through coordinated regional support.

Panel Discussion Key Insights

- Participants asked how regional initiatives can be translated into national action, especially where institutional capacity and data are limited.

- Recurrent needs highlighted:
    - Development of sector-linked thresholds and impact matrices
    - Strengthening inter-agency coordination & SOPs
    - Improved data access, sharing, and forecasting communication formats
- Panelists stressed collaboration through SAHF as a bridge between national systems and regional knowledge networks, enabling countries to adapt global tools for local heat response.
- Discussion reinforced the relevance of GHHIN, SASCOF, EW4All, and digital/data platforms in long-term regional heat resilience strategy.
- Concluding remarks called for continued co-production of services with RIMES/Met Office support, and further development of pilot demonstrations to operationalize temperature-related IBF.

Understanding Multi-Hazard Risk in Coastal Areas toward Enhancing Adaptation

The session on Understanding Multi-Hazard Risk in Coastal Areas Toward Enhancing Adaptation explored the growing vulnerability of coastal regions to multiple hazards—including sea-level rise, cyclones, flooding and heat—and the need for integrated, data-driven risk assessment tools to inform early warning and planning. ESCAP introduced ongoing regional work with INCOIS, RIMES, SAHF and partners to operationalize a multi-hazard coastal risk tool, while country experiences highlighted gaps in localized data, resources, and coordination. The discussion emphasized capacity building, validation through pilots, and how SAHF can support scaling of climate services and impact-based forecasting across South Asia.

Presentation Summaries

- *Multi-Hazard Coastal Tool Introduction (ESCAP)*
  Presented initial work on coastal risk in Asia-Pacific, noting that over 20 million people across 13 Indian Ocean countries remain exposed to cascading hazards. Introduced development of a standardized methodology and risk tool integrating hazard, climate, ocean, infrastructural, and socioeconomic layers to support impact-based forecasting and anticipatory planning.
- *India Coastal Methodology Example (INCOIS)*
  Shared insights on coastal modeling approaches and hotspot mapping methodology developed in India, demonstrating how multi-hazard risk layers can support local planning and early warning. Emphasized relevance of data transparency, integration, and reproducibility for cross-country application.

Panel Discussion Key Insights

- Countries stressed the need for localized multi-hazard maps, more granular socioeconomic and exposure data, and integration with existing early warning chains.
- Panelists discussed challenges in data availability, modelling capacity, and institutional coordination, especially in small island and highly exposed coastal settings.

- Maldives and Sri Lanka highlighted interest in technical support, training, and decision-support dashboards for their coastal adaptation planning.
- There was strong agreement on the role of SAHF as a platform for knowledge transfer, co-creation of tools, and shared learning on impact-based early warning systems.
- Panelists called for continued collaboration with ESCAP, RIMES and Met Office to refine methodologies, test tools in country contexts, and produce user-friendly outputs for planners, communities, and disaster managers.

VI. Feedback Summary

The Feedback Survey was administered to the workshop participants where a total of 18 respondents completed the questionnaire. The respondents were composed of 56% male and 44% female with age ranging from 25-64 years old (94%).

Pre-and Post-Workshop Assessment Results

The training resulted in a substantial increase in participant knowledge across both key technical areas. The pre- and post-training self-assessment reveals a clear "knowledge leap" from a basic/moderate understanding to a good/very good level.

- General Knowledge in IBF: The average score rose from 2.72 (Pre) to 4.06 (Post) out of 5. This represents a 49% increase in self-assessed knowledge gain regarding the general principles of IBF for temperature hazards.
- Framework & Toolkit Development: Participants started with a slightly lower baseline of 2.67, which increased to 3.94 after the training. This 48% increase demonstrates that the specific technical sessions on toolkit development were effective in building practical skills.

Participant Feedback Summary

Participants rated the training highly across all five evaluation dimensions (scale 1-5, with 5 being the highest), with an average score of at least 4.42 across the five dimensions. Among these evaluation dimensions, Effectiveness is the highest-rated category. The analysis is summarized in the table below.

Category	Average Score (out of 5)	Key Insights
Effectiveness	**4.57**	The highest-rated area. Participants felt the logistics were well-managed, facilities were conducive, and trainers were highly knowledgeable. The key outputs (draft framework & toolkit) were successfully produced.
Impact	**4.44**	Trainees expressed strong confidence that the training would positively influence departmental policies and that they would incorporate these skills into current projects.

Sustainability	**4.42**	High agreement on the ability to transfer knowledge to colleagues and the effectiveness of the Training-of-Trainers (ToT) approach.
Coherence	**4.33**	The approach was seen as inclusive and synergetic with regional initiatives. The balance between theory and practice was deemed appropriate.
Relevance	**4.32**	The content was highly relevant to participants' work and aligned well with government priorities and policy frameworks.

It is also important to note that all respondents (100%) either agree or strongly agree with the statement that they found the training useful, that the content was relevant, that the trainers were knowledgeable, and that the training inspired new ideas. This unanimous positive feedback highlights the high level of satisfaction among participants and underscores the effectiveness of both the training design and its delivery.

Qualitative Feedback & Lessons Learned

Strongest Aspects:

- Practical Application: Participants highly valued the "practical experience shared," specifically the exercises on vulnerability and exposure, and the creation of warnings.
- Expertise: The presentations by experts (e.g., UK Met Office) and the introduction to online platforms (SAHF Knowledge Hub, COMET) were cited as major strengths.
- Structured Approach: The "step-by-step" explanation of the IBF framework—from exposure to impact pathways—was praised for its clarity.

Key Takeaways for Participants:

- Translation to Impact: Learning how to translate a standard temperature forecast into an impact-oriented message using sector-specific thresholds.
- Stakeholder Collaboration: Understanding the necessity of proper Standard Operating Procedures (SOPs) between stakeholders (e.g., health sector) to make IBF effective.
- GEDSI Integration: The importance of integrating Gender, Equality, Disability, and Social Inclusion (GEDSI) into IBF was a significant learning point.

Recommendations and Way Forward

Based on the participant feedback, the following recommendations are proposed for future iterations:

- Duration and Format: Some participants suggested extending the training (e.g., to 7 days) to allow for deeper perception and practice. For those who joined training virtually, there was also a preference for face-to-face interaction to maximize engagement.
- Curriculum Refinement: While the framework was clear, future training could benefit from "further regional discussions of the framework before diving into in-country requirements" and more specific guidance on "national-level dissemination procedures."
- Sectoral Engagement: Including more participants from different sectors (beyond NMHSs) would enhance the cross-sectoral collaboration exercises.

- Continued Support: Participants explicitly requested continued support from partners (RIMES, UKMO) to assist with the actual implementation of IBF and heatwave protocols in their respective countries.

VII. Annexes

Annex 1. WORKSHOP AGENDA

Day 1 - 24 NOV 2025: Baseline, National Priorities, and IBF Best Practices

Time	Session	Lead / Speaker(s)	Content
09:00 - 09:30 (30 mins)	Welcome and Opening Remarks and Introductions	RIMES, UKMO, WMO	Launching of the workshop, presentation of objectives, expected outputs, and agenda for the week; Participant introductions
09:30 - 09:50 (20 mins)	Session 1: Baseline Assessment: Findings and Country Validations	RIMES	Presentation of baseline assessment results and country-validated findings Output: Validated baseline and mapped national contexts
09:50 - 10:20 (30 mins)	Session 2: Draft Regional Framework Outline and Initial Inputs	RIMES	Introduction of the draft structure of the regional IBF framework, including its core components Output: Shared understanding of the draft framework components
10:20 - 10:35	Coffee / Tea Break		
10.35 - 11.05 (30 mins)	Session 3: Training-of-Trainors (ToT) Requirements, Cascading Model, and Technical Assistance	RIMES, UKMO	Presentation of the ToT approach, requirements for national representatives, and expectations for cascading knowledge in-country. Discuss the roles, selection considerations, and support mechanisms from RIMES and UKMO Output: Agreed ToT nomination requirements and list of initial country support needs
11:05 -12:15 (70 mins)	Session 4: Regional/National Priorities and Gaps	RIMES, UKMO Workshop Participants	Structured breakout discussions to identify national IBF gaps, priority needs, and opportunities to align solutions with the regional framework Output: Consolidated list of regional and national priorities
12:15 - 13:15	Lunch Break		

13:15 - 14:00 (45 mins)	Session 5: (Temperature-Related) IBF Best Practices and Case Examples	UKMO, RIMES, IMD, PMD (TBC)	Presentations of regional best practices for heat- and cold-related IBF, including lessons from existing guidelines and action plans
14:00 - 14:55 (55 mins)	Session 6: Partner Presentations	Partners: GHHIN WMO ESCAP WFP	Presentations from development and knowledge partners on ongoing and relevant initiatives for linkages and synergies with SAHF IBF priorities
14:55 - 15:10	Coffee / Tea Break		
15:10 - 15:40 (30 mins)	Session 7: GEDSI Integration	RIMES - GEDSI Specialist	Presentation of approaches for integrating GEDSI in temperature-related IBF, including mapping of vulnerable groups and support systems for HW/CW mitigation/impact minimization actions, and inclusive communication and threshold considerations Output: GEDSI checklist for Framework and Toolkit
15:40 - 17:00 (80 mins)	Session 8: MEL, Learning Loops, and Demonstrating Transformational Change	RIMES, UKMO MEL Specialist	Introduction of MEL requirements, proposed templates, and reporting expectations. Explanation of WISER's transformational change focus and how it will be reflected in the framework and demonstrations Output: MEL skeleton for integration into Framework and Toolkit

Day 2 - 25 NOV 2025: Framework and Toolkit Development

Time	Item	Lead / Speaker(s)	Content
09:00 - 09:10	Recap of Day 1	Workshop Participant (to be nominated the day before)	Summary of Day 1 sessions, key points, and outputs

09:10 - 09:40 (30 mins)	Session 9: SAHF Knowledge Hub (SKHub) Community of Practice (CoP) Demonstration	RIMES IT Expert	Demonstration of the CoP feature in SKHub, including how members can join communities, post questions, exchange technical insights, and support continuous collaboration Output: Participants' understanding of how the CoP facilitates knowledge sharing and peer learning across the region
09:40 - 10:35 (55 mins)	Session 10: Governance, Roles, and Coordination Mechanisms	RIMES/ UKMO + Workshop Participants	Co-defining institutional roles, governance structures, and coordination between regional, national, and sub-national actors Output: Draft governance map and role/responsibility matrix
10:35 - 10:50	Coffee / Tea Break		
10:50 - 12:00 (70 mins)	Session 11: Terminologies and core concepts of IBF/IF, understanding the implications for temperature-related hazards	RIMES/ UKMO + Workshop Participants	Introduction of fundamental terminologies and core concepts of temperature-related hazards and IbF/IF Co-development of region-wide hazard (heatwave, cold wave), exposure (who/what is at risk), vulnerability (who is most susceptible), and impact (health, economic, social outcomes) components/indicators Output: Regionally harmonized glossary of core components of temperature-related hazards and IbF/IF
12:00 - 13:00	Lunch Break		
13:00 - 16:45 (with break)	Session 12: Hands-on exercise for co-developing the region-wide components of IBF/IF (Continuation of Session 10)	RIMES/ UKMO + Workshop Participants	Continuation of the previous session with more orientation and hands-on exercise on the components/indicators of temperature-related hazards IBF/IF - Hazard, vulnerability, exposure and impact Output: Key indicators for the temperature-related hazard, vulnerability and exposure

16:45 - 17:00	Preparatory Brief for Day 3	RIMES	Reminders and logistical briefing for the UNESCAP side events under the 5th ESCAP Disaster Resilience Week

Day 3 - 26 NOV 2025: Visit to UN Headquarters (Bangkok) and Participation in SAHF-related Side Events at the 5th ESCAP Disaster Resilience Week

Participants are highly encouraged and expected to attend the following side events, which are closely aligned with the SAHF IBF Project's objectives and activities:

- ***Building Heat Resilience through Subregional and Regional Cooperation: Learning and Perspectives from South Asia***
  Meeting Room A | 13:00 – 14:00
  Refer here for the session's *Concept Note and Agenda*

- ***Understanding Multi-Hazard Risk in Coastal Areas toward Enhancing Adaptation***
  Meeting Room A | 16:00 – 17:00
  Refer here for the session's *Concept Note and Agenda*

Full logistics and movement plan provided separately.

Day 4 - 27 NOV 2025: Framework and National Demonstration Introduction

Time	Item	Lead / Speaker(s)	Content
09:00 - 09:30	Recap of Day 2	Workshop Participant (to be nominated the day before) RIMES / UKMO	Summary of Day 2 sessions, key points, and outputs. Reflections from Day 3 ESCAP Side Events
09:30 - 12:30 (with break)	Session 13: From IBF/IF to operational scenario-based impact forecasting: Case studies and way forward	RIMES, UKMO, National Center for Disease Control (NCDC) India	Presentation of IBF/IF case studies and regional best practices on communication approaches for IBF/EWS Group Exercise: Draft plain-language warnings for different vulnerability groups (elderly, outdoor workers, urban poor) Output: Draft communication templates/messages for the Toolkit; Understanding of IBF process – from operations to action
12:30 - 13:30	Lunch		
13:30 - 14:30 (60 mins)	Session 14: Data, Modelling and Forecast data workflow	RIMES	Identification of data flows (observation, forecast data), APIs, and integration with DSS/portals (SKHub, RDAS) Output: Draft data workflow notes for Toolkit
14:30 - 15:15 (45 mins)	Session 15: Guidelines for National Demonstrations	RIMES	Presentation of the EOI template, selection criteria, and co-development of national demo guidelines Output: Validated guidelines and criteria for national demonstrations
15:15 - 15:30	Coffee / Tea Break		
15:30-17:00 PM (90 mins)	Session 16: Stakeholder and Mechanism Mapping at Country Level	Country Groups with Facilitators	Identification of relevant national stakeholders, vulnerable groups, institutional mechanisms, data systems; align with framework/toolkit modules Output: Stakeholder and mechanism maps per country

Day 5 - 28 NOV 2025: National Demonstrations and Workplan Development

Time	Item	Lead / Speaker(s)	Content
09:00 - 09:15	Recap of Day 4	Workshop Participant	Summary of Day 4 sessions, key points, and outputs
09:15 - 10:15 (60 mins)	Session 17: Country Draft Workplans	Country Groups with Facilitators	Countries begin drafting full national demonstration workplans (objectives, outputs, roles, timelines) using the Framework and Toolkit
10:15 - 10:30	Coffee / Tea Break		
10:30 – 10:45 (15 mins)	Session 18: People in Need (PIN) – Experience in Nepal	People in Need (PIN)	Presentation on PIN's work in establishing and implementing Heat Action Plans in Nepal
10:45 - 11:00 (15 mins)	Session 19: MEL, GEDSI, Risk in Demonstrations	RIMES / UKMO / Technical Experts	Guidance on integrating monitoring, evaluation, risk management, and GEDSI considerations into draft workplans Output: Workplans incorporating MEL, GEDSI, and risk components.
11:00 - 12:30 (90 mins)	Continuation of Session 17: Country Draft Workplans	Country Groups with Facilitators	Continued drafting and refinement of workplans
12:30 - 13:30	Lunch		
3:30-15:00 PM (90 mins)	Session 20: Presentations of Country Workplans	Country Groups	Presentation of draft national demonstration plan per country; peer and partner feedback Output: Refined workplans
15:00 - 15:30 (30 mins)	Session 21: Roadmap to Implementation	RIMES/UKMO + All Participants	Agreement on timeline for EOI submission, technical review process, final selection of demo sites, and upcoming meeting schedule Output: Implementation roadmap and key milestones
15:30 - 15:45	Coffee / Tea Break		
15:45 - 16:15 (30 mins)	Workshop Closing and Reflections	RIMES/UKMO + All Participants	Closing reflections, commitments, and next steps; formal closing remarks

Annex 2. LIST OF PARTICIPANTS

NMHS Participants

1	Dr. Singay Dorji	Specialist, Meteorological Services Division (MSD)	National Center for Hydrology and Meteorology
2	Mr. Kinley Tenzin	Meteorology/Hydrology Technician, MSD	National Center for Hydrology and Meteorology
3	Dr. Priyanka Singh	Scientist D	India Meteorological Department
4	Dr. M Iyyappan	Scientist D	India Meteorological Department
5	Mr. Ali Shareef	Deputy Director General, Meteorology	Maldives Meteorological Services
6	Ms. Azeema Ahmed	Meteorologist	Maldives Meteorological Services
7	Dr. Tin Mar Htay	Deputy Director	Department of Meteorology and Hydrology
8	Sudarshan Humagain	Meteorologist	Department of Hydrology and Meteorology
9	Devid Dhakal	Meteorologist	Department of Hydrology and Meteorology
10	Mr M M P Mendis	Deputy Director, National Meteorological Center	Department of Meteorology
11	Mr. A. W. S. J. Kumara	Meteorologist	Department of Meteorology

Sectoral Representatives

1	Dr. Mohammad Asaduzzaman	Deputy Director	Department of Livestock Services
2	Ms. Sonam Yangchen	Assistant Program Officer	Environment Health Program, Non-Communicable Disease Division Department of Public Health (Bhutan)
3	Mr. Zaain Adhunaan	Senior Public Health Officer	Health Protection Agency, Ministry of Health (Maldives)
4	Krishna Prasad Rijal	Senior Divisional Engineer	Ministry of Energy, Water Resources and Irrigation (Nepal)
5	Dr. Muhammad Athar Haroon	Deputy Director	National Drought Monitoring Center (Pakistan)

6	Dr. Kumara Wickremasinghe	Additional Secretary Medical Services	Ministry of Health (Sri Lanka)

Partner Organizations

1	Mr. David Corbelli	Senior International Development	UKMO
2	Ms. Helen Caughey	Expert Operational Meteorologist	UKMO
3	Mr. Jochen Luther	Technical Coordinator (Services)	WMO
4	Ms. Leila Salarpour Goodarzi	Economic Affair Officer	ESCAP
5	Ms. Madhurima Sarkar-Swaisgood	Deputy Chief of Section, Disaster Risk Reduction	ESCAP
6	Ms. Elisa Belaz	Expert, Disaster Risk Reduction Section	ESCAP
7	Mr. Rahul Suman	Expert, Disaster Risk Reduction Section	ESCAP
8	Mr. Jothiganesh Shanmugasundaram	Regional Technical Lead	WFP
9	Ms. Susantha Jayasinghe	Senior Data Analyst	ADPC
10	Mr. Ramiz Khan	Urban Adviser	RCCC
11	Ms. Janice Ying-en Ho	Regional Hub Manager	GHHIN SEA Hub, Heat Resilience & Performance Centre :: Yong Loo Lin School of Medicine :: National University of Singapore

RIMES

1	Dr. Anshul Agarwal	SAHF Lead
2	Dr. K.J. Ramesh	SAHF Adviser
3	Mr. Raihanul Haque Khan	Bangladesh Country Program Lead
4	Mr. Khan MD Golam Rabbani	Weather Expert
5	Ms. Danna Valdez	Climate Information Product Design and Marketing Officer
6	Mr. Thanut Rittichai	MEL Specialist
7	Mr. Peter Ferrer	Capacity Development Specialist
8	Mr. Mitesh Sawant	Agriculture Specialist / Project Manager

9	Ms. Virinya Piromrungkit	Project Administrative Officer
10	Mr. Patthapong Srika	IT Specialist
11	Mr. Pat Thananchaisirikul	Communication Officer
12	Mr. Ittiwat Suwanchawee	Finance and Account Associate
13	Mr. Sahawich Buaphud	Accounting Assistant

Online Participants

1.	Dr. Shiromani Jayawardena	SAHF Adviser, RIMES
2.	Ms. Raissa Jean Ancheta	SAHF Documentation Specialist, RIMES
3.	Mr. Asif Uddin Bin Noor	Climate Services Specialist, RIMES
4.	Mr. Surajan Shrestha	SAHF Web Developer, RIMES
5.	Ms. Nina Karla Jaim	Program Officer, RIMES
6.	Ms. Caroline Hattam	MEL Coordinator, UK Met Office
7.	Ms. Puja Shakya	Nepal Country Program Lead, RIMES
8.	Ms. Sanchita Neupane	Program Manager, People in Need
9.	Mr. Armel Castellan	WMO, WHO
10.	Ms. Su Myat Naing	DMH
11.	Mr. Austin Lord	The Stimson Centre (Nepal)
12.	Ms. Jeevika Khadka	The Stimson Centre (Nepal)
13.	Dr. M A K Mallik	BMD

Annex 3. SESSION 3 ACTIVITY (Mentimeter Survey)

1) ***What support does your NMHS need to participate in the ToT?***
   - Expert Technical Knowledge
   - Technical
   - If training session held out-of-country, then financial support
   - Support from Senior Management to travel
   - Nomination
   - Ground information to frame the user-oriented solution
   - Invitation for sector-specific specialist
   - Endorsement
   - Financial support
   - Well-informed guidances and travel support
   - Temperature-related threshold information for climate information with specific area
   - Institutional facilitation
   - Capacity building trainings
   - Capacity Development Support
   - Support from Management
   - Support from Organizers and head of the agency
   - Technical resources and infrastructure
   - Capacity of the ToT
   - Motivation and dedication
   - Funding
   - Institutional management commitment, resources

2) ***What support do you need for the national-level cascading?***
   - Financial support for the sustainability
   - Guidelines for impact data management
   - Inclusion in annual planning and work activities
   - Continuous coordination from stakeholders
   - Stakeholder meeting for public awareness
   - Technical documentation and financial support for organizing the training events
   - Funding and guidelines
   - Technical capacity and infrastructure
   - Data and modeling support
   - Capacity building and skills development
   - Guideline

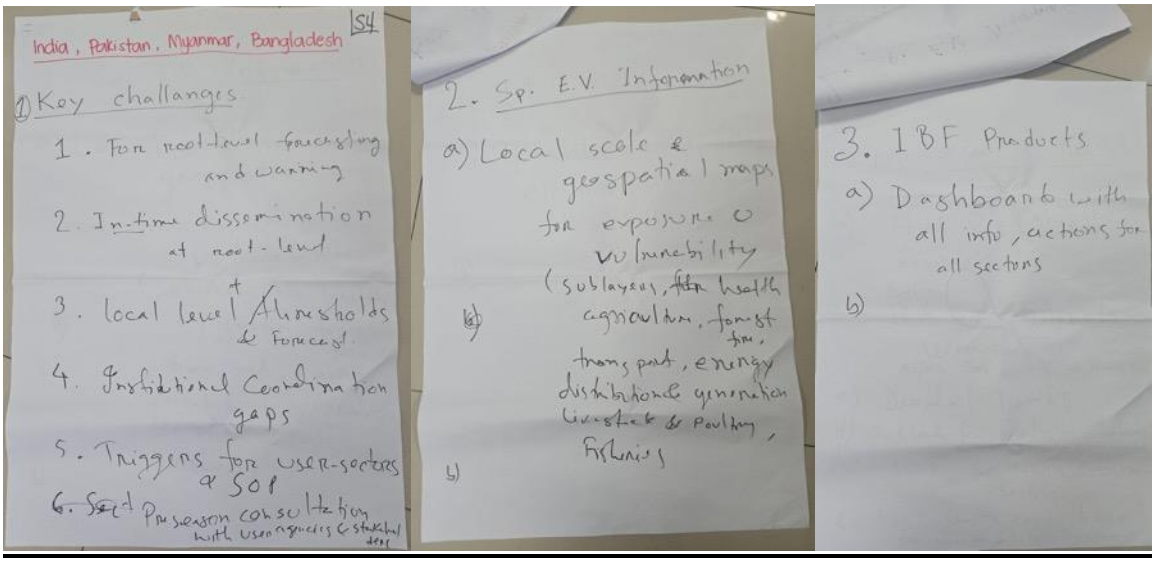
- Technical support in some cases
- Resources for recurring follow-up meetings with trainees
- Coordination between national, provincial, and local government
- M&E guidelines for evaluating effectiveness
- Capacity, motivation
- Technical and infrastructure support, resource materials, guidance
- Support for data
- Atmospheric science background

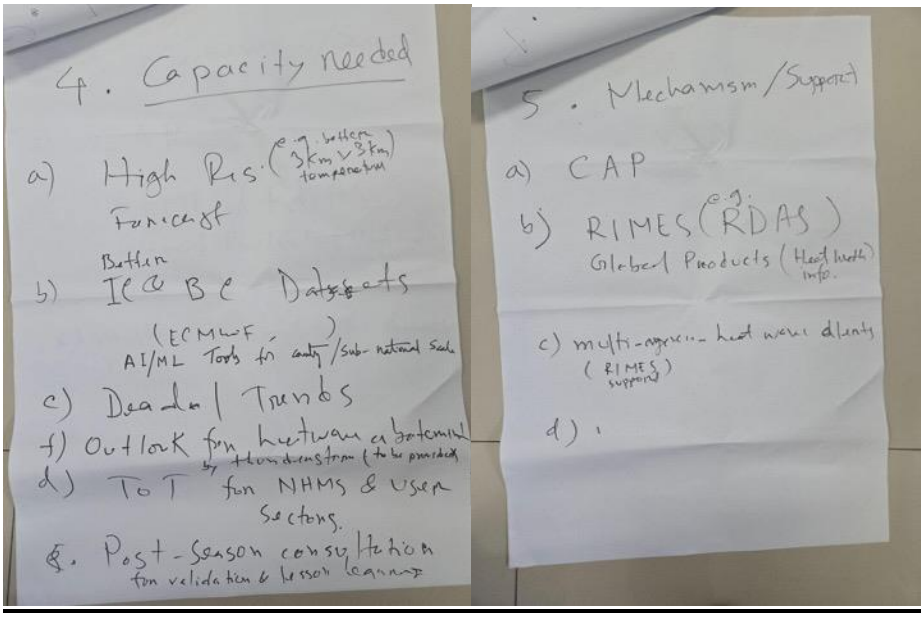
3) What are the main constraints or challenges your NMHS foresees?

- Expertise, coordination
- Resource constraints
- Incomplete or inconsistent hazard, exposure, and vulnerability datasets
- Panchayat or village-level awareness
- Limited technical capacity
- Limited human resources, technical and infrastructure limitations
- TOT, experiences and knowledge sharing meeting for IBF
- In time information dissemination
- Data gaps and quality issues
- Data gaps
- Institutional support and coordination
- Resources
- Human resource constraints
- Limited capacity and financial resources
- Skilled human resources
- Data adequacy and data quality, resources, priority human resource
- Financial and logistical constraints
- Manpower (knowledgeable officers)
- No support from stakeholders
- No standardized SOPs for IBF-enabled decision-making
- Awareness and user engagement gaps
- Institutional, financial
- Technical, managerial

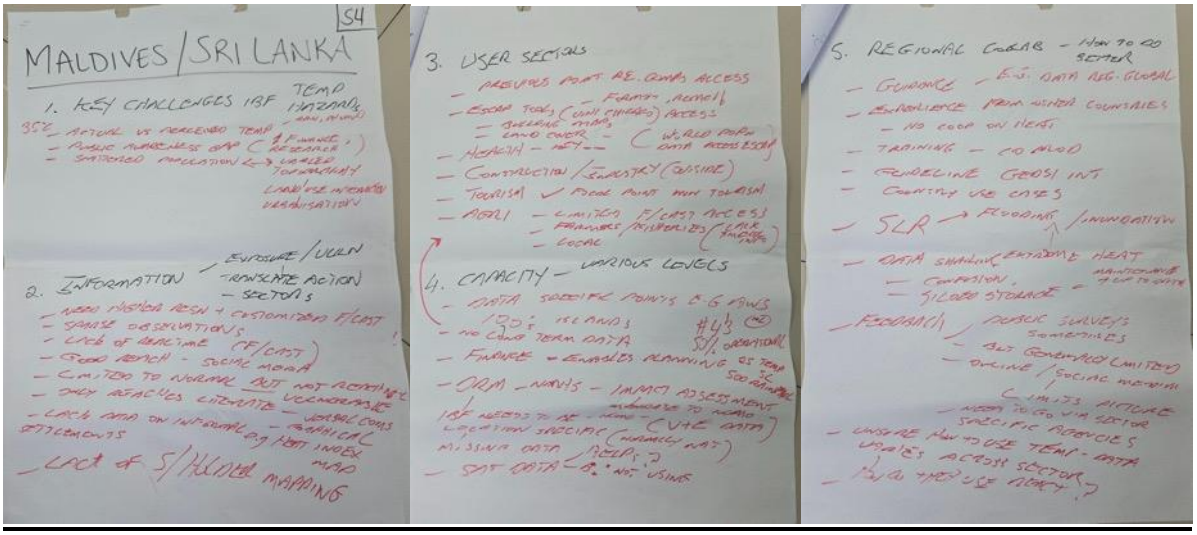
Annex 4. SESSION 4 BREAKOUT DISCUSSION

Group: India, Pakistan, Bangladesh, Myanmar

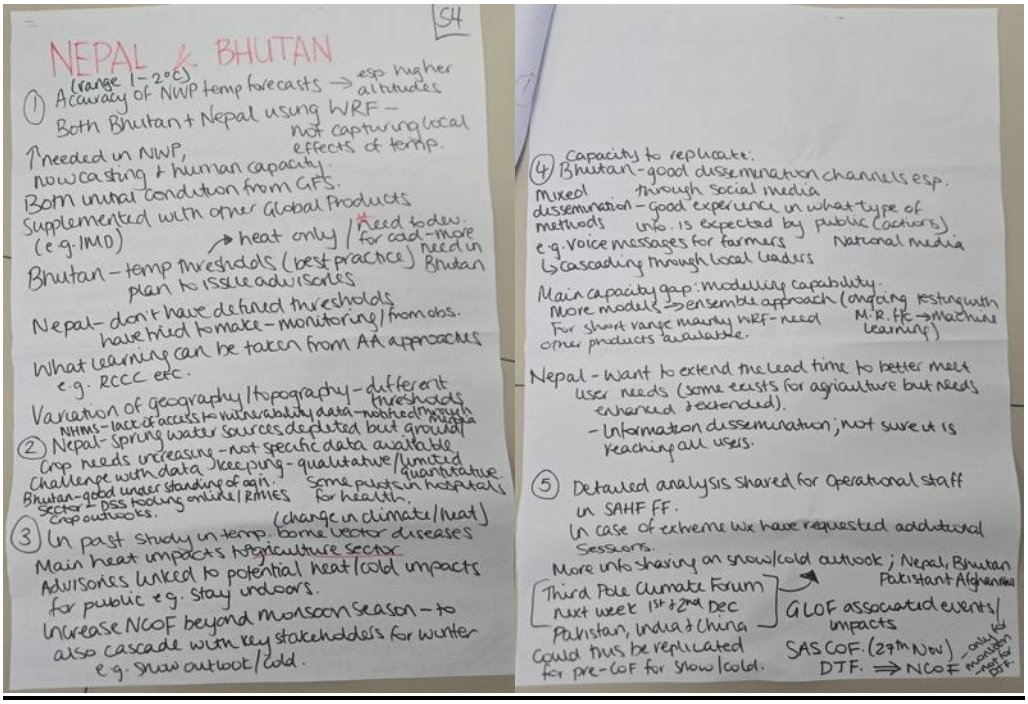




Group: Maldives and Sri Lanka



Group: Nepal and Bhutan



Group: Online

Key Challenges in Temperature-IBF

- Myanmar – No heat-warning system; only max/min forecasts; no sector SOPs; no collaboration.
- Bangladesh – Sectoral impacts not documented; limited access to heat-impact data (health, farmers, slums); limited work doing, health sector, to sse what is the impact of farmars working outside during, pilot, metropolitan city impact for slum areas , livestock Thermal heat index THI some actions
- Afghanistan – High Temperature warnings just start this but no impact info; IBF not implemented, Cold spell warning issued last winter first time.
  Nepal –limited station networks, micro-climates complicate triggers, impact data (especially on vulnerability) is uneven, more public outreach and awareness needed;; low community awareness. more public outreach and awareness needed
- Anticipatory actions are limited

Exposure & Vulnerability Information Needed

- Myanmar – Heat exposure data and sector thresholds.
- Bangladesh – Agricultural thresholds (e.g., flowering stage), outdoor worker exposure, slum vulnerability, livestock THI.
- Afghanistan – Impact datasets for heat/cold; remote-area vulnerability data.
- Nepal – Fine-scale vulnerability mapping; disability-disaggregated data; cold-impact info in mountain regions.
- Disaggregated and geospatially located data on persons with disabilities is critical

Missing IBF Products & Barriers

- Myanmar – No heat advisories, no heat-stress products.
- Bangladesh – Need sector-specific IBF tools, heat-health guidance, DSS;.
- Afghanistan – High-temp warnings lack impact translation; no cold-spell IBF products.
- Nepal – Limited forecasting capacity; IBF (rainfall) still in pilot; SOPs and impact understanding inadequate. research gaps on thresholds

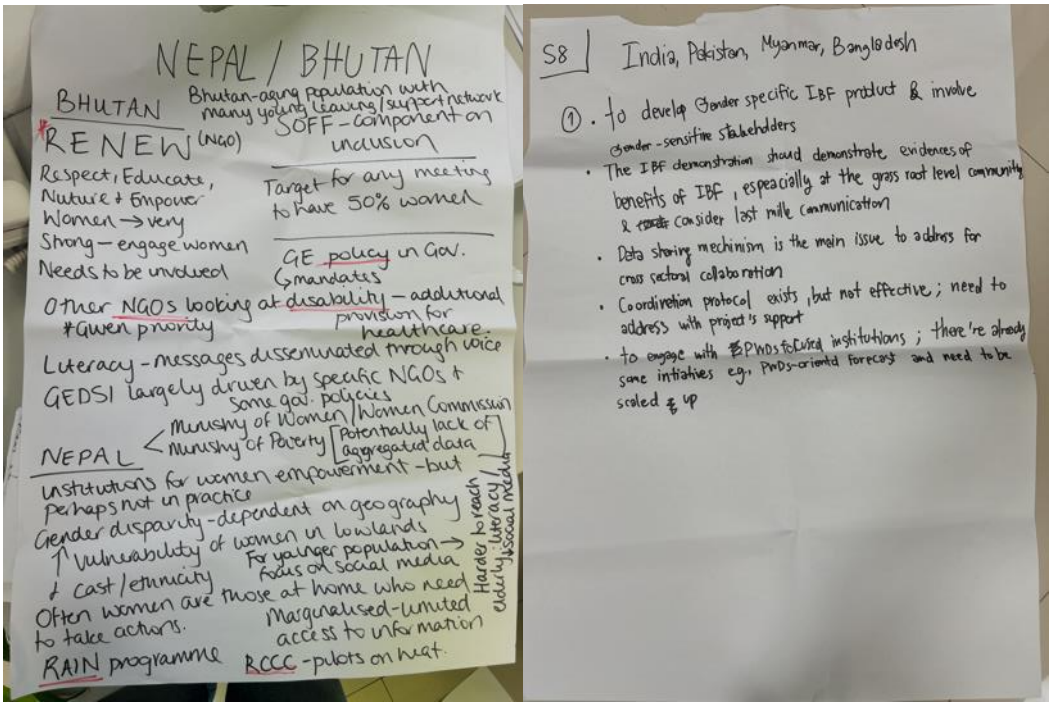
Capacity Needs

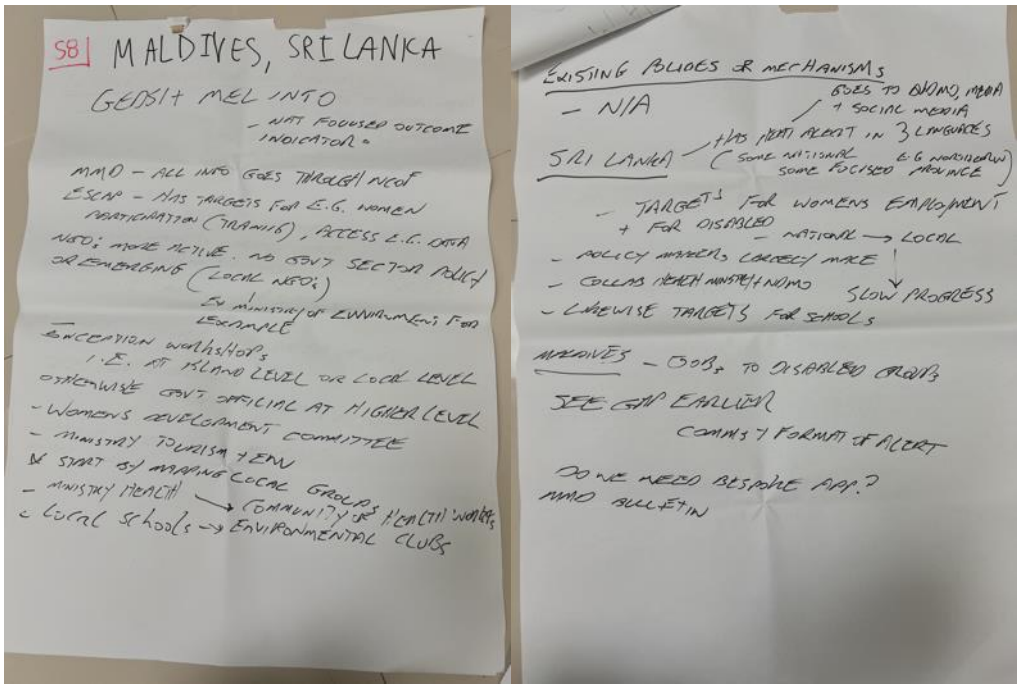
- Myanmar – Develop thresholds, SOPs, sector engagement.
- Bangladesh – NMHS + sector capacity building; community awareness, developing sector specific, Impact Matrix .
- Afghanistan – capacitybuilding, Training on impact-based advisories (heat & cold).
- Nepal – Tools, impact data, staff capacity; improved sector SOPs; local awareness.

Regional Collaboration Support Needed

- Myanmar – Access to regional datasets; shared methods. capacity building warning generation, sectoral capacity building , community level awareness required
- Bangladesh –platforms; data-sharing protocols; DSS support. capacity building warning generation, sectoral capacity building , community level awareness required
- Afghanistan – Regional heat/cold thresholds; capacity building warning generation, sectoral capacity building , community level awareness required
- Nepal -capacity building warning generation, sectoral capacity building , community level awareness required , Joint research initiatives.

Annex 5. SESSION 8 BREAKOUT DISCUSSION



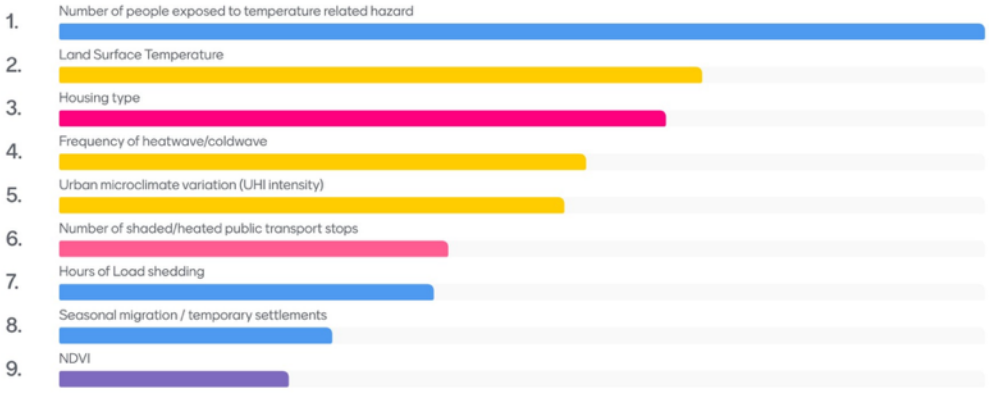


Annex 6. SESSION 11-12 BREAKOUT DISCUSSION (Mentimeter Survey)

HAZARD

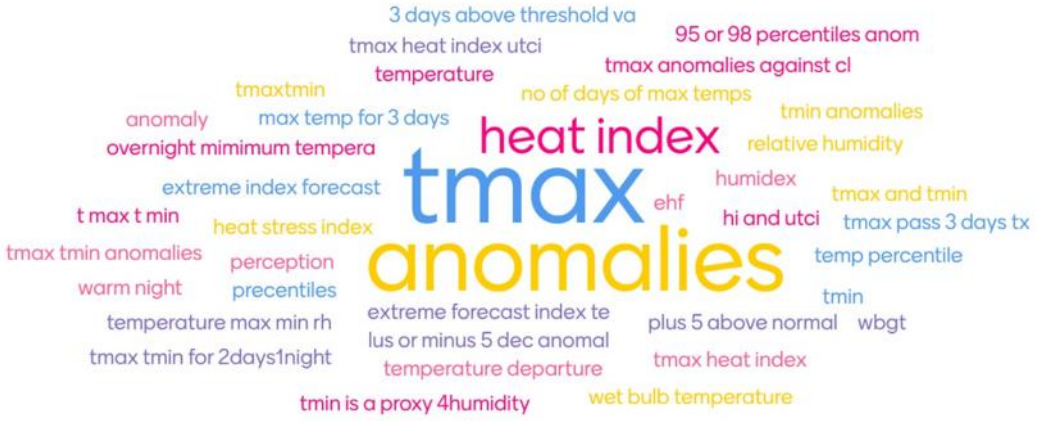
1) ***What indicators you think would be useful for exposure focusing temperature related hazards?***

2) ***Rank the indicator of the exposure for temperature related hazard***

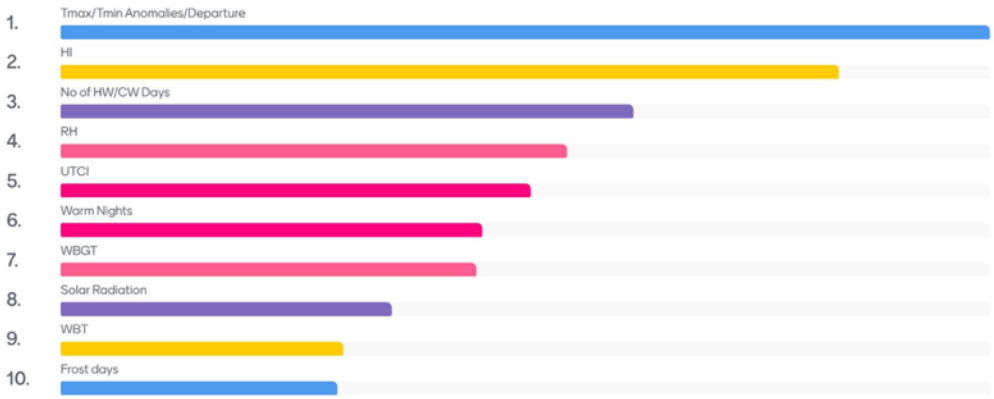


EXPOSURE

3) ***What are the key temperature related hazard indicators in your country context? (e.g., Tmax, Tmin Anomalies etc.)***



4) ***Rank the most important temperature related hazard indicators from the list below***



5) ***Which are the operationally available temperature related forecast products in your country?***