Training workshop: Utilising climate science and services for policy and decision making

Held online from 16 – 17 March 2022

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9 June 2022

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Executive Summary

As part of the Climate Analysis for Risk Information and Services in South Asia (CARISSA) project, under the Asia Regional Resilience to a Changing Climate (ARRCC) programme funded by the UK's Foreign, Commonwealth and Development Office (FCDO), the Met Office is working in partnership with organisations in the South Asia region to enhance the use of regional climate information to inform adaptation planning. This includes strengthening the knowledge and capabilities of both providers and users of climate information in the region.

This report summarises a training event delivered under CARISSA, focused on utilising available climate science and services for policy and decision makers. The workshop was aimed at a broad audience of users of climate information in three ARRCC focus countries (Nepal, Pakistan and Bangladesh), and across the South Asia region. The event was organised in collaboration with Bangladesh Meteorological Department, Nepal Department of Meteorology and Hydrology, and Pakistan Meteorological Department. The workshop was delivered online, partly due to restrictions imposed by the COVID-19 pandemic but also to widen participation.

The training, organised over two 4 hour sessions on consecutive days, covered an introduction to the climate system, interpretation of climate information, an introduction to climate services and climate communication, along with interactive activities using the Intergovernmental Panel on Climate Change (IPCC) sixth assessment report (AR6) Interactive Atlas and discussions around the challenges and solutions to using climate information.

The first day introduced participants to the climate system, followed by the interpretation of climate observation and model projection data. Discussion sessions around the use of climate information enabled participants to share challenges and potential solutions to overcoming these at the regional and national scale. The second day introduced participants to co-produced climate services and communicating climate information. An interactive session introduced participants to the IPCC Interactive Atlas, providing experience of accessing and interpreting the climate information this resource offers.

The workshop was well attended (approximately 85 participants on day 1 and 35 participants on day 2), with a wide range of organisation types represented including academia, government, humanitarian, industry, and meteorological service providers. A total of 196 people registered for the training workshop (64 female, 119 male). The workshop evaluation survey indicated that the participants felt the training objectives were achieved, with the majority highlighting that the knowledge gained through attending the workshop was relevant and applicable to their work. Participants felt that there was sufficient opportunity to discuss and share challenges and solutions to the use of and access to climate information at the national and regional scale.

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Acronyms and abbreviations

AR6 – Sixth Assessment Report

ARRCC – Asia Regional Resilience to a Changing Climate

CARISSA – Climate Analysis for Risk Information & Services in South Asia

FCDO – Foreign, Commonwealth and Development Office

IPCC – Intergovernmental Panel on Climate Change

MS – Microsoft

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1. Workshop scope and aims

1.1. CARISSA training and capacity development

The training workshop on utilising climate science and services for policy and decision making described in this report is one of a number of capacity development and training events that have been conducted under the ARRCC programme. This was the first regional training event to focus on the use of climate science and services in policy and decision making for climate information users in the South Asia region, with other capacity building activities targeted at climate information provider organisations. This forms part of a CARISSA workstream on training and capacity development, which aims to strengthen the knowledge and capabilities of both providers and users of climate information.

1.2. Training objectives

The workshop aimed to provide participants with an introduction to the climate system and an overview of interpreting both climate observations and climate model projection data and visualisations. An interactive session using the IPCC's Interactive Atlas enabled participants to access and explore visually the range of observational and projection data available at the global and regional scale through this resource. The concept and characteristics of co-produced climate services were introduced with illustrative case studies, along with broader advice around communicating climate information to a range of users and stakeholders. Interactive discussion sessions provided opportunities for participants to share their experiences of using and accessing national and regional climate information, and to highlight challenges and explore solutions based on their own experiences. Overall objectives of the training were as follows:

1. Understand the strengths and limitations of long-term climate information
2. Learn what climate information is available and how to access it
3. Discuss challenges and solutions to using climate information
4. Understand the role of co-produced climate services

1.3 Event platforms

The primary platform used to deliver the training was MS Teams, with Mentimeter and Kahoot also used for interactive activities and in-parallel discussion breakout groups.

MS Teams was used for hosting the main video call, which included all participants and the facilitating team. This platform was chosen as it can be easily set up on Met Office devices and it can be used in the South Asia region; participants are able to access the platform through the browser or by installing an app with no additional cost. This enabled the facilitating team to manage the meeting and breakout room settings.

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Taught sessions were delivered using PowerPoint presentations and presenters' videos were switched on when speaking. In general, participants' videos remained off, except for when speaking. The 'raise hand' option was available for participants who wished to speak or ask a question.

The majority of interactive activity (asking questions, making comments and providing feedback) was received via the MS Teams chat function, in addition to the breakout group sessions where participants interacted both verbally and responding to live Mentimeter questions. The benefit of Mentimeter was that participants could share their thoughts and questions anonymously. At the start of day 1 the facilitating team provided a brief introduction to Mentimeter and ran some energiser poll questions using the tool to ensure participants were familiar with the functionality.

2. Proceedings of the workshop

An agenda for the training workshop is detailed in Annex 2.

2.1. Day 1

Day 1 of the workshop began with a welcome to the participants and the training workshop objectives were outlined in relation to wider CARISSA and ARRCC aims. An introductory energiser session was held using Mentimeter, which allowed participants to answer questions anonymously. This provided an opportunity for participants to share their thoughts around what they hoped to learn from the training and to highlight how using climate information in their work is important (see Figure 1 and Annex 3 for all Mentimeter responses).

Figure 1. Mentimeter word cloud responses from participants, in response to the question *'why is using climate information in your work important for you?'* This was part of the day 1 energiser session and all Mentimeter responses can be found in Annex 3.

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Taught sessions included an '*Introduction to the climate system'*, which provided an overview of the climate system, differences between observation data and climate model data, climate variability, and an introduction to climate modelling and its applications. '*Understanding and interpreting climate information*' provided an introduction to common climate terminology, and key features of climate data visualisations such as maps and plots

Two discussion sessions using breakout groups were held. The first on '*Shared successes, challenges, and overcoming barriers'* allowed participants to share their experiences of how they use climate information to influence and inform decisions, as well as to identify associated challenges and possible solutions. The second built on this with a focus at the country level and discussions around *'Access to and use of national climate information'.* Breakout group discussions for three of the ARRCC focus countries, Pakistan, Nepal and Bangladesh, included presentations on the availability of climate information were delivered by focal points at Pakistan Meteorological Department (Syed Ahsan Ali Bokhari), Nepal Department of Hydrology and Meteorology (Indira Kadel), and Bangladesh Meteorological Department (Bazlu Rashid). A discussion session for participants interested in the South Asia region as a whole was facilitated in the main MS Teams meeting. Responses to Mentimeter questions from the breakout groups can be found in Annex 3. The responses and feedback from participants will be incorporated in plans for future training activities.

2.2. Day 2

Day two featured a mixture of interactive and taught sessions. An activity on using the IPCC AR6 Interactive Atlas provided the opportunity for participants to interpret and visualise observed climate trends and future climate projections for the South Asia region using the Atlas. There was opportunity for participants to ask questions throughout the session and answers to the activities were shared with all participants afterwards. A taught session, '*Introduction to climate services and climate communication'* provided an overview of co-produced climate services, identified different forms of engagement and gave example case studies of climate service delivery. The value added by intermediaries, boundary organisations, and users in climate services was covered along with key considerations when communicating climate information. To close the workshop, a question-and-answer session was held, where participants were able to ask members of the facilitation team questions that related to the content covered in the training. A final networking activity in small breakout rooms was held so that participants could reflect on their experience of the training and how this could be applied to their work, with opportunity to feedback comments to the wider group.

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3. Evaluation and next steps

3.1. Effectiveness of platforms used for remote delivery

MS Teams was easily accessible to both the facilitating team and participants. No participants alerted us of any technical difficulties in joining the call. Features such as the 'raise hand' and chat function proved useful throughout the course, though not all functions are available for browser and app users, such as the 'together mode' to view multiple videos. There were some technical difficulties encountered during the course related to the use of breakout rooms. Several participants were unable to access the automatically assigned breakout rooms during the two discussion sessions on day 1.

Mentimeter was a useful tool for generating interactive discussion and visualising live responses and feedback. As the answers are presented anonymously, this allowed more freedom for participants to submit responses and suggestions without feeling personal judgement. A good level of responses were received using this tool during the introduction activity and discussion sessions (see Annex 3).

For future use of MS Teams, it is recommended that an opportunity to check participant ability to join breakout rooms is checked ahead of the training where possible. Other video platforms (e.g. Zoom or BlueJeans) could also be explored for future workshops. For interactive discussions with large numbers (> 30 people), Mentimeter is highly recommended as it is simple to use and allows participants to submit anonymous answers.

3.2. Evaluation of training objectives and content

Results from the training evaluation survey (Annex 4) indicate that participants felt the objectives of the training (section 1.2) were delivered effectively. All respondents indicated that the training was mostly or highly relevant to their work, and the majority (more than 80%) felt they were likely to use knowledge gained from the workshop in their roles. Participants from a number of different organisation types (academia, industry, humanitarian, government and meteorological services) registered for the workshop; the survey results indicate that the training material was relevant to a broad range of organisations and users of climate information in the South Asia region. The majority of respondents (more than 85%) felt that after the training, their knowledge of the key topics covered in the sessions (understanding of the climate system, the IPCC AR6 Interactive Atlas, climate information interpretation, and climate services and communication) ranged from good to excellent. The survey results also indicate that participants felt there was sufficient opportunity to discuss the challenges and solutions associated with using climate information.

Overall ratings of different aspects of the training delivery and format largely ranged from good to excellent. Key areas for improvement include providing more opportunity to interact with other participants and increasing the time allocated for breaks.

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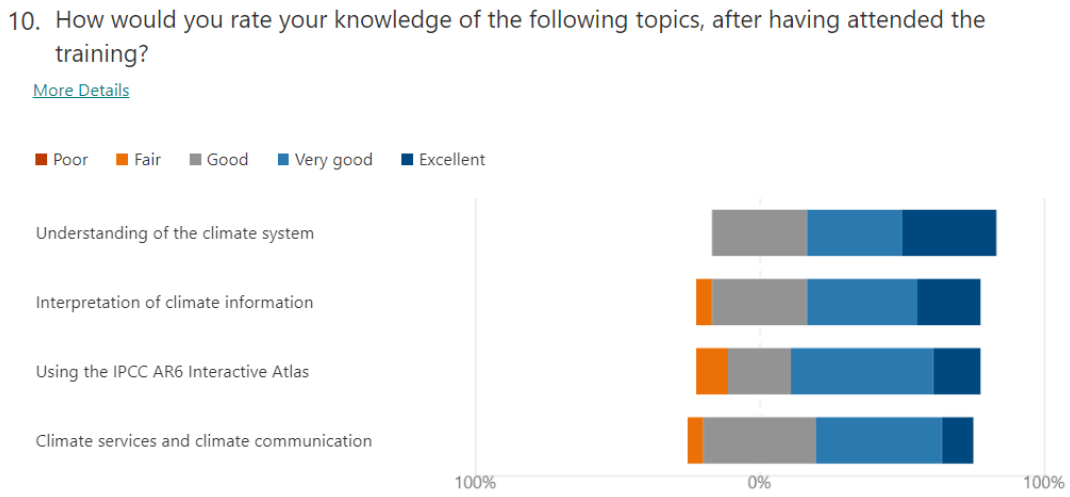
Survey respondents provided several recommendations that could be explored in further training. These include:

- Climate communication and co-produced climate services training
- Climate modelling, specifically CMIP6
- Use of climate information for early warning systems
- Integration of climate analysis for specific sectors (e.g. water resource management and agriculture)
- Climate change impact assessments (e.g., for the cryosphere, flood and erosion forecasting, water availability)



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Annexes

Annex 1: Participant organisations

A total of 196 people registered via Eventbrite for the training workshop (64 female, 119 male). In terms of attendance, at peak times ~80-90 participants joined on day 1 and ~30-40 participants joined on day 2. The table below details the organisations represented by the registered attendees.

Organizations	Sector	Organisation location
Nepal Department for Meteorology and Hydrology	Meteorological Service	Nepal
Bangladesh Meteorological Department	Meteorological Service	Bangladesh
Pakistan Meteorological Department	Meteorological Service	Pakistan
Bangladesh University of Engineering and Technology (BUET)	Academia/research	Bangladesh
Assam Water Research and Management Institute	Government	India
Bangladesh Red Crescent Society	Humanitarian	Bangladesh
United Nations World Food Programme	Government	Across South Asia region
International Organisation for Migration	Humanitarian	Across South Asia region
Centre for National Resources Studies, Bangladesh	Academia/research	Bangladesh
Institute of Water Modelling, Bangladesh	Academia/research	Bangladesh
DanChurchAid, Bangladesh	Humanitarian	Bangladesh
Renewable Energy and Energy Efficiency Partnership (REEEP)	Industry/private sector/consultancy	Austria
MNS-University of Agriculture, Multan	Academia/research	Pakistan
Central University of Rajasthan	Academia/research	India
Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)	Government	Across South Asia region
Valley Irrigation, Pakistan	Industry/private sector	Pakistan
Doaba Foundation	Humanitarian	Pakistan
Central Pollution Control Board	Government	India
ICAR-National Institute of Animal Nutrition and Physiology	Government/Academia/research	India
Tamil Nadu Agricultural University	Government	India
Malabar Christian College, Calicut, India	Academia/research	India

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Indian Institute of Technology Roorkee, India	Academia/research	India
Bangladesh Rice Research Institute	Government	Bangladesh
Punjab Remote Sensing Centre	Government	India
Kazi Nazrul University	Academia/research	India
National Institute of Rural Development and Panchayati Raj	Government	India
International Centre for Tropical Agriculture (CIAT)	Academia/research	Across South Asia region
Yildiz Technical University	Academia/research	Turkey
Amity University, Noida, UP and ICA-IARI, New Delhi, India	Academia/research	India
TERI School of Advanced Studies	Government	India
Amity University Rajasthan	Academia/research	India
Department of Higher Education, Government of Jammu and Kashmir	Government	Jammu and Kashmir
University of Manitoba	Academia/research	Canada
Gopal Narayan Singh University-Jamuhar, Rohtas-821305 (Bihar)	Academia/research	India
Center for Development Research (ZEF), University of Bonn	Academia/research	Across South Asia region
Ministry of Energy Water Resources and Irrigation	Government	Nepal
National Geophysical Research Institute	Government	India
School of Planning and Architecture, New Delhi	Government/Academia/research	India
Pandit Deendayal Energy University	Academia/research	India
Central University of Jharkhand	Academia/research	India
eGreen Compliance Consultants	Consultancy	India
Kerala State Disaster Management Authority	Government	India
National Institute of Hydrology	Government/Academia/Research	India
Banaras Hindu University	Academia/research	India
ICRISAT- International Crops Research Institute for the Semi-Arid Tropics	Academia/research	Across South Asia region
Utkal University	Academia/research	India
ICAR-Indian Institute of Farming Systems Research	Government	India
Environment Directorate Uttarakhand	Government	India
Indian Institute of Technology Kanpur	Academia/research	India
Mizoram Science, Technology and Innovation Council (MISTIC)	Government	India

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RBased Services Private Limited	Industry/private sector	India
University of Kashmir	Academia/research	Jammu and Kashmir
Vidyasagar University	Academia/research	India
Kerala Agricultural University	Government/Academia/Research	India
Indian Institute of Forest Management, Bhopal	Government	India
India Meteorological Department	Meteorological Service	India
Sindh Transmission & Dispatch Company	Government	Pakistan
United Nations Development Programme	Government	Across South Asia region
University of The Punjab, Lahore	Government/Academia/Research	Pakistan

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Annex 2: Event timetable

Day 1: Wednesday 16 March 2022

UK time	Pakistan time	Nepal time	Bangladesh time	Description
8:00	13:00	13:45	14:00	**Welcome and outline of training** (Joseph Daron)
8:15	13:15	14:00	14:15	**Energiser and introductions** (Amy Waterson)
8:35	13:35	14:20	14:35	**Introduction to the climate system** (Amy Waterson)
9:05	14:05	14:50	15:05	**Discussion session 1: shared successes, challenges, and overcoming barriers** (Rosie Oakes, Joseph Daron, Katy Richardson, Tamara Janes)
9:45	14:45	15:30	15:45	Break
10:00	15:00	15:45	16:00	**Understanding and interpreting climate information** (Amy Waterson)
10:30	15:30	16:15	16:30	**Discussion session 2: Access and use of national climate information: breakout groups for each country** (Indira Kadel, Bazlu Rashid, Syed Ahsan Ali Bokhari, Amy Waterson, Becks Parfitt, Jennifer Weeks, Rosie Oakes, Joseph Daron)
11:45	16:45	17:30	17:45	**Wrap-up and close day 1** (Joseph Daron)

Day 2: Thursday 17 March 2022

UK time	Pakistan time	Nepal time	Bangladesh time	Description
8:00	13:00	13:45	14:00	**Re-cap of day 1 and brief overview of day 2** (Amy Waterson)
8:15	13:15	14:00	**14:15**	**Energiser** (Becks Parfitt)
8:45	13:45	14:30	14:45	**Activity on using the IPCC AR6 Interactive Atlas** (Joseph Daron)
9:45	14:45	15:30	15:45	Break
10:00	15:00	15:45	16:00	**Introduction to climate services and communicating climate information** (Becks Parfitt)
11:00	16:00	16:45	17:00	**Networking activity** (Amy Waterson)
11:30	16:30	17:15	17:30	**Rapid question and answer session** (Amy Waterson)
11:45	16:45	17:30	17:45	**Wrap-up and closing** (Joseph Daron, Bazlu Rashid, Syed Ahsan Ali Bokhari)

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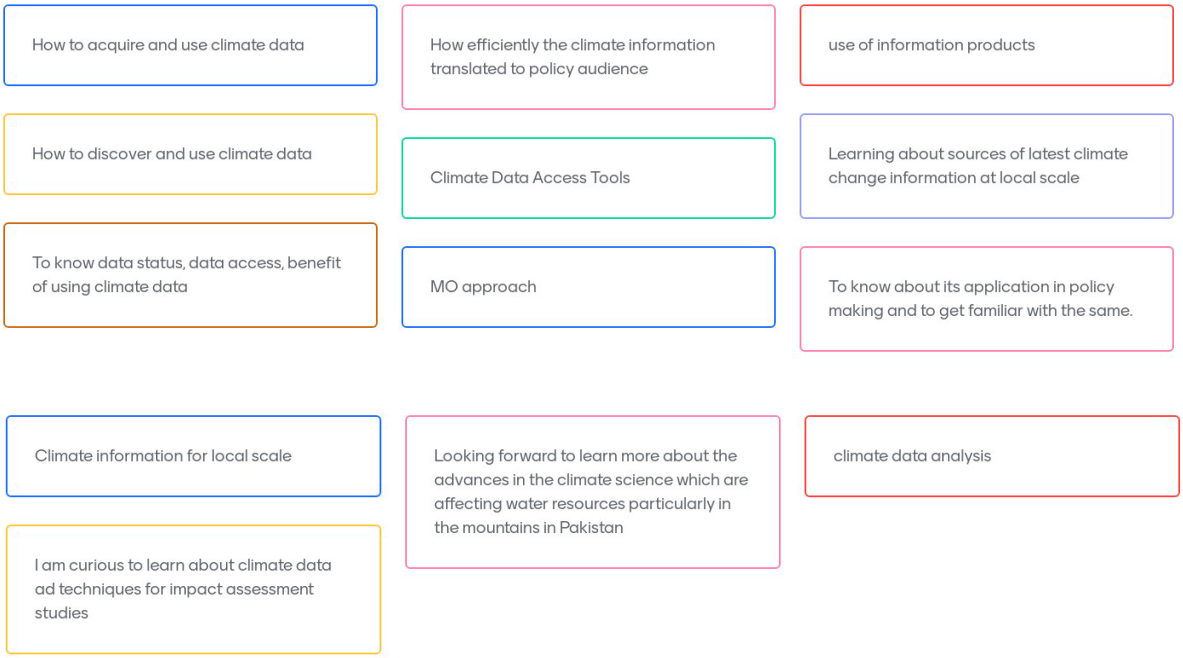
Annex 3: Mentimeter results

Day 1: Energiser

Why is using climate information in your work important for you?

What are you hoping to learn from the workshop?



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How others in the region are using climate information

Linking my work to Climate resilience

Future Climate scenarios and implications on Cryosphere

more on ARRCC project and some updates regarding the climate change adaptation and mitigation

understanding climate information service, and regional climate information service platform,

how to use weather and climate informatin for preparedness

I want to know about some tools and frameworks for using climate science in policymaking.

Advanced knowledge on application of climate service for livestock sector

I hope to know about the challenges and potential solutions to use the climate information.

status of climate data

New information/data sources, products, methods for climate change studies.

How integrating climate information into policy making help improve its impact?

Integrating Climate Information with Project Work on ground

What are the infrastructures necessary and what proactive role I can play as a river engineer.

Acquisition of data and their sources for climate change assessment

To incising my knowledge. As a DRR practitioner wat to know what's the future climate actions

Knowledge and resource materials over climate change and DRR issues which can be integrated to triple nexus approach programming with a view to build more resilient community, challenging existing climate change and environmental vulnerabilities. :)

Availability of Climate Data at regional scale, interpretation of the data and using them for long term planning (especially relevant to IWRM) and policy making.

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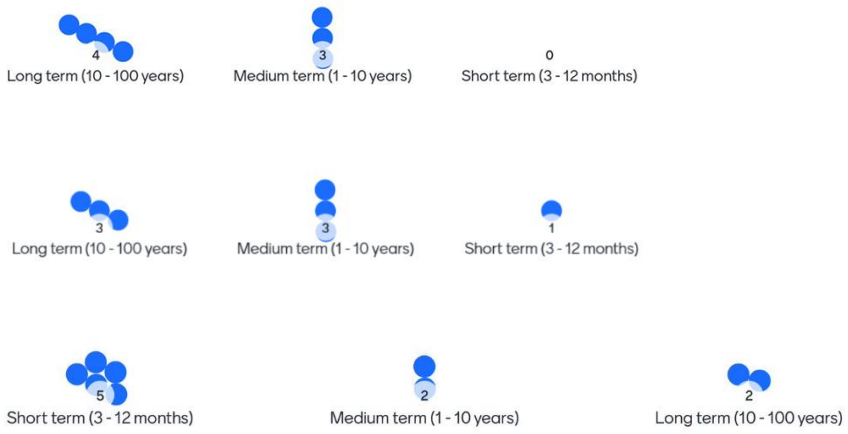
Day 1: Discussion session 1: shared successes, challenges and overcoming barriers

The responses below are from mutiple break-out groups that discussed the following questions.

Q 1: What type of work do you do that is affected by weather and climate?

Q 2: And over what timescales?



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Q 3: What climate information would you need to support your work?

Q 4: What are the main challenges in using climate information?

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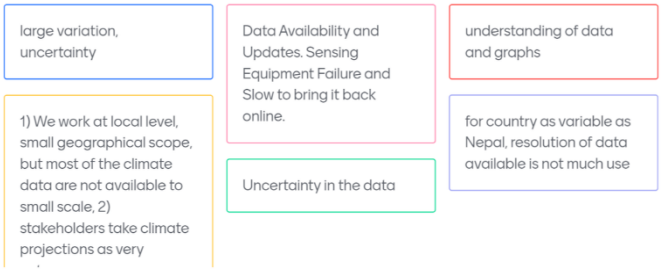
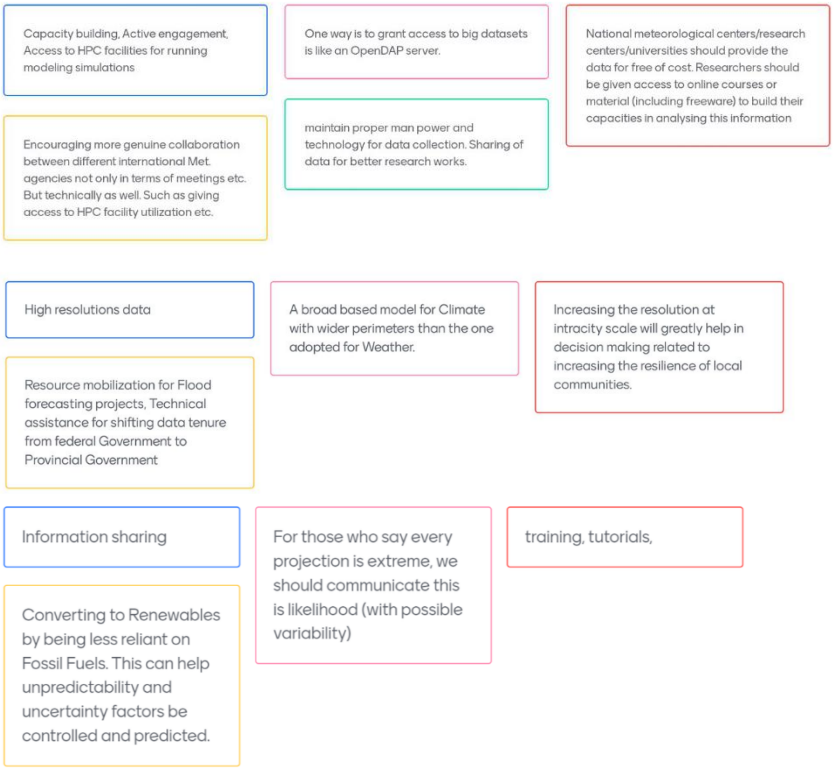


Q5: Can you suggest any solutions?



Day 1: Discussion session 2: access and use of national climate information

Nepal break-out meeting

Q1. How do you access longer-term climate information in your country or region?
(where from, what type of data are you using?)

- Climate Change Scenarios for Nepal National Adaptation Plan – government publication
- Global Circulation Model (GCM) data
- NASA Earthdata, NASA GCM data
- DHM websites (seasonal outlooks for precipitation and temperature, longer-term historical precipitation records)
- Climate Change Knowledge Portal of WB – projection data

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- Longer-term climate information for adaptation to climate change impacts (flooding and extreme events)

Q2. What are the challenges to using longer-term climate information to influence and inform decisions at the national or regional level?

- Differences in forecasts by different agencies
- Difficulties with relating projections to levels of emissions
- Resolution of projections
- When observations are not reflected in projections, or contrast with projections
- Data homogeneity and availability
- Data uncertainty, including model uncertainty
- Agencies not sharing detail of research in a timely manner, particularly high-resolution data

Q3. Can you suggest possible solutions to address these challenges?

- Start the discussion by saying these are models, there is uncertainty associated with them, with the emphasis on the direction rather than magnitude
- Using new sets of models and more recommended/accurate data can help to reduce uncertainty

Pakistan break-out meeting

Q1. How do you access longer-term climate information in your country or region? (where from, what type of data are you using?)

- From NMHS, including observed meteorological data, reanalysis data and future climate projection data from PMD
- CMIP5 and CMIP6 data products

Q2. How do you use longer-term climate information in your country or region, to influence and inform decisions, or in your work?

- National Climate Change Policy
- Sectoral risk assessments (agriculture, water resource planning and development)
- Disaster management plans and risk reduction (e.g. glacier monitoring)
- Design and strategic planning
- Construction companies, Forest Department, Insurance companies, Aviation
- Forecast-based financing
- Impact modelling studies

Q3. What are the challenges to using longer-term climate information to influence and inform decisions at the national or regional level?

- Uncertainty
- Resolution
- Data length and quality issues
- Variations in data and rapid and unpredictable changes
- Observational data equipment needs frequent maintenance (getting the actual data on the ground is a challenge, e.g. anemometer data)

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Q4. Can you suggest possible solutions to address these challenges?

- Upgrading of equipment and better interface
- Setting up national level data portals/repositories

Bangladesh break-out meeting

Q1. How do you access longer-term climate information in your country or region? (where from, what type of data are you using?)

Q2. What are the challenges to using longer-term climate information to influence and inform decisions at the national or regional level?

Q3. Can you suggest possible solutions to address these challenges?

Main meeting

Q1. How do you access longer-term climate information in your country or region? (where from, what type of data are you using?)

- Various AWRs and satellite data
- From regional weather centres, including rainfall forecasts
- Observed climate data via the India Meteorological Department, including long term (1900-2010) temperature and precipitation data
- CMIP5 data from ESGF data nodes
- IMDAA reanalysis data (provided by NCMRWF India)
- Remote sensing products
- Temperature reanalysis datasets, noting uncertainty due to topography
- Bangladesh Meteorological Department

Q2. How do you use longer-term climate information in your country or region, to influence and inform decisions, or in your work?

- From observations, text and remote sensing products
- Long-term climate information, particularly temperature and precipitation, to understand glacier-climate interactions in the past and future
- Linking with livelihoods
- Climate data for impact assessment and identifying vulnerable regions to make and implement policies
- Presenting work at conferences
- Climate information for Assam state in India is taken into consideration for designing flood forecast and mitigation models

Q3. What are the challenges to using longer-term climate information to influence and inform decisions at the national or regional level?

- Data is not free and needs to be purchased from an agency
- Accuracy of projections and correlating this with sectoral data

Q3. Can you suggest possible solutions to address these challenges?

- Creating a data repository for specific countries
- Free access to processed data via the Meteorological Department

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Annex 4: Training evaluation survey results

18 participants responded to the post-training evaluation survey

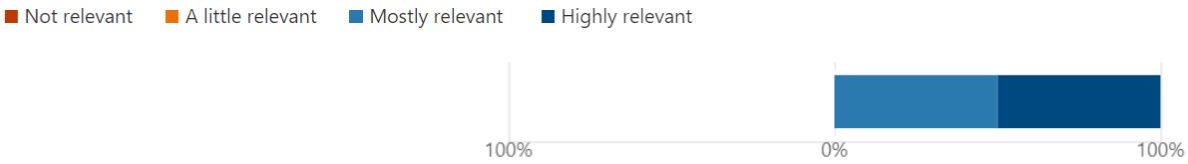
4. Which days of the training did you attend?

More Details Insights

Wednesday 16 March only	0
Thursday 17 March only	0
Wednesday 16 & Thursday 17...	18

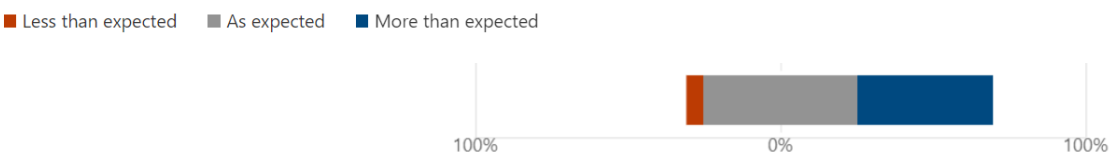
5. How relevant was the training to your work?

More Details



6. How much do you feel you have learned from the training?

More Details



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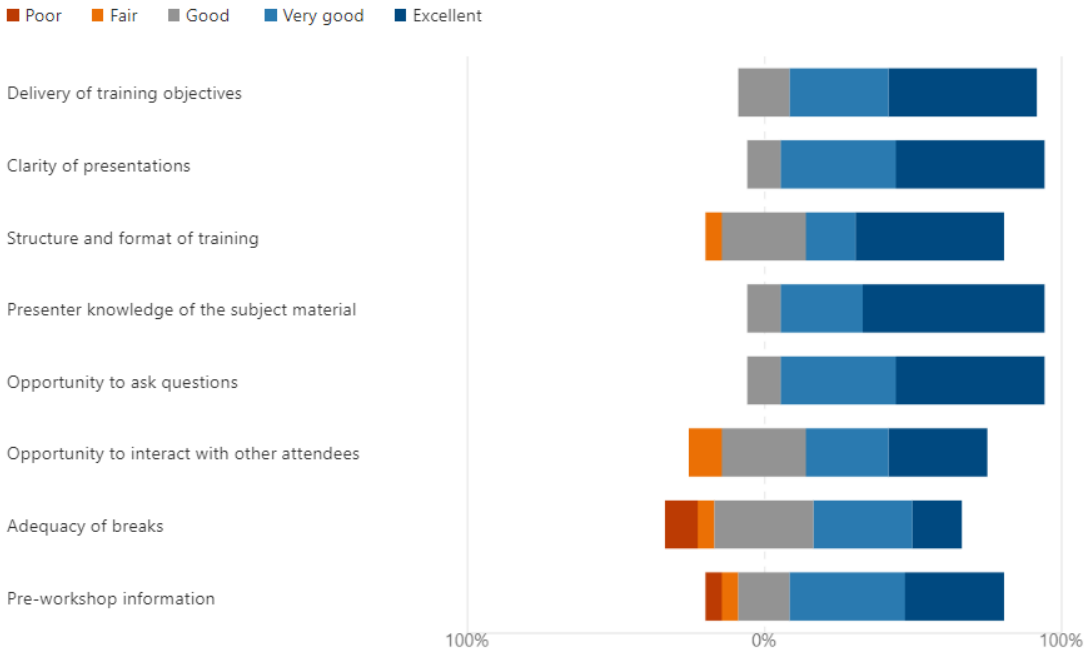
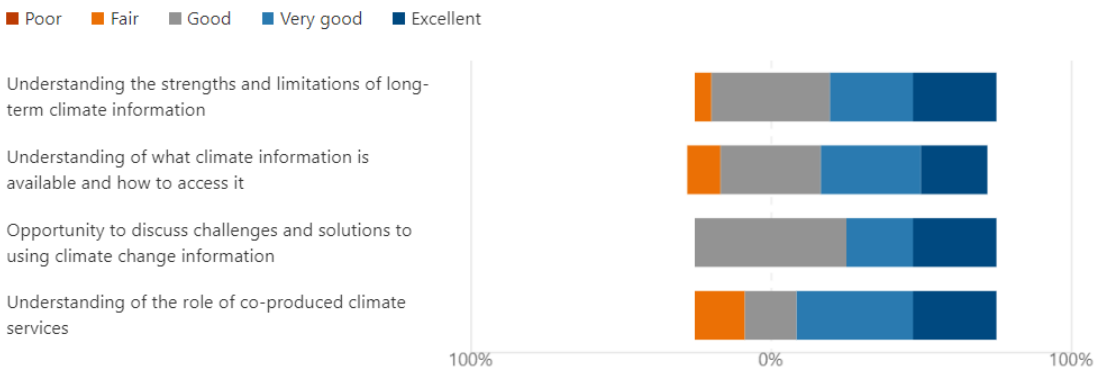
8. How would you rate the quality of the training in the following areas?

More Details



9. How would you rate your understanding or experience of the following after the training?

More Details



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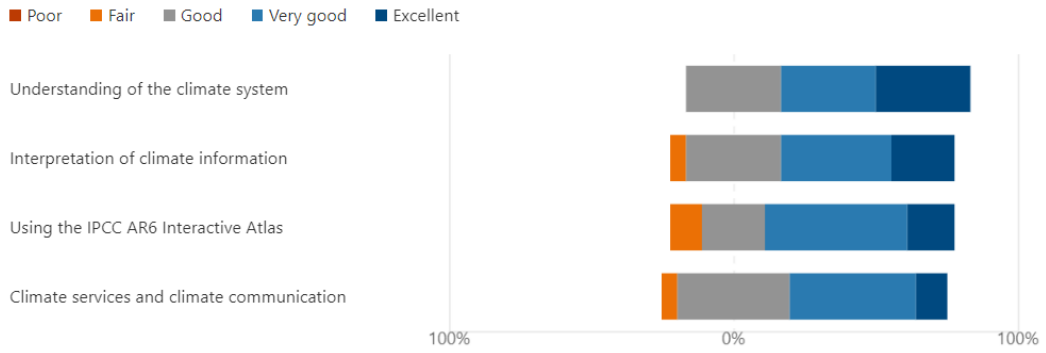
10. How would you rate your knowledge of the following topics, after having attended the training?

More Details



11. Are there further topics or training that would be useful in your role/organisation?

More information about CMIP6 and Application
Climate modeling
More information in this regard only
Climate activism and climate communication
Integrating climate change analysis with sectors such as water resource development and agriculture
Climate models Data Generation and Application
Climate Communication and Coproduction
Weather Communication for Flood & Erosion Forecasting
Yes, there are further topics or training that would be useful in my role/organization like co production training.
a specific training on climate risk to agriculture or so...
Yes, the new sources of climate information/data visualisation and Climate services and climate communication will be very useful to me.
Topics more focused on Climate Change Impact Assessments would be quite useful. Like assessment of impacts of CC on cryosphere, LULC and water availability.
alert systems used for intimating any disaster

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12. Is there any further comments or feedback on the training you would like to share?

Thank you to the MET Office Team for wonderful sessions
It is very informative
the content and presentations were managed according to time
The training was very productive. I would also hope some technical trainings, ie: using climate data to analyze climate change analysis.
The training was well designed and we'll collaborated. The training had all the components needed for beginners to learn about climate system andnits various issues.
I would suggest to hold in person activities under CARISSA in future since online engagement hasn't been of much use till now.
|More extensive, interactive, physical hands on training in near future.
I think that this type of workshop and training are more needed for better understanding and deliver information for end users.
Well planned and executed training. Connectivity could have been a little better.
Overall the training was quite good and informative, more exposure to accessibility and use of climate model would have been very helpful.
it was excellent
nil, just thanks

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