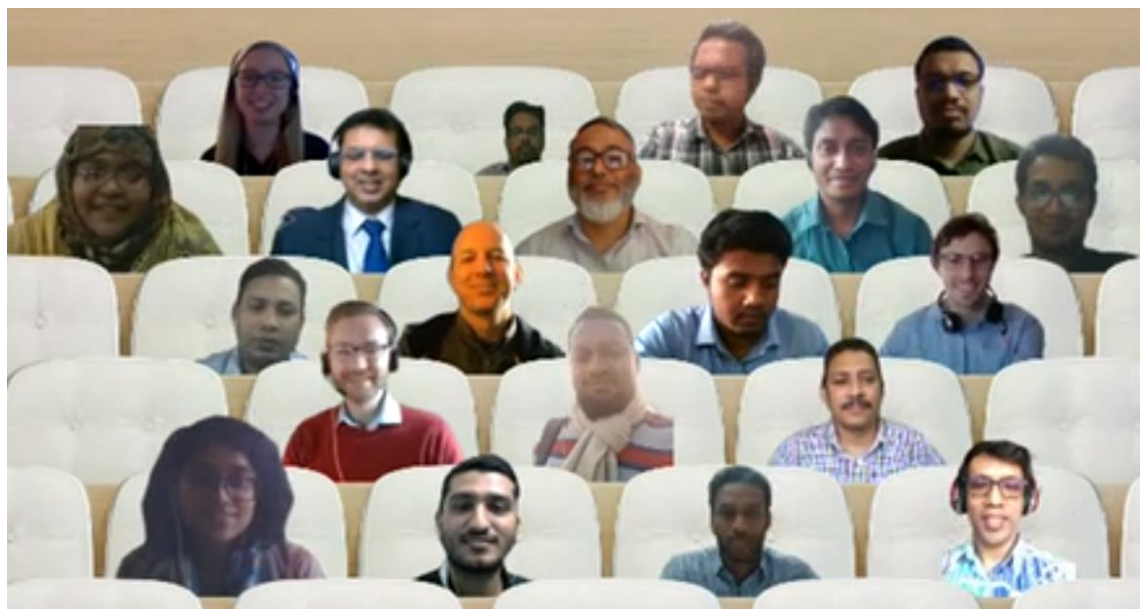




Training workshop: Sea-level science and the use of sea-level projections in Bangladesh

Held online from 23 to 25 November 2020

Jointly coordinated by the Met Office and Bangladesh University of Engineering and Technology



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17 December 2020

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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 South Asia to enhance the use of regional climate information to inform adaptation planning. This includes enhancing the capacities of organisations involved in provision and use of information on future coastal climate risks, such as sea-level rise that threatens vulnerable communities in the region.

This report describes the first training event delivered under CARISSA focused on sea-level science and projections. It was aimed at researchers and wider stakeholders involved in climate science and the management of coastal climate risks in Bangladesh. The event was organised in collaboration with Professor A.K.M Saiful Islam from the Bangladesh University of Engineering and Technology (BUET) and delivered remotely due to restrictions imposed by the COVID-19 pandemic.

The workshop covered the science of sea-level change, sea-level observations and projections before discussing the application of projections within the context of broader adaptation work in Bangladesh. The first day aimed to help answer questions about the causes of sea-level rise, with sessions focussed on the physical processes responsible for past and future sea-level changes at the global and local scale. The second day focussed on sea-level observing systems, with sessions on estimating sea-level trends with tide gauge records and satellite altimetry data. The final day focused on potential responses to sea-level rise in Bangladesh, with sessions on the use of sea-level projections for determining the height of coastal defences and an extended discussion session on proposed coastal adaptation work in Bangladesh. Each day featured live polls with short multiple-choice questions to gauge participants understanding of the concepts, along with optional homework assignments designed to reinforce learning and help consolidate the material.

The workshop was well attended, with 21 participants across a range of background from research, engineering, policy and defence, with places originally limited to 20 participants. The workshop succeeded in providing the underpinning science knowledge to interpret sea-level observations and projections, as indicated by the assignment and exercises responses. This was also shown on evaluation of the pre- and post-workshop surveys. Before the workshop, 32% of participants rated their knowledge of relevant topics as 'good' or above, which increased to 85% after the workshop. Participants felt they improved the most in 'physical processes responsible for sea-level change', increasing its 'very good' and above rating by 50%. Finally, the event generated cross disciplinary discussion about the challenges and opportunities relating to future coastal adaptation and development plans in Bangladesh.

Acronyms and abbreviations

ARRCC – Asia Regional Resilience to a Changing Climate

BDP2100 – Bangladesh Delta Plan 2100

BUET – Bangladesh University of Engineering and Technology

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

FCDO – Foreign, Commonwealth and Development Office

IPCC – Intergovernmental Panel on Climate Change

IWM – Institute of Water Modelling

IWFM – Institute of Water and Flood Management

MS – Microsoft

PSMSL – Permanent Service for Mean Sea-level

RSLR – Relative Sea Level Rise

SLR – Sea Level Rise

SROCC – Special Report on the Ocean and Cryosphere in a Changing Climate 2019

UHSLC – University of Hawaii Sea Level Center

UKCP18 – UK Climate Projections 2018

UKMO – United Kingdom Met Office

WP – Work Package

1. Workshop scope and aims

1.1. CARISSA Coastal Climate Services

The training workshop on sea-level science and the use of South Asia sea-level projections described in this report is one of number capacity development and training events that have been conducted under the ARRCC programme. This was the first training event to focus specifically on the issue of sea-level rise (SLR) and use of sea-level projections but is part of an ongoing coastal risk themed workstream being conducted under the CARISSA project of the ARRCC programme. The workstream aims to address growing concerns about the impacts of sea-level rise on low-lying coastal areas in South Asia by working with organisations in the region to improve the provision and use of sea-level projections.

Reviews of the recent scientific literature on sea-level science information and services for [Bangladesh](#) (Harrison et al., 2020a) and [Pakistan](#) (Weeks et al., 2020) indicated growing interest in SLR impacts but gaps in the provision of regional or location specific information on future SLR. In response the Met Office have published a [report on a new set of sea-level projections for South Asia](#) tide gauge locations (Harrison et al., 2020b). The projections are intended to provide the starting point for sea-level information tools and services for those undertaking work on coastal impact, risk and adaptation in the region. The training workshop is part of ongoing efforts to ensure organisations are able to access the new sea-level projections and make developments that will enable their use in coastal risk assessments or coastal management decision making.

1.2. Training workshop aims and objectives

The workshop provided an opportunity for engagement and capacity development of organisations in Bangladesh that are involved in work on coastal adaptation, impacts assessment, risk reduction and policy.

The workshop aimed to improve awareness of climate information on past estimates of sea-level trends and projections of future sea-level change, while also providing guidance on the scientific limitations and uncertainties that need to be considered when using information on sea-level changes. Attention was given to the open-source information from satellite and tide gauge observations, along with projections from the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC). The event also provided an opportunity to showcase new sea-level projections produced under the CARISSA project based on methods from the Met Office 2018 UK Climate Projections ([UKCP18](#)). In discussion sessions, the participants explored how other outputs from UKCP18 could potentially support national or sub-national scale adaptation work in Bangladesh.

Objectives:

1. Engage with organisations working on coastal adaptation and impacts assessment in Bangladesh
2. Improve awareness and use of information on sea-level change
3. Discuss issues related to SLR and the use of sea-level projections in coastal adaptation in Bangladesh
4. Provide learning resources on the science of sea-level change, along with the application of information from sea-level observations and projections in Bangladesh

In addition to these top-level objectives, individual workshop sessions had specific learning objectives and outcomes:

- Describe the physical processes responsible for sea-level changes at the global, regional and local scale
- Assess the relative importance of contributions from the different component sea-level processes to overall magnitude of sea-level change and their contributions to the uncertainty in sea-level change at different locations
- Use satellite and in-situ observations of sea-surface height to estimate past sea-level changes and current trends, identifying the climate and non-climate signals in the data
- Explain the processes responsible for the geographical variations in sea-level change over the Bay of Bengal region and local-scale variations within and between the Bangladesh coastal zones
- Understand the factors responsible for the *deep uncertainty* associated with sea-level projections for the end of the 21st century onward, which places restrictions on application of traditional approaches to evaluating future costs and benefits

The pre-workshop survey ([Annex 3](#)) revealed participants chose to attend the event due to its relevance to their job and to enhance their knowledge and skills to an advanced level. Some participants wanted to build basic knowledge and skills in the subject. Before the course, over 40% of participants rated their knowledge as 'fair' to 'poor' of nearly all topics, including the processes of regional sea-level rise and technical skills such as using tide gauge datasets.

1.3 Event platforms

The primary platforms used in the training workshop were Google Classrooms¹ and Microsoft (MS) Teams. Mentimeter and Google Jamboards were also used for interactive purposes to supplement these primary platforms.

MS Teams was used for hosting the main video call, which included all participants, organizers and presenters. This video platform was chosen since it can be easily set

¹ Learning resources remain available to course participants from the Google Classroom. Additional access can be provided on request.

up on Met Office devices with no extra costs, it can be used in Bangladesh, and participants can access the platform through the browser or by installing an app. This allowed organizers to have control over the meeting details and allowed for flexibility of use for the participants. Lessons were conducted as presentations through MS Teams and organizers' videos were switched on when speaking to reduce bandwidth issues. In general, participants videos remained off, except for when introducing themselves or when speaking. The 'raise hand' option was available for participants who wished to speak or communicate. A group photo (see report front page) was taken by using the 'together mode', although not all functionalities are available on the app or browser for guests to the call.

Google Classrooms was used to host all materials related to the course. This allowed facilitators to upload resources and also to set assignments for the participants. Presentations from each lesson were uploaded, along with audio versions and transcripts, to help with any bandwidth issues encountered. Materials remain stored on Google Classrooms for participants to access after the class, and further materials have been uploaded since the class, such as Python scripts; additional access can be provided on request.

In order to generate an interactive discussion, questions were set on Mentimeter for participants to answer in breaks. This could be accessed from the browser or on their phones. The answers were shared anonymously on the screen, so participants could see active polls and other participants' suggestions. Google Jamboards were also used as another tool for generating interactive discussion during the breaks. For example, a 'complete the sea-level puzzle' was set up, so that participants could suggest missing terms. Discussion questions were also posed, on the boards for participants to answer.

Before the course commenced, time was reserved for organizers to help participants with any technical setup issues. This was communicated with participants in advance. Information on the platforms, which included screenshots, links and walkthroughs, was produced and sent out before the workshop.

2. Proceedings of the workshop

A timetable for the workshop is detailed in [Annex 2](#).

2.1. Day 1

The first day of the training workshop focussed on the processes of global and regional sea level change. After all participants had succeeded in joining the MS Teams video call, welcome addresses were provided by A.K.M. Saiful Islam, Joseph Daron and Ben Harrison. This was followed by a visual walkthrough of Google Classrooms and participant introductions facilitated by Jennifer Weeks. Prior to the workshop, participants were asked to submit an introductory slide about themselves and during the session participants used these slides to introduce themselves, turning on video where possible.

The general format of the training workshop which followed included a presentation lesson, followed by a Q&A session and a Mentimeter discussion in the breaks. The first lesson by Matt Palmer provided an 'Introduction to sea-level change', who spoke about components of the 'sea level puzzle'. After this lesson, a Mentimeter poll was set for discussion, on 'Will sea-level rise be larger in the north Indian ocean be larger than the global average sea-level change? What about changes off the coast of Bangladesh?' which worked to gauge current understanding and generate discussion.

The second lesson was conducted by Ben Harrison on 'Regional sea-level change'. Ben showed participants how to use a [sea-level projections tool](#) produced by Climate Analytics. An assignment on using this tool was set for participants, who were split into groups and asked to answer questions on different regional sea-level projections.

2.2. Day 2

The second day focussed on observed sea-level changes. Before the start of the workshop, a Google Jamboard puzzle was presented for participants to fill in the missing words for Global and Regional sea-level change, which tied in with the course content learned on Day 1.

Jennifer Weeks presented two lessons on 'Sea-level observations using tide gauges'. The first outlined the history of tide gauge observations, long tide gauge records and why records must be treated with caution. These were adapted for a South Asia focus, including examples from the Bay of Bengal. After the first lesson, a Mentimeter question was set on 'What impacts could BDP2100 have on tide gauge records?' which generated a thought-provoking discussion. At the end of the second tide gauge lesson, Jennifer showed participants how to access tide gauge data from PSMSL and UHSLC, before talking through some Python scripts for plotting annual mean sea level data and high-frequency data, and for looking at storm surge impacts. A Google Forms quiz was set as an assignment for this topic.

A.K.M. Saiful Islam then presented two sessions on sea level observations. The first discussed a paper by [Becker et al. \(2020\)](#) on subsidence issues, which is one of the main causes of the high rate of relative SLR. The second lesson on 'Sea level rise trends in the Bay of Bengal using tide gauges and satellite altimetry' covered various processes and recent research in the Bay of Bengal.

In the breaks between these lessons, questions were posted on different pages of the Jamboards for discussion. These were relevant for SLR in Bangladesh, and included: 'Are there records of pre-instrumentation sea-level records for Bangladesh sites?'; 'What type of tide gauges are used in Bangladesh'; 'Do you think sea level rise will continue if all emissions stopped today?'; 'What can be done to slow relative/geocentric sea level rise?' amongst other questions.

2.3. Day 3

The third day focussed on future sea-level change, including impacts, risks and opportunities, and discussions on how sea-level projections can inform coastal risk

management. Throughout the day, discussions were generated on coastal adaptation in Bangladesh, particularly how to tackle deep uncertainty.

Ben Harrison presented on 'Bangladesh sea-level rise over the 21st century and beyond'. Mentimeter polls were set throughout the presentation, including questions such as 'How will Bangladesh coastal sea-levels change in response to Antarctic ice mass loss?'; 'What was the main driver of 20th century sea-level changes in the Bay of Bengal?' and 'What is the level of uncertainty associated with projections for different sea-level processes?'.

Tom Howard provided a pre-recorded presentation on 'Sea-level projections and future extremes', which focussed on the applications of outputs from the [UKCP18 marine](#) projections. This was set as an assignment for participants to watch ahead of the lesson. However, time was reserved in the schedule for participants to watch the lesson on Google Classrooms. This was followed by a live question and answer session with Tom Howard.

Ben Harrison then presented on 'Responding to sea level rise: Future sea level work on Bangladesh', including approaches to decision making, risks and uncertainty. This was followed by a panel discussion and 'ask the experts' session chaired by Joseph Daron where all of the experts who had given presentations joined to discuss questions from the participants, reflecting on the full three days. The discussion considered the uncertainty of risks from socio economic activity, alongside absolute and regional SLR at the design and planning level. Impacts and goals of the Bangladesh delta plan were also discussed.

After the panel discussion, there was time allocated to complete the post-course evaluation survey, and participants were shown their course attendance certificates; these were sent individually to participants after the course. This included a question to ask how participants would prefer to follow-up on the event.

David Corbelli, ARRCC programme manager, concluded the course with closing words and thanks, highlighting the next steps for ARRCC activities in Bangladesh.

3. Evaluation and next steps

3.1. Effectiveness of platforms used for remote delivery

MS Teams was used for video calling and presentations. The platform was easily accessible to facilitators and participants and did not require any additional costs. No participants alerted us of any technical difficulties in joining the call. Features such as the 'raise hand' function, and the spotlight 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 however some technical difficulties encountered during the course. For sharing the screen, there was often a delay in which applications MS Teams

recognised as being open. Therefore, it was not always possible to share the desired screen. During Jennifer Weeks' presentation, poor internet connection interrupted the talk and Jennifer was disconnected from the call on two occasions. From the Bangladesh side, although there were no issues raised, several members kept dropping in and out of the call. It is not clear whether this would have happened on other platforms, such as Zoom, and whether participants dropping out of the call was only a result of connection issues.

Google Classrooms was a successful platform for sharing course materials. All participants were able to access the platform and view the material. The platform allowed for uploading a range of file formats, such as zip files, presentation with audio, pdfs and links to websites. Presentations, Python scripts and timetables were uploaded successfully, and students were notified when this occurred. Students could post on the chat stream, or comment on material uploaded. Assessments were submitted on time with good turnout. Participants were also able to watch Tom Howard's pre-recorded presentation before returning to the call and taking part in a discussion. This worked well, however could have benefitted from more clarification on the timings and instructions.

Mentimeter was a useful tool for generating interactive discussion. The tool is used already in Bangladesh so some participants were familiar with its use. Since the answers are presented anonymously, this gives more freedom for participants to submit suggestions without feeling personal judgement. A good level of responses were received using this tool.

Google Jamboards was used also to generate discussion, however received less response from participants. This tool may not be so familiar in Bangladesh. There were also initial technical issues with access to the Jamboards. The participant response to Jamboards increased with time.

3.2. Evaluation of training objectives and content

All top-level objectives were met during the training workshop. New organisations were engaged and, as can be seen from the survey results, participants represented a diverse range of organisations and roles – see [Annex 1](#). For example, organisations included the Bangladesh Agricultural Research Institute, the Local Government Engineering Department and the Department of Environment, which have not been engaged with previously in the ARRCC programme. Participants were also affiliated with organizations previously engaged in the programme, allowing these connections to expand and strengthen. The roles of participants ranged from hydrologists, engineers, climate change specialists, researchers and directors, covering a broad range of experience.

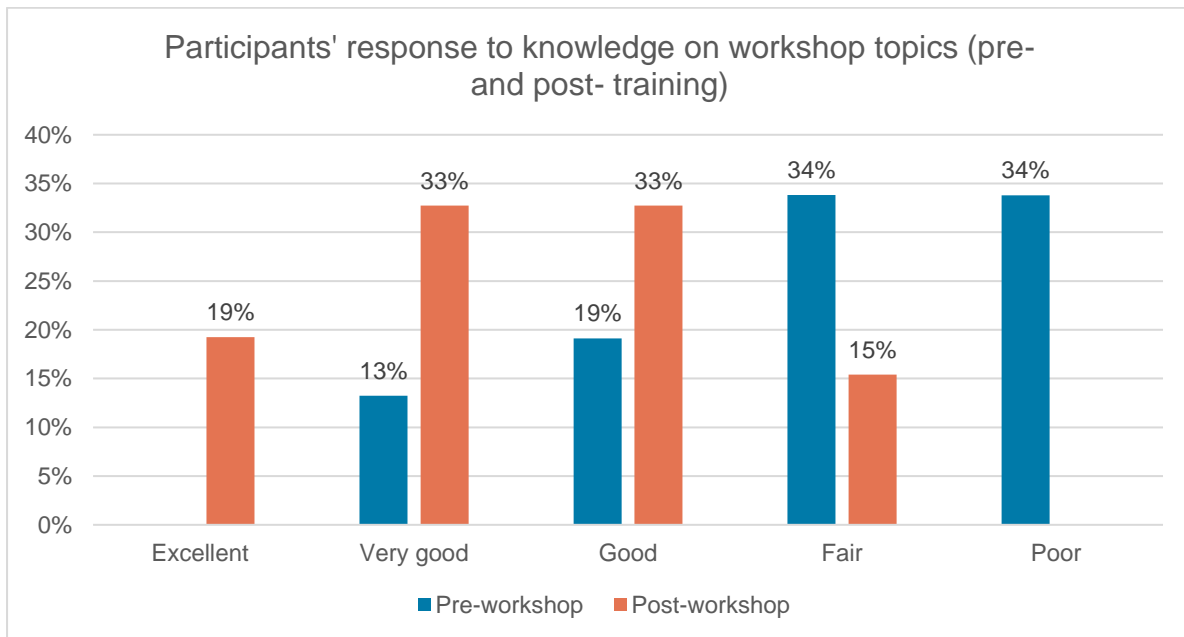
The workshop enabled opportunities for collaboration, as well as further discussion. One participant invited the organizers to the International Conference on Meteorology and Climate Science in December 2020. Ben Harrison accepted the invitation to present at the conference.

During the course, organizers demonstrated how information on sea-level change can be used and accessed. Links were provided on Google Classrooms to the sea level projections report for South Asia and projection data, which shows how access was provided to regional projections. Participants were shown how to extract tide gauge data from the Permanent Service for Mean Sea Level (PSMSL) and the University of Hawaii Sea Level Center (UHSLC) for stations in South Asia. They were also shown how to produce plots using Python scripts using this tide gauge data. These scripts received multiple requests from participants and have since been uploaded onto Google Classrooms. Participants were shown how to use a sea-level projections tool produced by Climate Analytics and set an assignment to practice using this tool.

Throughout the course, there were interactive discussions related to SLR and the use of sea-level projections in coastal adaptation in Bangladesh. This was achieved through the panel discussion, where participants were encouraged to submit questions to the experts. The panel allowed extended discussion on deep uncertainty, which was one of the learning objectives for this course. This stimulated a dynamic discussion on regional adaptation and policy. Questions were also posed to participants during breaks, using the Mentimeter tool, which covered a broad range of topics related to SLR in the Bay of Bengal. Alongside the Jamboard interactive tool, these polls enabled participants to test their knowledge gained from presentations.

Workshop evaluation surveys were completed before and after the event (see [Annex 3](#) and [Annex 4](#)). The pre- and post-workshop surveys were completed by 17 and 13 participants respectively. In the post-workshop survey, participant feedback was generally very positive, with 69.3% saying they learnt more or much more than expected. In the pre-workshop survey, nearly 70% of participants rated their knowledge for all topics as 'fair' to 'poor'. In comparison, this rating significantly increased after the course, with 85% of participants rating their knowledge of all topics from 'good' to 'excellent' in the post-workshop survey. Rating of the technical knowledge (e.g. Jupyter notebooks) was not included in the post-course survey, so is not evaluated here.

This figure below shows a comparison for participants' knowledge on topics before and after the workshop training:



The topic with the most improvement was 'physical processes responsible for sea-level change'. Before the course, 10% of participants rated their knowledge as 'very good' in this topic, with none rating their knowledge as 'excellent'. After the course, this increased to 60% of participants rating their knowledge from 'very good' to 'excellent'. Knowledge ratings of 'Regional differences in sea-level change' and 'analysis of sea-level data' and 'application of sea-level data to research' also increased after the training workshop.

The post-workshop survey also provided the opportunity for participants to suggest what further sea-level science training would be useful in their roles. Multiple responses requested more 'hands-on' and practical training, on topics such as the use of satellite data, analysis of SLR data, analysis of future projections, and the use of different tools and techniques. Other suggested topics included evidence-based policy making, the impact of SLR on food security and ocean nutrition. These suggested topics, and requests for further engagement, will inform follow-up support provided in the CARISSA project. Finally, a policy-level webinar on sea-level projections in South Asia, to be jointly coordinated by BUET and the Met Office, is planned and provides an opportunity for continued coastal adaptation discussions.

3.3. Recommendations for future delivery of online- or classroom-based sea-level training

Google Classrooms proved to be a useful platform and is recommended for future training courses. For future use of MS Teams, it is recommended that all presentations are shared between organizers and opened ahead of the call, to avoid the open-

application delay and other technical issues which may occur when screen sharing. Other video platforms (e.g. Zoom or BlueJeans) could be tested for future workshops.

For interactive discussion tools, Mentimeter is highly recommended, since it is simple to use and allows participants to submit anonymous answers. In comparison, Google Jamboards could prove useful for discussion, however would benefit from more guidance when first introduced.

It would be useful to have a set-up session in the week before the event. This session could include recorded tutorials on how to set-up and use the course platforms. Practice assignments could be provided to check participants are able to upload documents and use the course tools.

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Annexes

Annex 1 – Participant organisations

	Organizations	Previous Engagement	Sector
1	Institute of Water Modelling (IWM)	Yes	Autonomous government hydrological consultancy
2	Bangladesh Agricultural Research Institute (BARI)	No	Academic -Agriculture
3	International Centre for Climate Change and Development (ICCAAD)	Yes	Climate Adaptation and Capacity Development
4	Bangladesh Water Development Board (BWDB) – Flood Warning and Forecasting Centre (FWFC)	No	Government – National Hydrology Service
5	Bangladesh Water Development Board (BWDB) – Coastal Embankment Improvement Project (CEIP)	No	Government Coastal Infrastructure Development
6	Center for Environmental and Geographic Information Services(CEGIS)	Yes	Autonomous government Environmental consultancy
7	Bangladesh University of Engineering and Technology (BUET)	Yes	Academic – Engineering
8	Local Government Engineering Department (LEGD)	No	Government Infrastructure Development
9	Dhaka University (oceanography)	No	Academic - Oceanography
10	Dhaka University (meteorology)	No	Academic – Meteorology
11	Department of Environment (DOE)	No	Government and policy

Annex 2 – Event timetable

Day 1: Monday 23rd November – Theme: What are the physical drivers of sea level change?

1 Opening Session 0900-0930

0900 – Welcome Address from the Bangladesh course organisers (Saiful Islam, BUET)

0905 – Welcome Address to the participants from Met Office (Joseph Daron, UKMO)

0915 – Introduction to the course and Google classroom orientation (Jennifer Weeks, UKMO)

2 Participant introductions and “ice breaker” 0930-1000

0930 – Participant introductions and ice-breaker activity (Jennifer Weeks, UKMO)

1000 – Break

3 Global sea-level processes – past, present and future(s) 1015-1115

1015 – Science for sea-level change: Part 1 Global Sea-level rise (Matt Palmer, UKMO)

1115 – Break

4 Regional sea-level processes – 1130-1220

1130 – Science of sea-level change: Part 2: Regional sea-level rise (Ben Harrison, UKMO)

Exercise – Regional variations in sea-level change and uncertainties with projections on the web

1230 – END OF DAY 1

Day 2: Tuesday 24th November - Theme: How do we know about past changes and present trends?

5 Introduction to day 2 - 0900-0910

0900 – Introduction to topics and learning outcomes for day 1 (Ben Harrison, UKMO)

6 Tide gauge fundamentals - 0915-1000

0915 – Sea level observations I: SLR estimates from tide gauge records (Jennifer Weeks, UKMO)

1000 – **Break**

7 Tide gauge complexities -1015-1100

1015 – Sea level observations II: Challenges encounter when interpreting and explaining tide gauge results – Examples from South Asia location (Jennifer Weeks - UKMO and Saiful Islam, BUET)

1100 – Q & A

1115 – **Break**

8 Sea-level changes from space -1130-1220

1135 – SLR trends in Bay of Bengal using tide gauges and Satellite Altimetry (Saiful Islam, BUET)

1230 – END OF DAY 2

Day 3: Wednesday 25th November - Theme: What are the potential impacts of future SLR and how can sea level projections inform coastal risks management?

9 Introduction to day 3 -0900- 0910

0905 – Introduction to the aims of day 3 and themes for the discussion session (Ben Harrison, UKMO)

10 Sea-level projections for Bangladesh over 21st century and beyond, 0915- 1000

0915 –Regional to local sea-level change: Climate and non-climate processes (Ben Harrison, UKMO)

- *Exercise: Multiple choice questions on regional and Bangladesh sea-level change (Ben Harrison, UKMO)*

1000 – **Break**

11 *Application of sea-level projections – Examples from the UK Met Office 1015-1115*

1015 – *Recorded session on sea level projections and future extremes: Application of UKCP18 sea-level projections (Tom Howard, UKMO)*

1045 – *Discussion on application of sea level projections*

12 *Potential application of sea-level projections in Bangladesh 1115-1130*

1115 – *Future Met Office sea-level work in Bangladesh (Ben Harrison, UKMO)*

13 *Discussion of challenges, opportunities and next steps? 1130-1225*

1130 – *Panel discussion (Chaired by Joe Daron, UKMO)*

1220 - *Follow-up activities in Bangladesh and broader work in the ARRCC programme (Saiful Islam – BUET, Ben Harrison, Joe Daron, David Corbelli – UKMO)*

1230 – **Closing of the Workshop (Saiful Islam-BUET)**

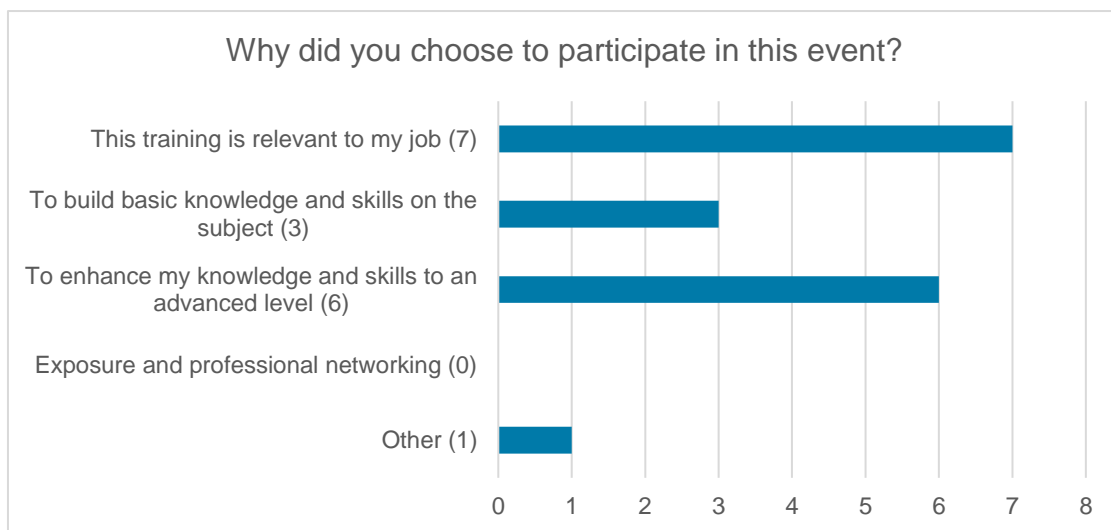
Annex 3 – Pre-workshop survey results

1. 17 out of 21 participants responded to the pre-workshop survey. All 17 participants said the event was communicated to them on time. For course attendance, there were three female participants compared to 18 male participants.

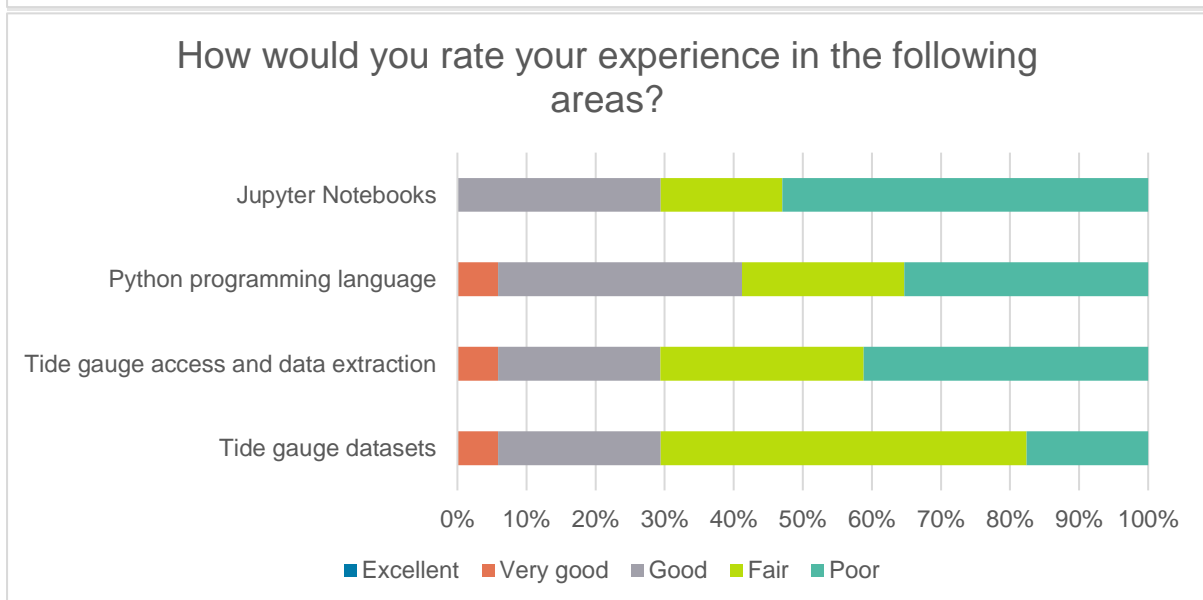
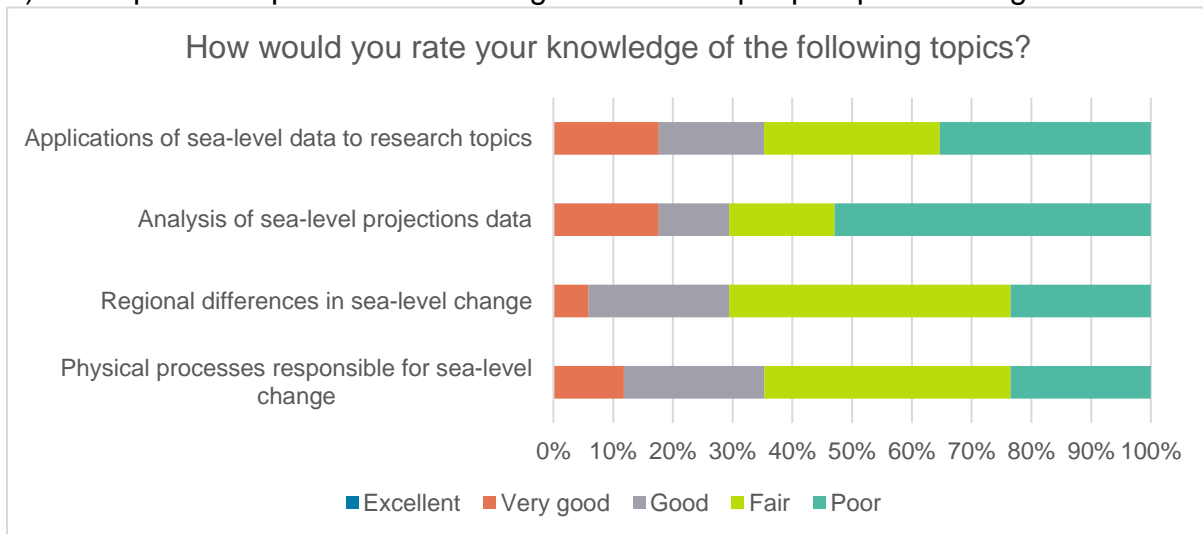
2. Organization and role (combined from both surveys)

Center for Environmental and Geographic Information Services (CEGIS)	Junior Specialist
Department of Environment	Assistant Director
IWM	Associate Specialist, Institute of Water Modelling; Junior Engineer
IWFM, BUET	Research Associate; Research Assistant; Senior Researcher; Lecturer (x2)
Local Government Engineering Department (LGED),	Hydrologist, Climate Change Expert; Climate Change Specialist
Bangladesh Agricultural Research Institute (BARI)	Planning and executing agro-geoinformatics and crop model based research - Senior Researcher
Flood Forecasting and Warning Centre, BWDB	Sub-Divisional Engineer; Assistant Engineer
University of Dhaka	Lecturer (Department of Meteorology); PhD (D2)
Kyushu University	PhD student

3. Questions to evaluate current understanding and knowledge:



b) Participants' response on knowledge on workshop topics pre- training



4. Participant expectations from the training:

Able to analyze the sea-level data and want to find out the Bangladesh sea-level projections.

I want to be an expert in this topic.

gain more knowledge and expertise in sea-level rise

I would like to acquire knowledge on the projection of sea level rise which will enable me to analyze impact assessment on crop production in future due to climate change.

build basic knowledge on the subject

Sea-level projection, point base storm surge forecasting and inundation in Bangladesh, climate scenario

I hope to learn new things from this training, and also hope that this training will benefit me in my researches.

I wanna know the causes, effects, remedies and application of sea-level rise science

5. Additional comments:

This is a very nice initiative for us. I wish you could manage more training for Bangladeshi students.

I have no expertise in Python. If it is possible how could I Expert in this topic data handling

Such type training can be arranged on impacts assessment of sea level rise.

looking forward to learn something new

Add practical session

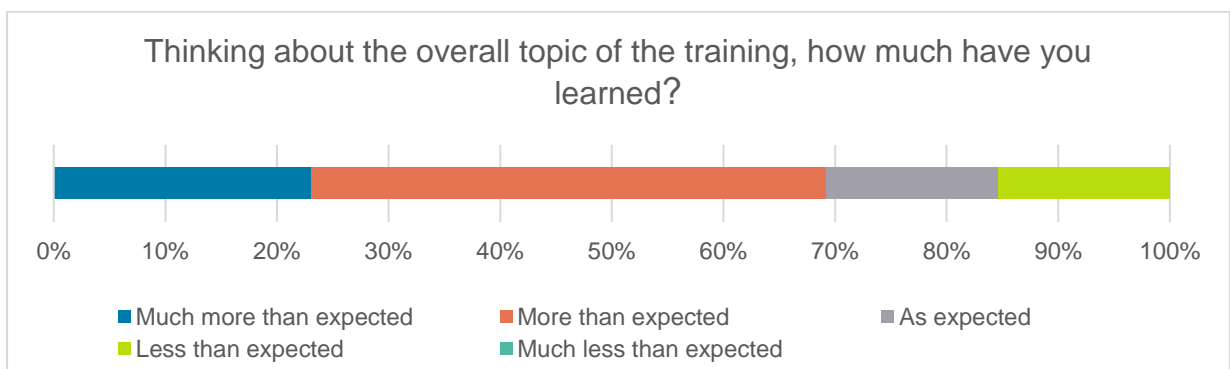
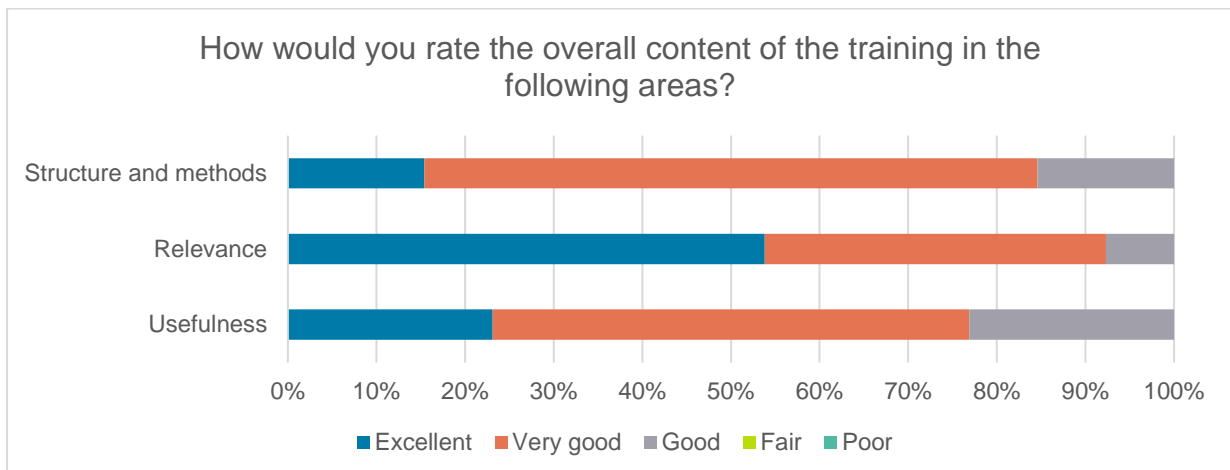
Can I get the training manuals in advance and also which software are required for this training?

Looking forward to attending the events

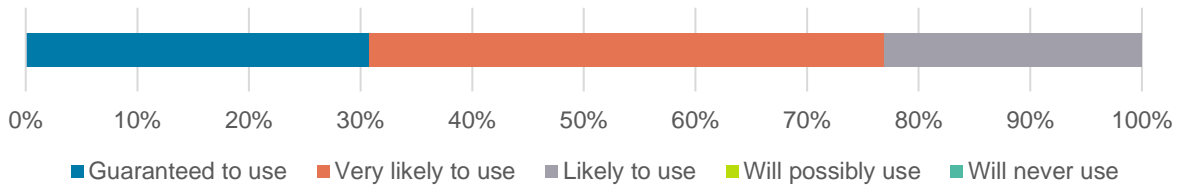
Annex 4 – Workshop evaluation survey results

1. 13 out of 21 participants responded to the post-workshop survey

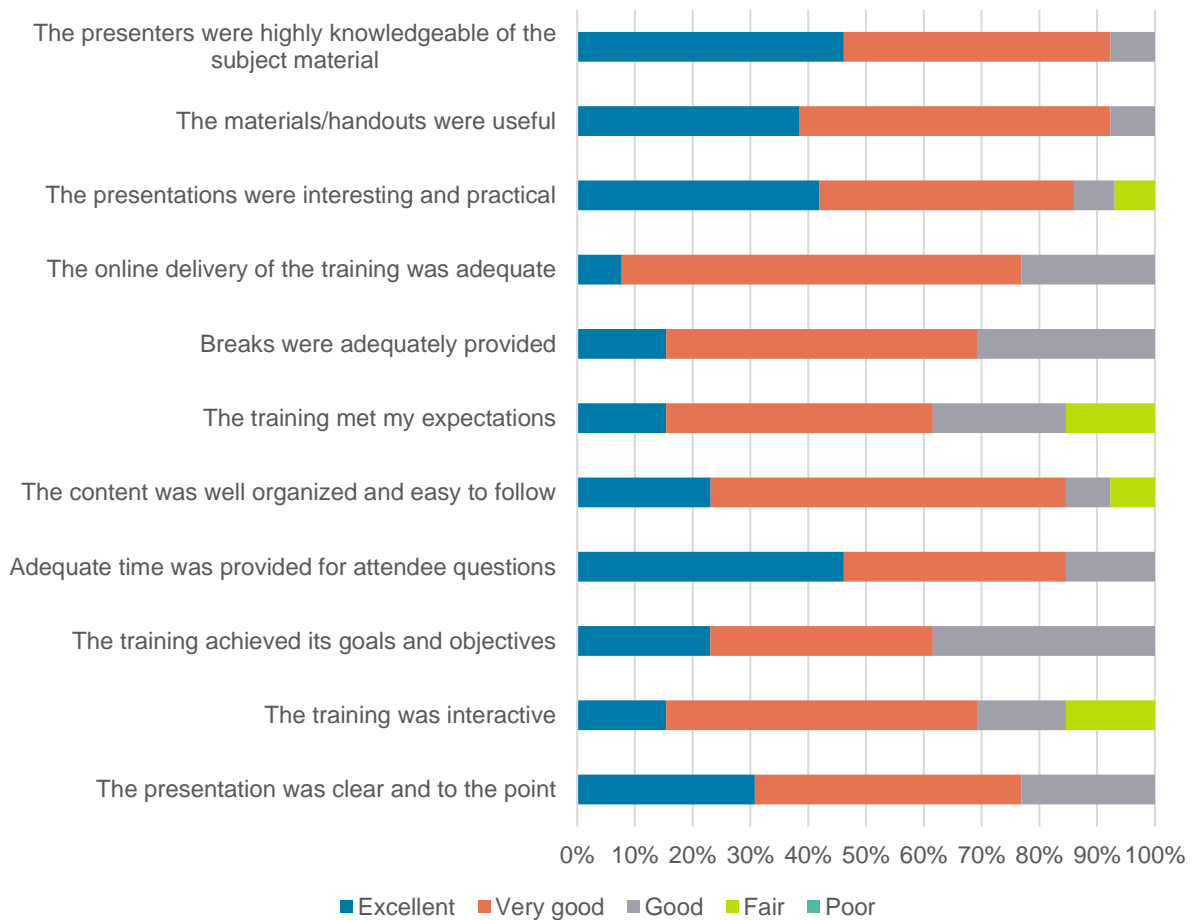
2. Questions to evaluate effectiveness of training and participants' learning:



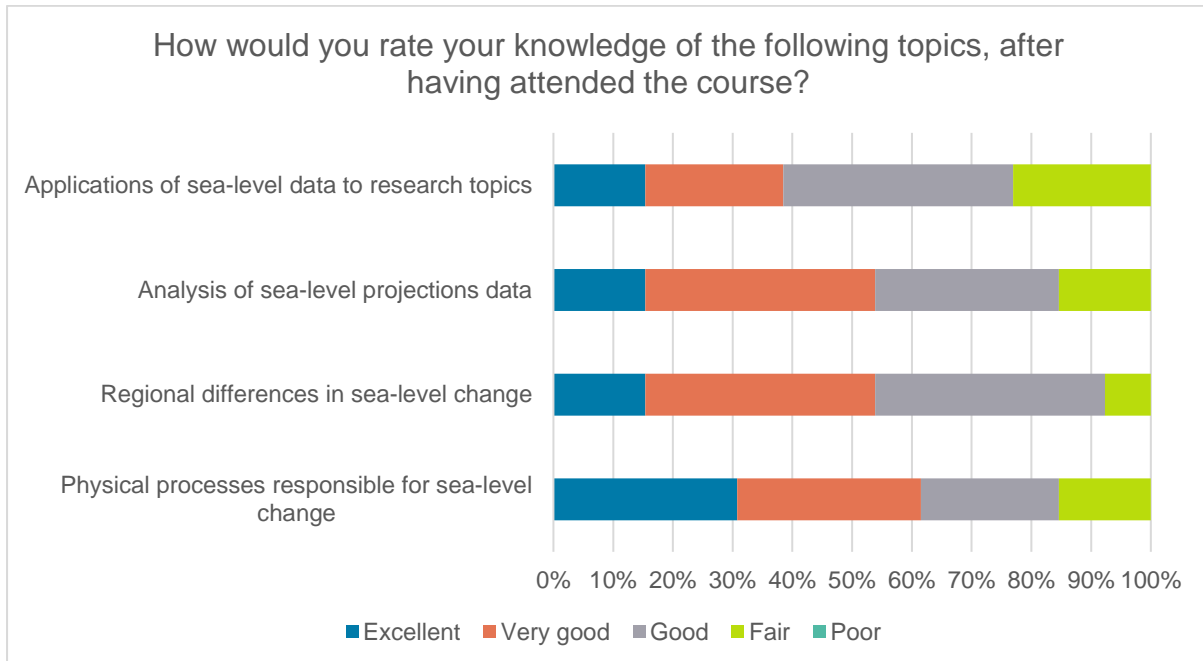
How likely are you to use the information or knowledge you gained in the training in your normal area of work?



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



3. Participants' response on knowledge on workshop topics post-training:



4. What further training would be useful for sea level science in your role?

Further training will very essential to proceed in advance level.

If you could provide more hands-on training on the use of Satellite data, analysis for SLR data, analysis for future projections, use of tools and techniques; it would be more beneficial for me.

sea surface temperature and fish migration/impact on ocean nutrition (food for fish), sea surface temperature -pressure and cyclone, storm surge

Data processing and analysis, projection methods, case studies etc.

Evidence based policy making

GBM delta development, Delta Plan 210

Practical training necessary.

Training on climate projection, wave modeling, climate risk mapping, hot-spot

analyzing various satellite data to use in sea level and climate variability using different languages.

5. Additional remarks from participants:

I would like to request for more hands-on training opportunity

I would like to participate in such trainings in future also. Please let me know all the details and I will do the rest. Thank You all for this nice and wonderful venture!

thank you so much for this initiative! even during COVID19

The training was very informative and useful. It was mainly focused on the overview of the physical processes involved in sea level rise and also the projections. But it would be perfect

if a more technical and hands on session is conducted including the data collection, processing and methodologies and also a few case studies. Looking forward to the future training sessions in this regard.

Need further training on SLR projections with increased the time and days.

I want to learn more about Delta Development GBM delta as well as all delta in the world.

Sea level rises is very important. So more & more research is must.

more hands on training

Thanks for hosting such an informative training. I hope to join again and learn in the future!

Annex 5 – Workshop Organisers

	Name	Organization
1	Professor A.K.M Saiful Islam	Institute of Water and Flood Management, Bangladesh University of Engineering and Technology (BUET)
2	Dr Matthew D. Palmer	United Kingdom Met Office (UKMO)
3	Dr Tom P. Howard	United Kingdom Met Office (UKMO)
4	Dr Joseph D. Daron	United Kingdom Met Office (UKMO)
5	Ms Jennifer H. Weeks	United Kingdom Met Office (UKMO)
6	Mr David Corbelli	United Kingdom Met Office (UKMO)
7	Mr Benjamin J. Harrison	United Kingdom Met Office (UKMO)