

Workshop Proceedings

Stakeholder-Driven Prioritisation of Adaptation Options, Adaptation Turning Points and Pathways for Extreme Events in Upper Ganga Basin

22 December 2016, Dehradun, Uttarakhand, India



Consortium members



About HI-AWARE

The Himalayan Adaptation, Water and Resilience (HI-AWARE) Research Consortium conducts research and pilot interventions, capacity building and policy engagement to enhance the climate resilience and adaptive capacity of poor and vulnerable people living in the mountains, hills and flood plains of the Indus, Upper Ganga, Gandaki and Teesta river basins in Pakistan, India, Nepal and Bangladesh.

HI-AWARE aims to influence policy and practice to aid the climate resilience and adaptation of poor and vulnerable populations in the region by generating evidence based knowledge on geophysical, socioeconomic, gender and governance drivers and conditions leading to climate vulnerability, as well as monitoring and assessing adaptation measures. It focuses on identifying 'critical moments' when communities are most vulnerable to climate risks, 'adaptation turning points' when existing adaptation strategies no longer work, and "adaptation pathways", sequences of policy actions that address both short-term responses to climate change and longer term planning. It looks at strengthening the expertise of researchers, students and science-practice-policy networks to conduct as well as use research on climate/ social vulnerabilities, resilience, and adaptation.

HI-AWARE comprises of five consortium members: The International Centre for Integrated Mountain Development (ICIMOD), the Bangladesh Centre for Advanced Studies (BCAS), Pakistan Agricultural Research Council (PARC), The Energy and Resources Institute (TERI)-India, and Wageningen University and Research Centre (Alterra-WUR).

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HI-AWARE internal Report

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22 December 2016, Dehradun, Uttarakhand, India

Organized by:

Himalayan Adaptation, Water and Resilience (HI-AWARE) Research, Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), The Energy and Resources Institute (TERI), Centre for Ecology Development and Research (CEDAR) and Wageningen University and Research

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Executive Statement

The Energy and Resources Institute (TERI) and Centre for Ecology, Development and Research (CEDAR) and Wageningen University and Research jointly organized a day-long Stakeholder Consultation Workshop titled “Stakeholder-Driven Prioritization, Adaptation Turning Points and Pathways in Upper Ganga Basin”. The workshop was held on 22nd December 2016 in Dehradun and brought together a diverse group of researchers, practitioners, students and scientists from different institutes.

The main objective of the workshop was to understand the potential adaptation options in response to extreme events such as floods, droughts and heavy precipitation etc.; develop stakeholder driven prioritization of proposed adaptation options; and identify adaptation turning points and pathways. The prioritization was done under various categories under which the options were clubbed. This included options that were technological, social, ecological, structural and financial. In view of the prioritized option, discussions followed on turning points in adaptation options in changing climatic scenarios in future wherein the frequency of extreme events is likely to increase with increase in precipitation and change in peak time of seasons.

Divided into two sessions, the workshop was initiated by Dr. Vishal Singh (CEDAR) who welcomed all the guests and shared the agenda for the day, which was followed by a presentation by Ms. Suruchi Badhwal (TERI). Ms. Bhadwal gave an overview about the HI-AVARE project, updated the participants about progress made in climate downscaling for Uttarakhand and highlighted the objective of the workshop.

In the second session, through a presentation, the risks imposed by climatic changes in different regions of the state especially the Upper Ganga Basin were discussed. Afterwards, a participatory exercise was conducted with participants for prioritization of potential adaptation options against the risks. The options were demarcated into different categories i.e. agricultural, structural, technological, social and ecological with stakeholders ranking the criteria also before prioritizing adaptation options. Post the exercise, all participants discussed the rationale behind scoring of each criterion and adaption options.

Post lunch, the final session proceeded with the stakeholders discussing whether the prioritized options would hold in situations of changing climatic scenarios in future wherein the frequency of extreme and abrupt events is likely to increase with increase in precipitation and change in peak time of seasons. The hypothesis being questioned therefore was whether the prioritized options would hold valid in future or would there be a need at a certain point in time to develop alternate options in order to replace the ones prioritized. Stakeholders drawing from their experience suggested that the selected adaptation options should have the potential to remain robust or feasible/ sustainable and economical in the future as well. The stakeholders emphasized on strengthening of adaptation options vis-à-vis data generation or technological up gradation in a continuous manner reasonably together with alternative options viable in changing scenarios in future.

The consultation concluded with Shri Jai Raj, IFS, Principal Chief Conservator of Forest (PCCF) expressing his views on differential responsibilities of NGO's, communities and government on building new developmental pathways. He also suggested of the contribution that communities can make to strengthen the adaptation process and help in compliance with rules and regulations.

Introduction

The stakeholders' consultation workshop on "Stakeholder-Driven Prioritization, Adaptation Turning Points and Pathways in Upper Ganga Basin" aimed to understand the potential adaptation options in response to extreme events such as floods, droughts and heavy precipitation keeping in mind the perspectives of different stakeholders in the basin.

The workshop facilitated the HI-AWARE research primarily in application of the 'Multi-Criteria Analysis' (MCA) methodology at state level in Uttarakhand (Upper Ganga Basin). The methodology and key findings will be part of activity 3.2.1 under Task 3.2 on identification and prioritization of important adaptation practices and approached by stakeholders. MCA is a decision support tool that simultaneously takes into account multiple evaluation criteria and allows comparison of qualitative and quantitative factors together in ranking alternative options. MCA has been widely applied to a number of environmental issues with having advantage of involving stakeholder participation in the decision making process at an early stage. It is especially valuable in circumstances where data is not always available and converting climate change impacts into economic terms is difficult.

The workshop engaged members of civil society, scientists and students/researchers in brainstorming to have a shared understanding on priorities on possible adaptation interventions and criteria to score them.

Event Highlights

The event was divided in to three sessions:

Session 1: HI-AWARE Introduction

The session was initiated by Dr. Vishal Singh (CEDAR) who welcomed all the guests and shared the agenda for the day, which was followed by a presentation by Ms. Suruchi Badhwal (TERI). Ms Bhadwal gave an overview about the HI-AWARE project and the areas being considered under this study. She also introduced the HI-AWARE consortium partners to the participants and also talked about the commitment of the project, which is to deliver strong output and have impacts in terms of policy and community practices, and hence the need for such strategic engagement processes. She updated the participants about the progress made in



climate downscaling for Uttarakhand and highlighted the objective of the workshop. She emphasised that given the past disaster events in the state, and future climate projections which indicate increase in the frequency of heavy precipitation events, it is crucial to plan ahead, which is what necessitated the need for such a discussion. She explained how the research aims at developing people centered, gender sensitive cases and evidences which provide various perspectives on climate change. She added that the project has a focus on adaptation actions with the intent to generate and evidence-base to support decision making and that it will involve the co-creation of knowledge with communities in different localities and find solutions for their problems. She then went ahead to describe the roles of TERI, ICIMOD and TMI within HI-AWARE and the scope of research and policy engagement in Uttarakhand.

Further in the session, there were also discussions and suggestions from the participants on strengthening student's expertise and capacity-building which also reaps benefits in the long-terms with student researchers playing an instrumental role in conducting fieldworks and enhancing the information-sharing process and playing role in reducing the vulnerability of households

Session 2: Prioritisation of Adaptation Options

This session was a participatory exercise on prioritization of proposed potential adaptation options against a list of criteria. The exercise started with a presentation by Neha Khandekar (TERI) sharing the list of risks imposed by climatic changes in different regions of the Uttarakhand state especially in the Upper Ganga Basin which is declared to be 'semi critical'. Following it there was a discussion the possible potential adaptation options which have been identified against the risks and demarcated into categories i.e. technological, ecological, social, financial instrument and structural (Table 1). The options were reviewed by the team beforehand to avoid repetitions and to ensure that the list includes all potential options. The options were selected through a literature review exercise that was conducted prior to the workshop including interventions from the field gathered during the participatory visits with the potential to be scaled up. Khandekar also briefed the participants with the steps/methodology for carrying out the MCA for prioritisation.



Table 1: List of adaptation options

Category	Potential options
Technological	<ul style="list-style-type: none"> • Early warning systems – ICTs, Mobiles • Tolerant crop varieties (floods, droughts, pests and diseases), short-duration rain-fed crops • Bio-engineering/Soil and water conservation – bunds and trenches, road construction technologies • Cold-storage and processing/ Post-harvest technologies • Resilient housing • Poly-houses
Ecological	<ul style="list-style-type: none"> • Afforestation/ Assisted re-generation • River regulation zones (protection of flood plains)
Social	<ul style="list-style-type: none"> • Public awareness generation programs – SOPs/ Evacuation, Disaster rescue relief committee/ Disaster preparedness • Vegetable kits/ fodder briquettes • Relocation from critical spots – people and support infrastructure • Fund development • Post-trauma treatment • Well-equipped shelters

Financial Instrument	<ul style="list-style-type: none"> • Life and infrastructure Insurance/ Crop insurance scheme/ Livestock insurance
Structural	<ul style="list-style-type: none"> • Compliance in case of development projects- road construction, hydropower development • Embankments • Diversion drains, creation of water cuts/ anicuts/ check walls • Dams – storage • Retro-fits of infrastructure

The next step included a discussion on the list of criteria identified for ranking of the adaptation options which were shortlisted from the available secondary literature with the aim of including the most important ones such that they are mutually exclusive from each other. The criteria presented were- Political Willingness, Feasibility, Urgency and Cost-effectiveness with brief explanation given for each criterion for clarity among participants (Table 2). The stakeholders were then distributed sheets to rank the criteria and score each criterion between 10-100, with score of 10-20 indicating a low score i.e. the criteria is considered to be less important when developing an adaptation option while a score of 90-100 implies that it is considered to be very important when deciding on an option. The purpose was to derive weights for each criterion before prioritization of adaptation options (Table 3).

Table 2: List of Criteria

Criteria	Explanation
Political Willingness	Political willingness will be linked to coherence of adaptation measures with the existing development goals (e.g. NAPCC)
Feasibility	Geographical, Technological, Social, Institutional: This looks at how feasible the implementation of a given adaptation option is in the current administrative, institutional and bio-physical contexts. It relates to the institutional and administrative complexities of realizing an option, and whether or not radical institutional changes and adjustments are required. How feasible is the proposed action given existing laws, regulations, policies and the political climate? How technically feasible is it? Is there an opportunity to adapt existing strategy/actions, or will entirely new initiatives be needed?
Urgency	Urgency of the adaptation intervention with respect to impending risk: What are the costs of delaying action? Is it likely to cost more to implement later rather than now? Will we lose species, resources, or options by delaying action? Are the consequences of not acting now irreversible?
Cost	Cost may be split into implementation and maintenance costs

Table 2: Scoring of Criteria

Criteria	Weight	10-20	30-40	50-60	70-80	90-100
Political Willingness	10/15	-	-	-	9	6
Feasibility	7/15	-	-	-	8	7
Urgency	1/15	-	1	2	8	4
Cost	5/15	-	2	4	6	3

Post the exercise, all participants discussed the rationale behind scoring of each criterion.

Discussions

Political Willingness was concluded to be the most important criteria since it was felt that government acts as fund mobilizer and are responsible for ensuring implementation. Individually all the criteria were deemed important however on a relative scale, political willingness was mentioned does override other criteria. In this context, participants reasoned that looking at the sustainability aspects of any intervention, political willingness will be required. This also holds good in case of replicability of an intervention, as it was mentioned that interventions can be initiated but its replication depends on political acceptance. According to the participants, there already exists numerous state and local level development plans but most of them falter in their implementation. There are examples of interventions being implemented in only selected sites owing to vested interests in implementing them and many of these lack scalability and sustainability in execution.

Feasibility was also deemed to be an important criterion by participants wherein social feasibility surfaced to be of more significance than technical and geographical feasibility. In highlighting the importance of geographical

feasibility, participants pointed out that because of adverse geographical conditions of certain locations, it becomes difficult to approach the area and employ technological solutions or provide support to the communities. Furthermore, institutional capacity needs on response measures and preparedness is needed to be strengthened in vulnerable locations so that timely action could be taken at the ground level.

There seemed to be unanimous agreement among stakeholders that geographical feasibility of a project should be taken into account when considering the interventions since each district in Uttarakhand has different geographical vulnerability which necessitates the fact that technology should be customised to a region.

However, participants from the Uttarakhand Meteorological Department favoured, technological feasibility over other criteria, since it was felt that in certain cases like construction of a dam etc., technology would play a vital role in guiding the intervention. In conclusion, on an overall basis social feasibility was felt to be the most important criteria as part of feasibility, since it works both ways, on one hand public acceptance provides support to an intervention during its implementation and on the other, lack of local participation can constrain the implementation of an action.



Costs constitute another criteria which may prove to be hindrance to the implementation of adaptation options if there are insufficient funds with the government or huge investment costs that are needed. Though some experts have scored it in the higher range of 70-80, it has got a relatively less score by many participants in comparison to other criterion.

Urgency was ranked lower on a relative scale by many of the participants as compared to the other criterion discussed above. Participants ranking urgency low stated that if political willingness and feasibility as an option exist, so there already is preparedness for an extreme event and urgency doesn't arise. In essence, measures shouldn't depend on occurrence of an extreme event rather there should be preparedness so that developing strategies doesn't arise out of urgency to take action. Those participants, who scored urgency high, reasoned that post disaster occurrence there is a need for measures to reduce the losses and contain the ill-effects of the hazard.

Post the discussion all criteria were again reviewed in terms of the weights for the purpose of cross validation so that a consensus can be formed. This was followed up by asking the participants to rank the adaptation options against the criterion discussed.

The following options were prioritized from the exercise:

- Early Warning Systems (ICT's, mobile)
- Public Awareness Generation Programs
- Retro-fits of Infrastructure
- Well Equipped Shelters
- Resilient Housing
- Post Trauma Treatment



Session 3: Adaptation Turning Points and Pathways

In view of the prioritized options, the purpose of this session was to discuss whether the given options would hold in situations of changing climatic scenarios in future wherein the frequency of extreme and abrupt events is likely to increase with increase in precipitation and change in peak time of seasons. The hypothesis being questioned, therefore, was whether the prioritized options would hold valid in future or would there be a need at a certain point in time to develop alternate options in order to replace the ones prioritized. If there is a possibility that the options might not be feasible in future, then what measures can potentially be taken up to ensure a resilient society? As explained by Ms. Suruchi Badhwal (TERI), the need for the discussion arises because of concepts such as tipping points, turning points in scientific literature wherein if a certain threshold or biophysical limit is crossed, there may be increase in the frequency of extremes such as floods. In such a case, certain options such as embankments may not be a feasible adaptation option and there will be a need to develop new options. Prof. Eddy Moors (Wageningen University and Research) elaborated the concept by asking the participants about "conditions under which a certain measure is not feasible anymore." If the frequency of floods increases with time, do prioritized adaptation options still work?

Discussions

The adaptation options prioritized are such that they have the potential to remain robust or feasible in the future. It is hard to pinpoint circumstances under which such options may not hold good and even if they do, abandoning options altogether may also not be feasible. However, the strengthening of those adaptation options vis-à-vis data

generation or technological up gradation may be possible and that will most likely be a continuous process. For example, **early warning system** as an option may remain feasible for multiple hazards; though the technology would need to be upgraded as new advancements are made and current systems become obsolete. It is likely that a combination of options such as **retrofitting of infrastructure**, resilient housing would be required along with EWS to help people plan for extreme events if they become more frequent. Given the suitability of early warning system as an option, Prof Eddy Moors asked the stakeholders if they were aware of any situation wherein people had to move from a particular location due of increased flooding and if yes, then could certain options be taken up including EWS.



The discussion saw participants share their knowledge and experience about cases wherein increase in the number of or intensity of extreme events has caused people to migrate temporarily and permanently in some cases. In this context, participants talked about how disasters force individuals to relocate temporarily if the frequency of disaster is low or rare but if the frequency of the flood increases, say twice or thrice a year, it coerces people residing near embankments to migrate. There was mention of similar experiences during 2013 Uttarakhand floods, when the damage to infrastructure and livelihoods was so enormous, that those who managed to survive moved to Dehradun or other towns in plain regions. There were also instances cited where in certain villages of Rudraprayag, the inhabitants are dependent on forest for their livelihood and despite hazards; people are not willing to relocate.

Drawing from their field experience, some participants suggested that options should be economical, sustainable and feasible. There should use of both traditional knowledge and technological advancements when developing adaptation options. Traditional early warning systems should also be encouraged like **low cost options such as bells, drum beats** which can be used at river banks for warnings at every 4-5kms. Further, **installation of micro meteorological stations** by the government at different sites has the potential to support early warning systems in disseminating information. Participants from IMD also advocated that certain early warning tools such as the **SMS service** are cost-effective; however, it can be improved with better information dissemination to public and by directly

connecting the people with the service. Thus, combining two approaches of top-down and bottom-up approach for information dissemination can be instrumental in reducing risks.

The discussions saw considerable emphasis on **public awareness systems**. There was agreement among all participants that it is crucial to impart knowledge at the community/village level and provide **skill training** to individuals to enhance their adaptive capacity so that at the time of rescue relief, people are prepared to deal with the situation. In reference to Post-trauma Centres, participants talked about the need to have **psychological care at schools** to help children deal with 'social trauma' since they are the most vulnerable and have a '**Train the Trainer**' program in place so that the skills of the personnel, in dealing with traumas, can also be enhanced. Talking about the loss of life during disasters, participants also spoke about the need to consider about animal welfare as well in such cases. Evacuation also includes rescuing of stranded animals and providing them feed/fodder since apart from ethical reasons, these animals also form livelihood of most people in the mountainous regions. Even though government has taken initiatives for same in the past, but the resources and equipment have to be augmented.

For **well-equipped shelters**, the site selection for shelters was mentioned to be up most important in this context as it can lead to loss of lives if the selection is improper. There exists number of buildings/British structures in Uttarakhand which have survived over the years. Such structures can be used as shelters during the disaster recovery phase. Again, this would be complemented with public awareness program so that individuals are aware of where the shelters are. As of now, most of the shelters which exist lack proper medical and sanitation facilities. It needs to be ensured that these shelters are safe and are equipped with other essential facilities.

Discussion regarding clear demarcation of turning points and its pathways was broad and could not clearly define the stakeholders views about the various ways that could be explored. But it was concluded that whether the adaptation options hold valid in the future will depend on the types of vulnerability experienced in affected regions, socio-economic conditions of individuals and communities and on the types of options that are available in future. Participants also pointed out that a good pool of resources already exist but there is no convergence between different schemes and **integration of different plans and resources is** urgently required.

Concluding Remarks

After listening to the discussions of the session, Mr. Jai Raj, IFS, Principal Chief Conservator of Forest (PCCF), Uttarakhand concluded by presenting his viewpoint on the issue of climate change and adaptation. He spoke about the different responsibilities that the state government deals with and the need for the NGO's, communities and government to work together in coherence. To build new developmental pathways, communities also have to step forward to strengthen the adaptation process and help in compliance with rules and regulations. Alongside, it is imperative that there should be synergy and coordination among different state departments.

Closing Session



The workshop was concluded by Ms. Suruchi Badhwal (TERI) by stating that given limited resources and the proposed options, efforts should be focused on developing a model for prioritisation of actions wherein both community and government interests can be addressed. She mentioned that stakeholders such as NGO's and communities need to work together with the government rather than the government alone being in-charge. She also stressed on the convergence between top-down and bottom-up approaches combining both community experience and scientific knowledge which is expected to play a key role in development and implementation of adaptation options.

Ms Bhadwal thanked the gathering and the guests for their time and inputs and reiterated that HI-AWARE is not just a project but an initiative that seeks to engage stakeholders in the decision making process and therefore expressed an interest by the team looking forward for strengthening the engagement process with stakeholders in the region to help achieve the desired outputs.

Annexures

Annex 1: Agenda of the workshop

Stakeholder-Driven Prioritization, Adaptation Turning Points and Pathways for Extreme Events in Upper Ganga Basin

December 22, 2016 | 1000 to 1730 hours

Venue: Hotel Madhuban, Rajpur Road, Dehradun, Uttarakhand

Session 1: Introductory			
10:00 - 10:10am	Welcome	Dr Vishal Singh	CEDAR
10:10 - 10:30am	HI-AWARE Introduction	Ms Suruchi Bhadwal	TERI
10:30 - 10:45am	Tea Break		
Session 2: Prioritisation of Adaptation Options			
10:45 - 11:00am	Presentation on the procedure for prioritisation: Ms Neha Khandekar		
11:00 - 13:00pm	Prioritisation of select options		
	Facilitators		
	Ms Neha Bharti and Mr. Ganesh Gorti, TERI Ms Ishani Sachdeva and Mr Prateek Sengupta, CEDAR		
13 00 - 14:00pm	Lunch		
Session 3: Adaptation Turning Points			
14:00 - 15:30pm	Open House Discussion on Adaptation Turning Points Moderator: Ms Suruchi Bhadwal, TERI		
15:00 - 15:30pm	High Tea		
Session 4: Adaptation Pathways			
1530 -1730 pm	Chair and Session Opening remarks: Mr Jai Raj, IFS, PCCF		
	Open House Discussion with Experts on Policy Instruments to be considered in light of the Turning Points Moderator: Dr Eddy Moors, Wageningen University and Research		
	Summing up and Way forward: Ms Suruchi Bhadwal, TERI and Dr Vishal Singh, CEDAR		
1730 – 1800 pm	Tea		



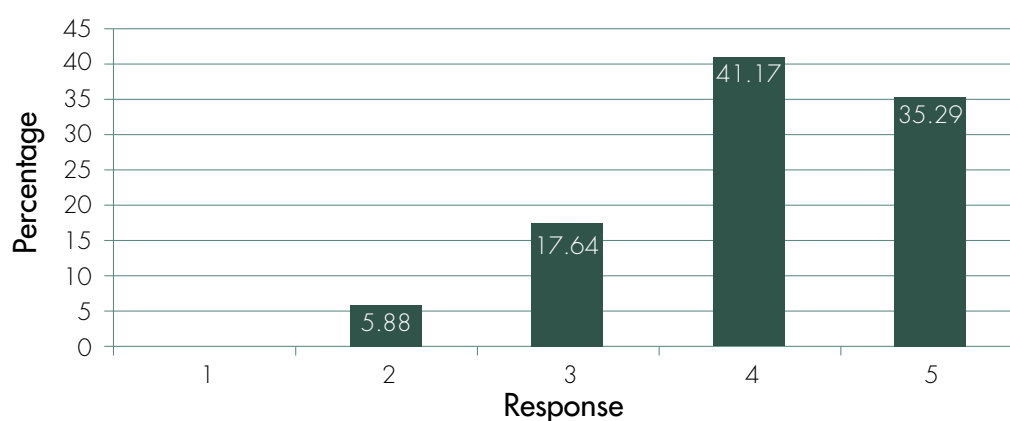
Annex 2: Engagement Statistics

Participants											
Disaggregated by gender			Disaggregated by affiliation					Disaggregated by location			
Male	Female	Total	Resear- chers	Policy makers	Practiti- oners	Govt. Offi- cials	Media	Intern- ational	Re- gional	Na- tional	District /Local
11	5	16	4	0	9	3	0	0	8	2	6

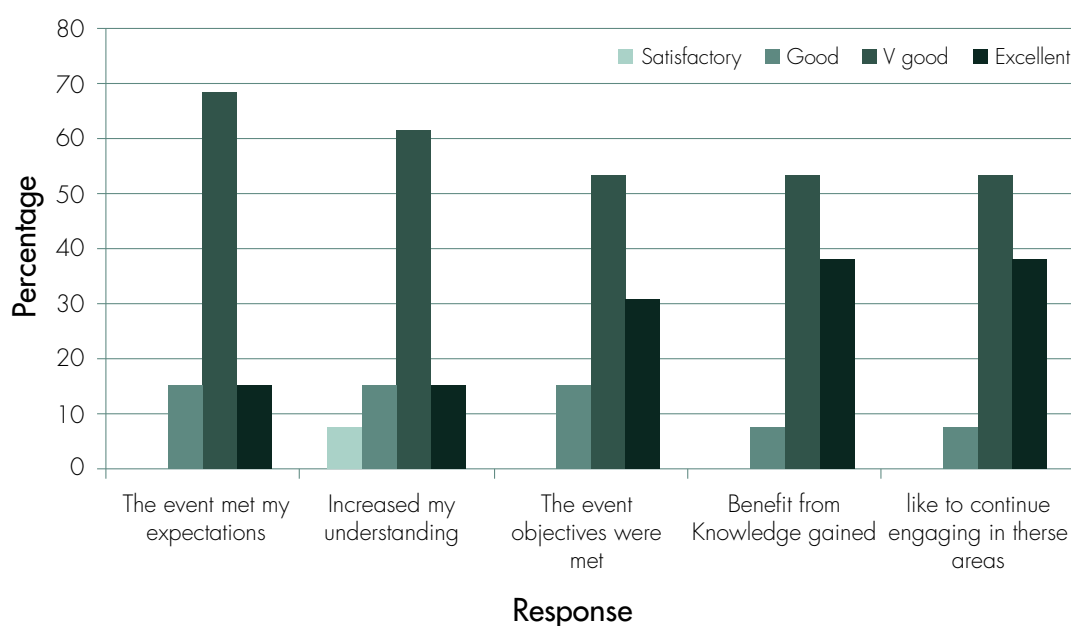
Annex 3: Engagement Evaluation

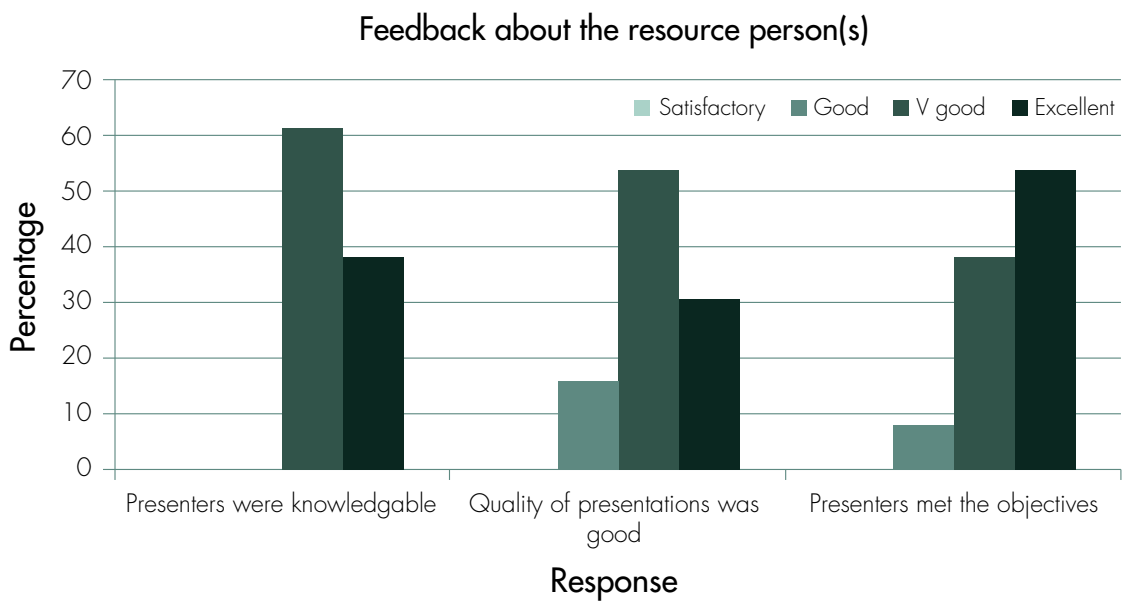
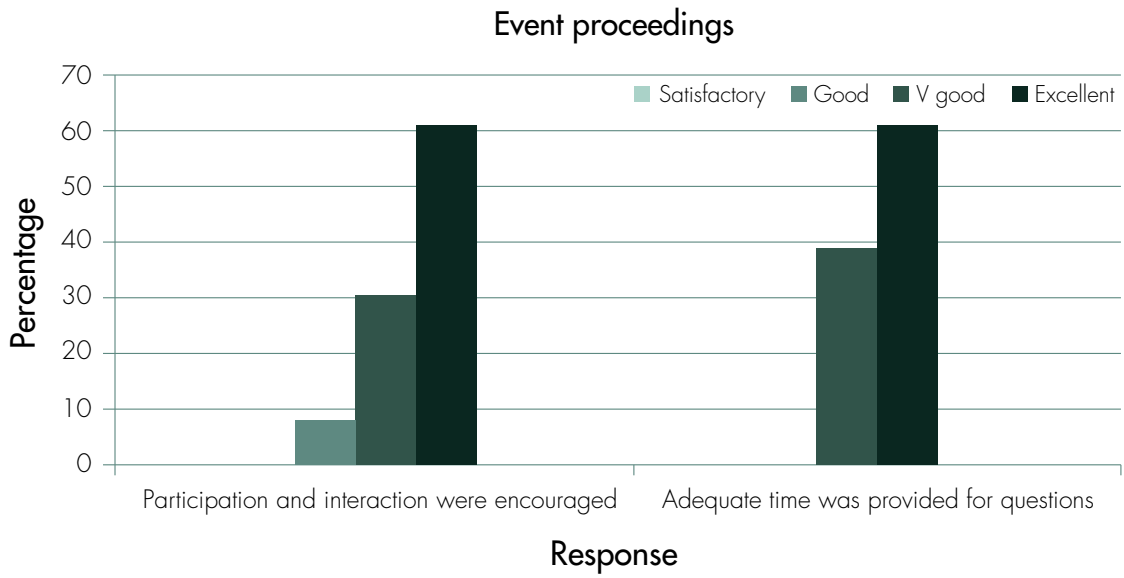
The overall feedback received from the participants was very good and most of them found the workshop beneficial in terms of knowledge exchange. Figures below summarise the results of event evaluation by the participants.

How relevant is the event to your work (on an increasing scale of 1 to 5)?



About the Event





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