COMMUNICATING EXTREME WEATHER EVENT ATTRIBUTION

Research from India and Kenya
Executive summary

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PRACTICAL ACTION
Consulting

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Introduction

Climate change attribution analysis assesses the likelihood that a particular extreme weather event has been made more or less likely as a result of anthropogenic climate change. Communication of extreme event attribution information in the immediate aftermath of an extreme event provides a window of opportunity to inform, educate, and affect a change in attitude or behaviour in order to mitigate or prepare for climate change. Timely access to this information can help decision makers ensure that appropriate adaptation and investment decisions are prioritised.

Effective communication of climate change attribution information is critical to ensuring decision makers at all levels understand and are able to act upon such information. In early 2017 this research project examined the most effective methods, phrases and tools for communicating climate change attribution information, considering comprehension, ease of understanding, and willingness to take action across a range of different actors in two countries: Kenya and India.

This research project will help examine and provide guidance on how to best communicate attribution information to high-level decision makers, the media, and the general public subsequent to an extreme weather event, including the immediate aftermath.

The research explores three key issues:

1. effective phrasing of attribution information
2. appropriate visual communication of attribution information
3. trusted sources and channels to communicate information

Data was collected from national, high-level decision makers, national and local media, and public stakeholders in Bihar and Uttar Pradesh, India and Kwale and Turkana, Kenya. The table below shows the sources of primary data, indicating numbers of participants within each user group.

Country	Kenya			India		
User Group	High-level decisión makers	Media	Public	High-level decision makers	Media	Public
Men	20	4	53	32	10	66
Woman	4	5	47	8	0	34
Total	24	9	100	40	10	100

Photographer: Knud Falk/ Climate Centre

Photographer: Tamara Leigh/IFRC-Climate Centre

Recommendations

Analysis of the quantitative and qualitative data enables some recommendations to be drawn. These recommendations are consolidated into guidance on phrases that are most likely to be understood for each stakeholder group (see Annex).

1 Probability

In Kenya, high-level decision maker and media participants prefer percentage information. The term '*chance*' is preferred in general and is used by the Ministry of Environment and Natural Resources within Kenya to communicate probability information. For those participants with a scientific background, *'probability'* was preferred due to familiarity.

In Kenya, the public found the concept of probability very difficult to understand. Information on frequency was easier for this group to understand. It is recommended that probabilistic information is not communicated to this group. It is also recommended that statistical information is not communicated to this group of stakeholders, based on their own requests and lack of understanding.

In India, high-level decision makers showed preference for '*probability*' and use of percentages. They did not find there to be much difference between the terms *'probability'*, *'likelihood'*, and *'chance'*.

In India, media participants showed a preference for the term *'chance'* and for percentage information. However, there was a broad range of responses for these statements, which is likely linked to the knowledge background of each participant.

In India, the responses from the public participants were unclear, showing a range of preferences. There was understanding of the concept of probability, but some difficulty understanding the difference between the terms *'probability'*, *'likelihood'*, and *'chance'*. The term *'chance'* was preferred overall.

Photographer: Knud Falk/ Climate Centre

2 Frequency

In Kenya, high-level decision makers understood the statement on *'return time'*, but found this option difficult. Both high-level decision maker and media participants preferred the statement using the phrase *'twice as often'*. The use of '*lifetime'* was heavily criticised because a lifetime varies between people, with poorer people having a much shorter lifespan.

In Kenya, the public exhibited a range of responses, with some confusion over the measure of increase. It is suggested that the statement is simplified to *'drought occurs more often because of climate change'*.

In India, there was a range of responses from high-level decision makers. Phrases such as *'factor of two'* and *'twice as often'* were considered difficult to understand. Some preferred the *'return time'* information, which is likely due to their scientific background. Media participants preferred statements on *'return time'* and *'double the frequency'*, but further investigation is needed due to the low response rates for this stakeholder group.

In India, there was a range of responses from the pubic; the statement on *'frequency... twice in a lifetime'* was considered the easiest to understand. There was general difficulty understanding *'frequency'*, due partly to difficulty translating this term into Hindi. It is recommended that probability information presented using the term *'chance'* may be preferable for this stakeholder group.

3 Intensity

In Kenya, both high-level decision maker and media participants preferred the term *'severity'*. The term '*strength*' was disliked for describing drought. Public participants preferred the term *'worse'*; this may be due to translation difficulties for other terms. It is also recommended that statistical information should not be communicated to public stakeholders in Kenya.

In India, high-level decision maker and media participants showed preference for *'severity'* or '*intensity*', but requested further clarification of the measurement used. Public participant responses were very evenly spread across statements, with *'strength'* and *'worse'* marginally preferred.

4 Uncertainty

Participants in Kenya and India preferred statement 3 *'increased the chances... by a range of 30-50%, best estimates are approximately 40%'* and statement 4 *'Scientists are fairly certain that climate change increased the chances of the current drought heat wave by 40%'*. Amongst the Kenyan public there was a clear preference for *'fairly certain'* over numerical uncertainty statistics. The degree to which participants understood the information on uncertainty varied with their background knowledge. It is suggested that for the majority of participants, uncertainty information is confusing and unnecessary, and therefore should be excluded. The

media and public groups in general had difficulty with uncertainty information.

High-level decision makers with statistical backgrounds or working within climate science preferred statement 1 *'Climate change increased the chances of the 2016 Rajasthan heat wave by 40% (+/- 10%)'* because it contains the purest information. It is suggested that the uncertainty information could be made available to those who wish to know more.

5 Single statement A

'Results were inconclusive and evidence for a link to climate change cannot be made at this time'.

From the results, it is advised that care needs to be taken with communicating this statement as there is room for misinterpretation.

In Kenya, high-level decision makers were divided between those who preferred the original statement or a simplified version. There is a need for further division of this stakeholder group into sub-groups. The media and public showed clear preference for the simpler statement *'Scientists were not able to conclude whether climate change affected this extreme weather event'.* In India, all participants showed preference for the simpler statement.

6 Single statement B

'Climate change did not affect the chances of this extreme weather event'.

This statement was found, in general, to be easily and correctly understood by all participants and countries. It is recommended to rephrase the statement in order to improve the clarity and grammar of the sentence: *'Climate change did not have any effect on the chances of this extreme weather event occurring'*, however, this should be tested before being used.

7 Single statement C

'This extreme weather event was not as bad as we expected given how climate change is affecting this region'

It is suggested that if this statement is used, it needs to be accompanied by more information on the predicted regional trends. There was consensus across all stakeholder groups and countries that a simpler statement '*This extreme weather event was not as bad as we expected given how climate change is affecting this region*' is easier to understand.

8 Visuals

The public showed a preference for visuals containing photographs. The public was less interested in statements and statistical information. It is recommended that communication of this information should focus on severity, not probability, as this is easier for all stakeholder groups, particularly the public. Use of pictures for a 'before' and 'after' comparison was recommended by several participants, using photographs specific to each location. However, this recommendation should be treated with caution and tested before use.

Infographic representations of climate change need to be easily understood and connected to climate change. Collaboration with designers and communicators within a specific country is recommended to develop an appropriate visual depiction of climate change, particularly focusing on the effects of climate change, such as on livelihoods.

For all visuals, confidence levels should be omitted. This information only confuses people, or is ignored.

High-level decision makers preferred the visual with a graph representing a before and after increase in frequency of droughts. However, this visual may need to be altered by providing more scientific representation of the information, such as labelling the axes, labelling the peaks, colour coding the peaks, or providing a key or label to identify what the peaks represent.

The visuals representing changes in probability, intensity, and frequency information via a series of before and after infographics were found to contain too much information and were overwhelming. It is recommended that they are broken up to provide separate infographics on probability, intensity, and frequency. The visual representations of these terms (such as dice and eggs to represent probability) were not well understood.

It is suggested that focus groups and specialist designers within each country are needed to further investigate visual communication of extreme event attribution information, particularly designing with people who are illiterate.

9 Trust

There is a need to work with the main trusted sources of information for each stakeholder group to co-develop a communication strategy. It is recommended that extreme event attribution scientists work with the national meteorological department, and in-country communication specialists to develop a communication strategy and disseminate information.

Conclusion

The information required to communicate extreme event attribution analysis is extremely complex. It is noted that the phrases presented in this report will need to be accompanied by further information on extreme event attribution during communication. In addition, further education and resources are needed at all stakeholder levels to increase understanding and awareness of extreme event attribution and climate change more broadly. These resources need to be tailored to the needs of the end user, and should be created in collaboration with them, taking into account their needs, levels of knowledge, and language requirements. This includes developing non-text communication and educational material with in-country communication specialists.

The recommendations for extreme event attribution communication in this report are guidelines. Even within stakeholder groups in this research study, there is variation in individual understanding and preferences for phrasing of extreme event attribution information. Further investigation into differences within stakeholder groups is recommended, particularly within the high-level decision maker group, who's views were quite diverse. Communicating in local languages requires further investigation; this will require working with native speakers to establish terms and phrases that are understood within the local context, rather than translating from English to a secondary language.

Whilst the communication of extreme event attribution information is complex and requires further investigation, it should be noted that there is a high-level of interest in this information across all stakeholders. Overall, there were positive responses from all participants wishing to know more about extreme event attribution information; 41% of participants responded 'definitely yes' when asked if they wanted to know more; 66% of Kenya high-level decision makers and public participants responded that they definitely did want to know more.

All stakeholders expressed high interest in both climate change and extreme events. The majority of participants were aware that climate change is occurring and resulting in more severe and frequent extreme weather events. They are worried about the effects, and wish to know more about ways to mitigate against the effects of climate change. There was a clear expression of interest in extreme event attribution information across all stakeholders in Kenya and India, and many participants indicated they wished to know more.

Photographer: Nancy Okwengu/IFRC-Climate Centre

Annex: Paired statements

This table provides a guide on recommended phrases for each stakeholder group, for different scientific information on extreme event attribution. These recommendations are based on both qualitative and quantitative results from the study. It must be remembered that there was a range of responses, understanding, and preference for phrases, terms and statistical information from within each stakeholder group. Therefore, this guidance should be used with caution.

Scientific statement: Probability		Anthropogenically-induced climate change resulted in an increase in the probability of event X by a factor of X.
Kenya	High-level decision makers	Climate change increased the probability of the current drought by 40%.
		OR
		Climate change increased the chances of the current drought by 40%.
	Media	Climate change increased the chances of the current drought by 40%.
	Public	*Use frequency information instead of probability information.*
India	High-level decision makers	Climate change increased the probability of the 2016 Rajasthan heatwave by 40%.
	Media	Climate change increased the chances of the 2016 Rajasthan heatwave by 40%.
	Public	Climate change increased the chances of the 2016 Rajasthan heatwave by 40%.

Scientific statement: Frequency		Human-induced climate change increased the risk of the event to be exceeded in the location from a X in X year event to a X in X year event.
Kenya	High-level decision makers	Climate change has increased the return time of droughts, like the current Kenya drought, from a 1 in 20-30 year event to a 1 in 7-10 year event.
		OR
		Droughts, like the current Kenya drought, now occur twice as often due to climate change.
	Media	Droughts, like the current Kenya drought, now occur twice as often due to climate change.
	Public	Droughts, like the current Kenya drought, now occur more often due to climate change.
India	High-level decision makers	Climate change has increased the return time of extreme heat events, like the 2016 Rajasthan heat wave, from a 1 in 20-30 year event to a 1 in 7-10 year event.
		OR
		Climate change has increased the frequency of extreme heat events, like the Rajasthan heatwave, so that events that used to happen about twice in a lifetime now occur about 4 times in a lifetime.
		OR
		Climate change has doubled the frequency of extreme heat waves, like the 2016 Rajasthan heat wave.
	Media	Climate change has increased the return time of extreme heat events, like the 2016 Rajasthan heat wave, from a 1 in 20-30 year event to a 1 in 7-10 year event.
		OR
		Climate change has doubled the frequency of extreme heat waves, like the 2016 Rajasthan heat wave.
	Puplic	Climate change has increased the frequency of extreme heat events, like the Rajasthan heatwave, so that events that used to happen about twice in a lifetime now occur about 4 times in a lifetime.
		OR
		Use probability information instead of frequency information.

Scientific statement: Intensity		Anthropogenically-induced climate change resulted in an increase in intensity of event X by a factor of X.
Kenya	High-level decision makers	Climate change increased the severity of the current Kenya drought by approximately 20%.
	Media	Climate change increased the severity of the current Kenya drought by approximately 20%.
	Public	Climate change made the current Kenya drought worse.
India	High-level decision makers	Climate change increased the intensity of the 2016 Rajasthan heat wave by approximately 10%.
		OR
		Climate change increased the severity of the 2016 Rajasthan heat wave by approximately 10%.
	Media	Climate change increased the intensity of the 2016 Rajasthan heat wave by approximately 10%.
		OR
		Climate change increased the severity of the 2016 Rajasthan heat wave by approximately 10%.
	Public	Climate change increased the strength of the 2016 Rajasthan heat wave by approximately 10%.
		OR
		Climate change made the 2016 Rajasthan heat wave 10% worse.

Scientific statement: Uncertainty		Anthropogenically-induced climate change increased the probability of extreme event X by X (+/-X%).
Kenya	High-level decision makers	*Provide uncertainty information as a follow up.*
	Media	*Provide uncertainty information as a follow up.*
	Public	*Do not provide uncertainty information.*
India	High-level decision makers	Climate change increased the chances of the current Kenya drought by a range of 30-50%, best estimates are approximately 40%.
	Media	*Provide uncertainty information as a follow up.*
	Public	*Provide uncertainty information as a follow up.*

Scientific statement: A		Results were inconclusive and no attribution statement can be made at this time.
Kenya	High-level decision makers	Results were inconclusive and evidence for a link to climate change cannot be made at this time.
		OR
		Scientists were not able to conclude whether climate change affected this extreme weather event.
	Media	Scientists were not able to conclude whether climate change affected this extreme weather event.
	Public	Scientists were not able to conclude whether climate change affected this extreme weather event.
India	High-level decision makers	Scientists were not able to conclude whether climate change affected this extreme weather event.
	Media	Scientists were not able to conclude whether climate change affected this extreme weather event.
	Public	Scientists were not able to conclude whether climate change affected this extreme weather event.

Scientific statement: B		Comparing the ensemble models, we find a nonsignificant change in the likelihood of extreme event X with a return time of X years due to anthropogenic emissions.
Kenya	High-level decision makers	Climate change did not affect the chances of this extreme weather event.
	Media	Climate change did not affect the chances of this extreme weather event.
	Public	Climate change did not affect the chances of this extreme weather event.
India	High-level decision makers	Climate change did not affect the chances of this extreme weather event.
	Media	Climate change did not affect the chances of this extreme weather event.
	Public	Climate change did not affect the chances of this extreme weather event.

Scientific statement: C		This extreme weather event was not as severe as expected, when compared to predicted regional climate change trends.
Kenya	High-level decision makers	This extreme weather event was not as bad as we expected given how climate change is affecting this region.
	Media	This extreme weather event was not as bad as we expected given how climate change is affecting this region.
	Public	This extreme weather event was not as bad as we expected given how climate change is affecting this region.
India	High-level decision makers	This extreme weather event was not as bad as we expected given how climate change is affecting this region.
	Media	This extreme weather event was not as bad as we expected given how climate change is affecting this region.
	Public	This extreme weather event was not as bad as we expected given how climate change is affecting this region.

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