

# Climate information for the hydropower sector in Nepal

## Motivation

Hydropower is crucial to Nepal's energy system, generating 90% of power, with further expansion planned for the future<sup>1</sup>. The hydropower sector in Nepal is at risk from high flow events and flooding linked to extreme rainfall.

The aim of this project is to work with local stakeholders to address the need for relevant and reliable climate information. This will help to guide adaptation planning and investment decisions in the hydropower sector to help achieve climate resilience.



Construction of the Upper Marsyangdi Hydroelectric Station.

## Quantifying risk of current and future extreme rainfall events

### Current climate risk

Observed precipitation extremes do not paint a full picture of what could plausibly happen in our current climate<sup>2,3</sup>. Combining the observational record with new weather and climate forecast models enables us to explore a greater range of unseen possibilities.

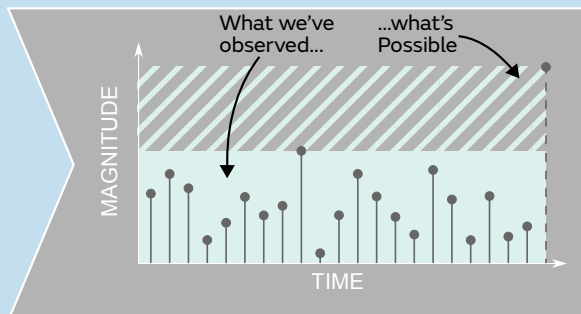
In the current climate, there is a higher risk of unprecedented extreme rainfall than we would expect from looking at observation records on their own. This is especially true where observations records are incomplete or only extend a few decades into the past.

### Future climate risk

Temperatures are increasing and rainfall patterns are changing as a result of climate change. Climate model projections indicate that precipitation extremes could become more intense and may be more frequent<sup>4</sup>.

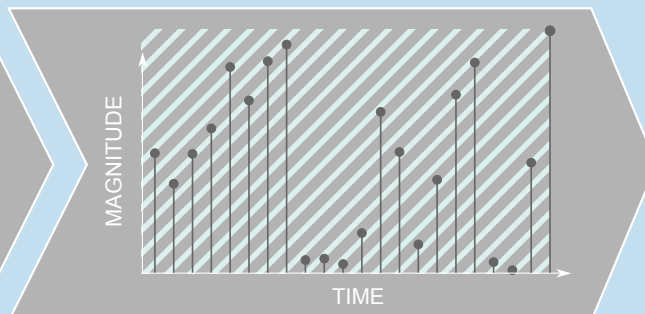
This would mean that a precipitation event that is considered extreme in the current climate is likely to be more common in the future, and extreme events in the future will likely be more extreme than those we experience now.

#### CURRENT CLIMATE (1981 – 2010)



Combining observations with climate models simulates extreme rainfall events that haven't been recorded yet but could plausibly occur.

#### FUTURE CLIMATE (2041 – 2070)



Future precipitation extremes may be more frequent and more intense compared to the current climate.

We are quantifying the risk of extreme rainfall events in Nepal, both in the current and future climate. We can only understand the potential impacts of these extreme events by **working with industry and policy makers to understand the vulnerability of the hydropower infrastructure** to these hazards.

### Consider the following questions:

- What weather and climate hazards are you vulnerable to?
- What would be the worst-case scenario if there was an extreme rainfall event which caused flooding?
- How are weather and climate data currently incorporated into your decision-making process?

### Next steps:

We would like to work with you to understand what weather and climate information could be provided to make the hydropower sector in Nepal able to withstand variation in the current and future climate. Please get in touch with us for more information: [ARRCC@metoffice.gov.uk](mailto:ARRCC@metoffice.gov.uk)

### References:

1. [bit.ly/USAIDNepal](https://bit.ly/USAIDNepal); 2. [bit.ly/Thompsona17](https://bit.ly/Thompsona17); 3. [bit.ly/Thompson19a](https://bit.ly/Thompson19a); 4. [bit.ly/3sLEv7m](https://bit.ly/3sLEv7m).