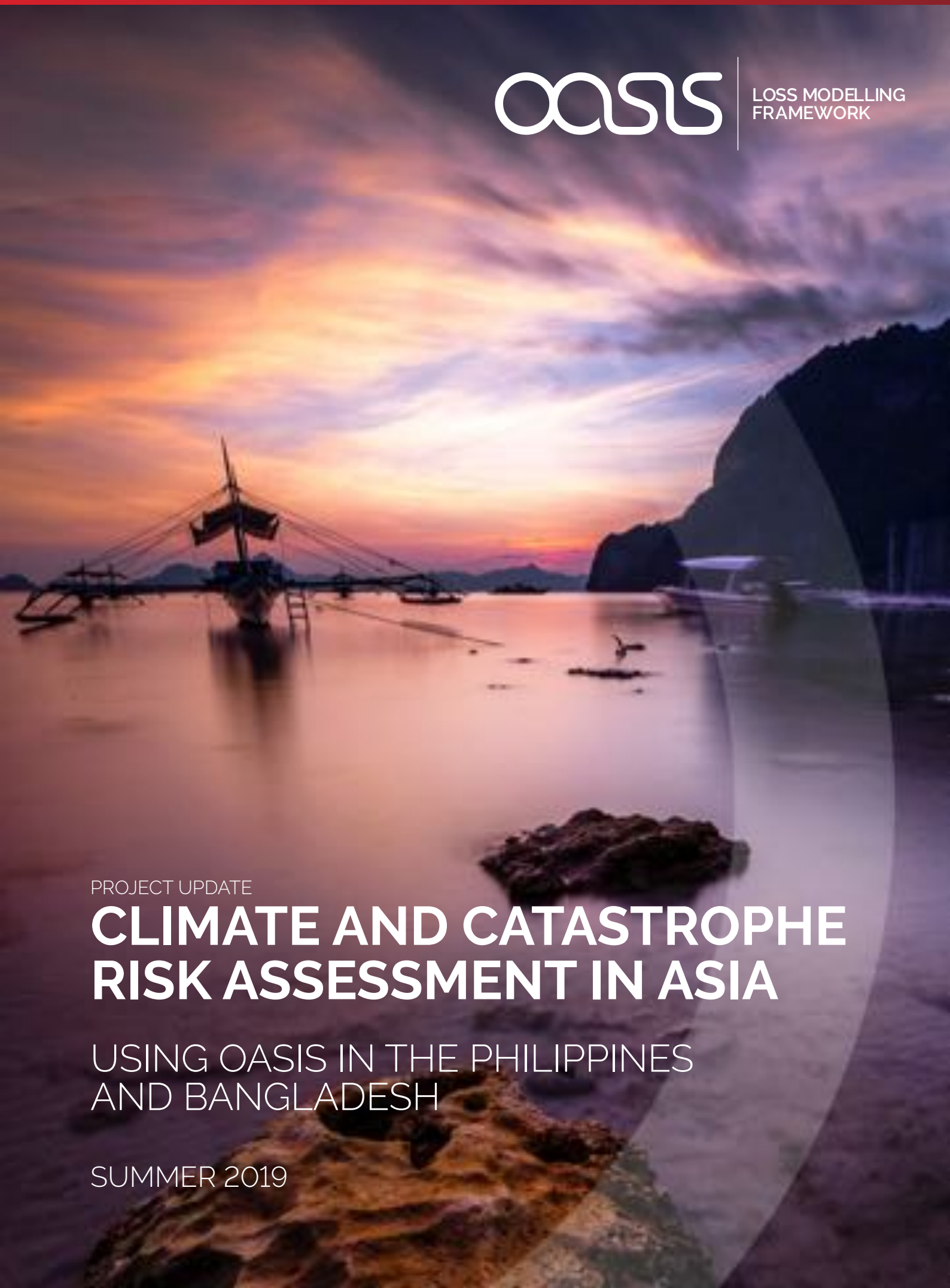


LOSS MODELLING FRAMEWORK

PROJECT UPDATE

CLIMATE AND CATASTROPHE RISK ASSESSMENT IN ASIA

USING OASIS IN THE PHILIPPINES AND BANGLADESH

SUMMER 2019

CLIMATE AND CATASTROPHE RISK ASSESSMENT IN ASIA

USING OASIS IN THE PHILIPPINES AND BANGLADESH

In June 2018 Oasis LMF was awarded funding by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) for a multi-national collaboration to improve climate and catastrophe risk resilience in the Philippines and Bangladesh. The project will last until June 2020 to co-develop open-access risk models for cyclone and flooding on the open-source Oasis Loss Modelling platform, along with the long-term capacity in the countries to maintain and update risk models in the long-term.

The Philippines and Bangladesh are especially vulnerable to the impacts of climate change. Bangladesh is experiencing average annual GDP growth of 6 per cent and has historically suffered some of the worst natural disasters in the world in terms of fatalities. It has invested significantly in early-warning systems and cyclone shelters to reduce human casualties. However, sea level rise is further threatening the low-lying Ganges-Brahmaputra-Meghna delta and the Bay of Bengal can 'funnel' cyclones to Bangladesh. Rich alluvial soils attract farmers to vulnerable areas which are densely populated, and new port facilities are under development to add capacity to Chittagong, for example at Pyra on the northwest coast of the Bay of Bengal.

Meanwhile, The Philippines lies to the west of an area of Ocean capable of producing the most intense tropical cyclones on the planet, as evidenced by Typhoon Yolanda (Haiyan) in 2013 with wind gusts over 170mph. The country was ranked as 8th in the world in terms of the number of people exposed to floods each year within the 2009 Global Assessment Report on Disaster Risk Reduction, which are a perennial challenge, usually triggered by a combination of factors including typhoons, tropical depressions, prolonged heavy rains, clogged waterways and improper street drainage. It is estimated that TY Yolanda hampered economic growth by about 0.9 percentage points in 2013 and another 0.3 percentage points in 2014.

INCREASING COSTS OF DISASTERS
WHO PAYS?

Picture source: Dhaka Tribune (Hasan, M.), 3rd May 2019 'Always best to be prepared' **https://www.dhakatribune.com/opinion/editorial/2019/05/03/always-best-to-be-prepared**

The burden of the increasing costs of disasters in both of these countries largely remains on governments, businesses and individuals. However, international collaborations such as the Insurance Development Forum (**https://www.insdevforum.org/**) the InsuResilience Global Partnership (**https://www.insuresilience.org/**) and the Centre for Global Disaster Protection (**https://dfidnews.blog.gov.uk/2017/07/20/centre-for-global-disaster-protection/**) have been formed to address the increasing insurance protection gap, bringing public-private partnership disaster risk financing solutions. The Department of Finance of the Philippines has recently elaborated a national Financial Protection Strategy to enhance the resilience to disaster and climate risks. However, a fundamental obstacle remains in the open availability of data and transparent understanding of the risk and how it might change in the future.

Although increasing in frequency and intensity, extreme events happen infrequently by their very nature. In addition, the combined impacts of industrialisation and urbanisation and climate change is changing the risk landscape. Therefore, it is not possible to rely on historical experience to understand and manage risk from such events. Catastrophe risk models were created by the re/insurance industry 25 years ago in order to solve this very problem.

The new project Oasis Platform for Climate and Catastrophe Risk Assessment – Asia will deliver catastrophe models to simulate extreme weather event related damages and their impacts in the Philippines and Bangladesh (country-wide flood model for the Philippines and cyclone model for Bangladesh). These models can be used to assess the likelihood and financial damage caused by extreme climate events and underpin information required by financial markets to provide disaster risk financing and insurance coverages. For more information on catastrophe models and Oasis see **https://oasislmf.github.io/modelling_methodology/what_is_a_catastrophe_model.html** and **http://www.oasismooc.org**.

The project will importantly foster in-country capacity in the development, use and understanding of catastrophe risk models through an in-depth scientific partnership between international experts in climate and catastrophe modelling and national scientific experts from academia and all the main national science agencies. Additionally, it will provide the tools for in-country actors to update and sustain the models in the long-term beyond the timeframe of the project.

Partners include the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA); Department of Disaster Management (DDM) of Bangladesh; the Disaster Risk and Exposure Assessment for Mitigation program of the Philippines (UP DREAM); Bangladesh Meteorological Department (BMD); experts from the Bangladesh University of Engineering and Technology (BUET); International Union for Conservation of Nature (IUCN) Bangladesh, the U.K. Met Office; Potsdam Institute for Climate Impact Research (PIK); Flood catastrophe modelling experts KatRisk, National Reinsurance Corporation of Philippines (Nat Re); international reinsurance brokers Willis Towers Watson and Tysers Risk Management; and the technology, management, education and governance consultancy Kitetrackers of Bangladesh.

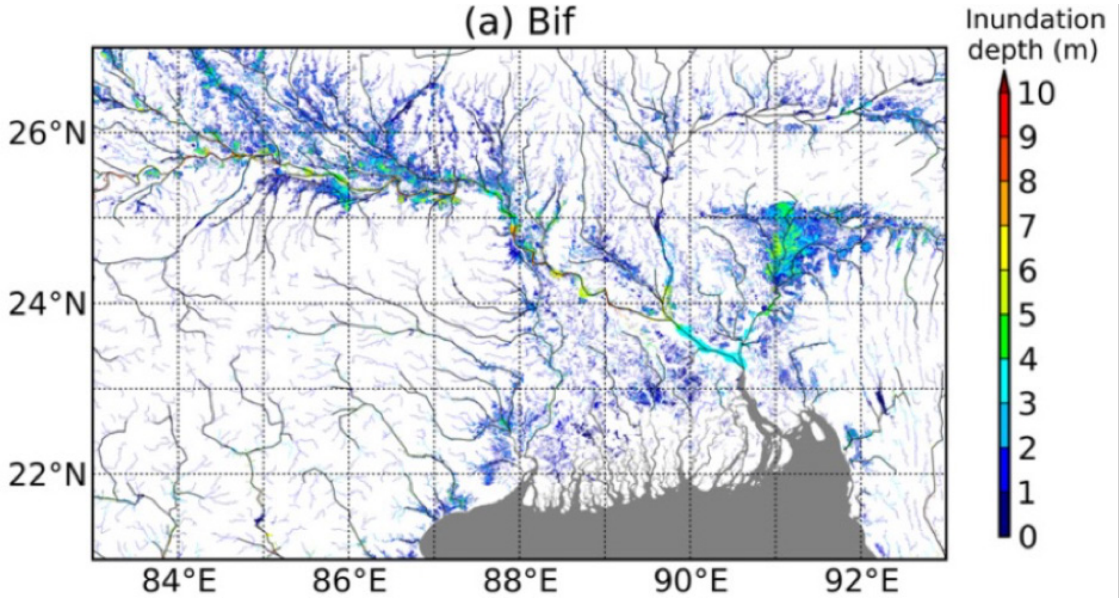
RISK MODELLING COLLABORATION

Since the project began in July 2018, workshops were held in each of the Philippines and Bangladesh to bring together the international scientific and re/insurance market experts with in-country scientists, policy-makers, insurers and multiple other stakeholders.

The full reports and presentations from those workshops are available here:
https://www.dropbox.com/sh/qlo1bewsle5jdk3/AAD7u493of0SEKJ5fnfAebBTa?dl=0.

Most of the work in 2019 is focused on the detailed data gathering and modelling required to understand the risk at a detailed level. In both countries, the first simulations of storms and floods are being developed and tested between the international scientific partners. Subsequently, stochastic event sets of 10,000s of realistic possible cyclone and flood events will be generated, each with a probability of occurrence in any given year and their impact footprint in high resolution. These will provide the basis of a thorough understanding of the risk landscape across both countries and help answer questions on where and how likely future flood and cyclone events may occur.

Future climate-change scenarios will be generated by the Potsdam Institute of Climate Impact Research (PIK) to better understand the potential impacts of climate change on flooding and on droughts. They will consider regional changes and impacts across the entire system, for example including the whole upstream catchments of the Ganges, the Brahmaputra and the Meghna River systems in Bangladesh.



Hiroaki Ikeuchi et al. (2015) Modeling complex flow dynamics of fluvial floods exacerbated by sea level rise in the Ganges–Brahmaputra–Meghna Delta. Environ. Res. Lett. 10, 124011

Information on vulnerability and historical cyclone damages are being collected in order to gain a better view of the potential damage at a local level than previously existed. Visits to local communities impacted by historical cyclones for example in the low-lying Bangladesh delta allow the gathering of new information. Information on the location of flood defences, dykes etc is also being gathered to improve the modelling of storm surge and flood effects on today's population and environment.

A second round of capacity building workshops in climate and catastrophe modelling are being organised in Dhaka in June 2019 and Manila later in the year. These will bring together international and in-country scientific experts to improve the skillsets and tools available to academics and scientists in each country for long-term benefits beyond the lifetime of the project. A PhD project will also be initiated within the framework of the project and visiting experts from Dhaka and Manila will spend up to 3 months each at PIK in Germany to further extend their analysis toolkits capability.

By the end of 2019, we expect t have the first sets of results from the models and will be sharing those updated as we get them. Further workshops and events will take place in each country to share the results and release the models formally for public use in 2020.

ABOUT US

Oasis Loss Modelling Framework (Oasis LMF) is a not-for-profit organisation founded in 2012 to open up the world of catastrophe risk modelling used by the (re)insurance industry. It is collectively owned by close to 40 of the world's leading insurers, reinsurers, brokers and financial institutions. Together with an Associate Member community of almost 100 companies and academics, it forms a widespread community dedicated to improving catastrophe risk modelling and extending its use for the public good.

We provide an open source platform for developing, deploying and executing catastrophe models.

Our ecosystem consists of more than 15 suppliers covering over 80 models and counting:
https://oasislmf.org/community/model-providers

The Oasis platform and documentation can be downloaded for free from GitHub:
https://oasislmf.github.io

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