

JBA SRI LANKA FLOOD MODEL EXECUTIVE BRIEFING.

Background

Sri Lanka experiences major flooding on a regular basis, with significant events every year since 2015. The climate is dominated by the southwest and northeast monsoons, which affect the country from May to September and December to February. Flooding is linked to monsoon rainfall during these periods and cyclone activity can exacerbate the situation further, as was the case in May 2017 when up to 600mm of rainfall over two days caused widespread flooding affecting over 800,000 people¹.

Although insurance penetration in Sri Lanka is low, there has been steady year-on-year growth in insurance with total gross written premium increasing by 15% in 2017². Local regulations stipulate that primary insurers must cede 30% of their non-life liabilities to the National Insurance Trust Fund (NITF), with risk transferred to the international reinsurance market through a 7.5 billion LKR retrocession cover³. In 2016, the government implemented the National Natural Disaster Insurance Scheme (NNDIS) through NITF, which provides cover for uninsured households and small businesses that are affected by a natural disaster. With all properties in Sri Lanka now insured, modelling flood for re/insurance purposes in Sri Lanka is more important than ever. To meet this need, JBA has developed the first multi-peril probabilistic flood model for Sri Lanka.

HIGHLIGHTS.

New updates incorporated into Sri Lanka's first multi-peril probabilistic flood model

Best representation of low-income households and small businesses now covered by the National Natural Disaster Insurance Scheme

Extensively validated by recent events, including May 2016 and May 2017 floods

Advanced modelling techniques to capture the unique characteristics of flooding in Sri Lanka

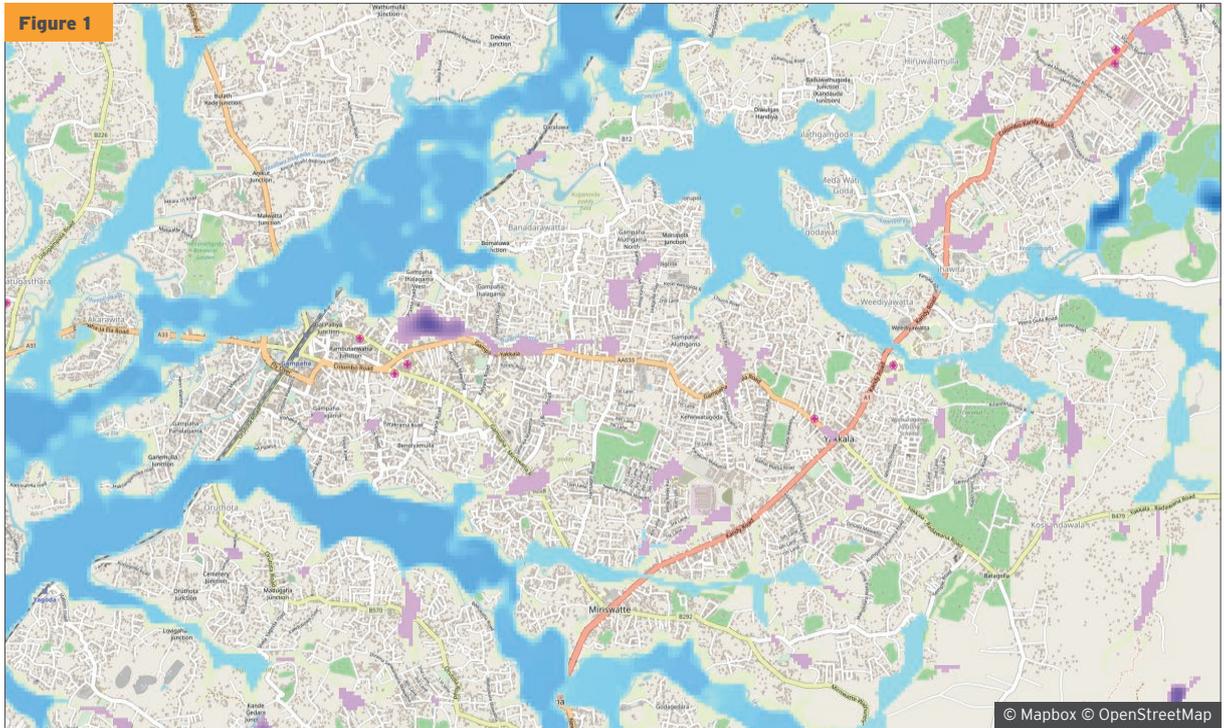
The geography of Sri Lanka makes it very prone to flooding: the island has over 100 rivers, including major rivers such as the Kelani, Gin, Kalu, Nilwala and Mahaweli. Underpinned by JBA's 30m flood maps, which use globally consistent, best-available elevation data, the model allows for differentiation in flood potential across small distances. The model captures the extent and depth of flooding through advanced 2D modelling techniques. River flooding and surface water flooding are each explicitly modelled, with the ability to break out losses from each flood type and understand their individual contribution to overall losses.

¹ Ministry of Disaster Management & Ministry of National Policy and Economic Affairs; Sri Lanka Rapid Post Disaster Needs Assessment Floods and Landslides, May 2017
<http://www.lk.undp.org/content/dam/srilanka/docs/localpublications/PDNA%20Sri%20lanka%202017-1.pdf>

² Insurance Board of Sri Lanka; Insurance Board of Sri Lanka Annual Report 2017
<http://www.ibsl.gov.lk/images/Circulars/Final%20report%202023.07.2018.pdf>

³ <https://www.lankanewspapers.com/2018/04/09/22-global-reinsurance-giants-join-provide-reinsurance/>

Figure 1
JBA's 50-year
river flood (blue)
and surface
water flood
(purple) map for
Gampaha city.



Monsoonal rainfall is the main cause of flooding in Sri Lanka and it is therefore important to capture the effects of this temporal variability. Events are modelled using a continuous rainfall simulation, capturing seasonal changes in event type and

severity, and antecedent conditions where prolonged rainfall may cause the ground to become saturated. In combination, these technical elements of the model present a highly comprehensive view of flood risk.

Understanding the market

In a data-poor market such as Sri Lanka, leveraging JBA's considerable Asian Pacific flood modelling experience has been key. Prior learning from the development of JBA's other Asia Pacific models has been applied to create vulnerability functions specific to Sri Lanka. Data from 2015 and 2016 flooding that impacted households and small businesses was used to refine vulnerability functions and provide the best representation of uninsured properties now covered by the NNDIS.

Flood vulnerability functions are based on property type, structure and occupancy information. Where this information is not available, assumptions are made about exposure characteristics to assign the most appropriate vulnerability function. These exposure assumptions were updated in 2018, to provide an up-to-date view of property types and their distribution in Sri Lanka.

Validated with recent events

Recent experience from flood events in May 2016 and May 2017 has been used to validate model results and ensure that it provides an up-to-date

MODEL FEATURES.

River and surface water flood events

>40,000 stochastic events

Defences modelled incorporating the effect of overtopping

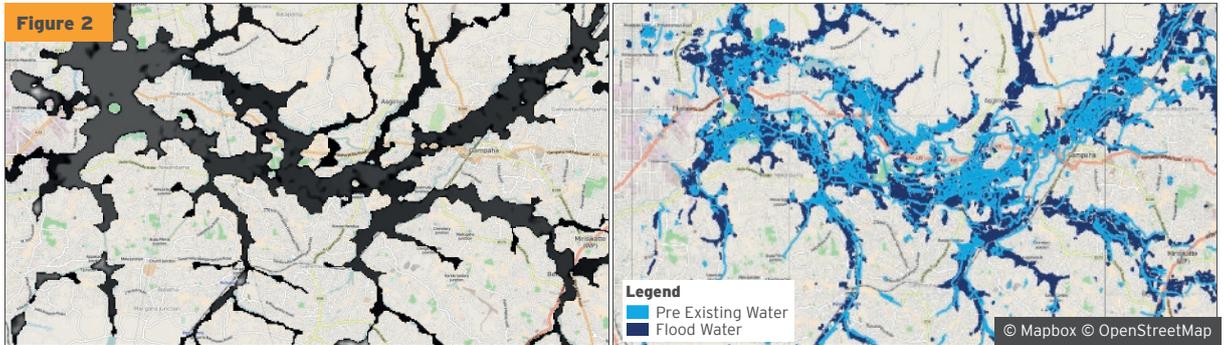
Analysis cells enabling portfolio analysis at co-ordinate resolution, divisional secretariat, district and province level

Residential, commercial and industrial lines of business

Buildings, contents, and business interruption coverages



Figure 2
Validation of JBA Flood Map (left) against JAXA satellite data (right) in Gampaha Divisional Secretariat for the 2016 flood event. Source: reliefweb.int



and representative view of risk. There was a strong correlation between the JBA flood maps and flooding observed from satellite imagery; and model estimates of the number of affected properties compared well with damage reported in government post-disaster reports.

Model access

The Sri Lanka Flood Model can be accessed via portfolio analysis services provided by JBA, or our catastrophe modelling platform, JCalf®.

The model can also be accessed via Oasis and ModEx.

About JBA Risk Management Limited

Established in 2011, we are a global leader in flood risk management. Affectionately known as The Flood People, our flood maps, catastrophe models and analytics are used by some of the world's

largest insurers, reinsurers, financial institutions, property companies and governments. We're experts in translating complex, scientific data into useful information, using sophisticated hydraulic approaches and models to provide cutting-edge flood risk intelligence.

As part of the JBA group, established over 20 years ago, we work closely with leading academic institutions in the field of flood risk. We also support our independent charity, JBA Trust, which enables research, education and training in the water environment sector.

Our commitment to continuous improvement and detailed research and development is what makes us the number one choice for many insurers, reinsurers, financial institutions and governments.



Figure 3
Flooding on a Sri Lankan street.



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