An application of GloFAS to support disaster risk financing through Flood Foresight

Copernicus EMS Global Flood Forecasting and Monitoring Meeting

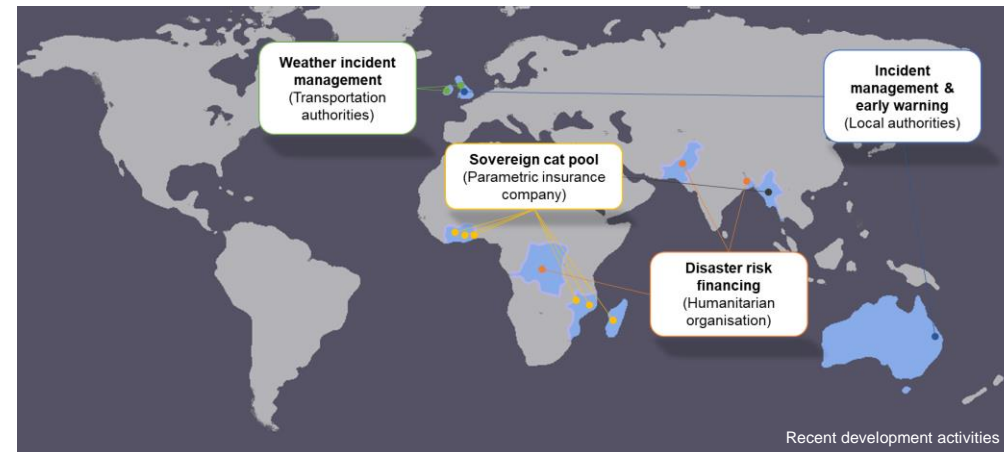Christine McKenna, Kay Shelton, Heather Forbes, John Bevington

JBA Consulting, UK

Disaster risk financing

JBA is supporting development of disaster risk financing schemes around the world for:

- **Humanitarian anticipatory action:**
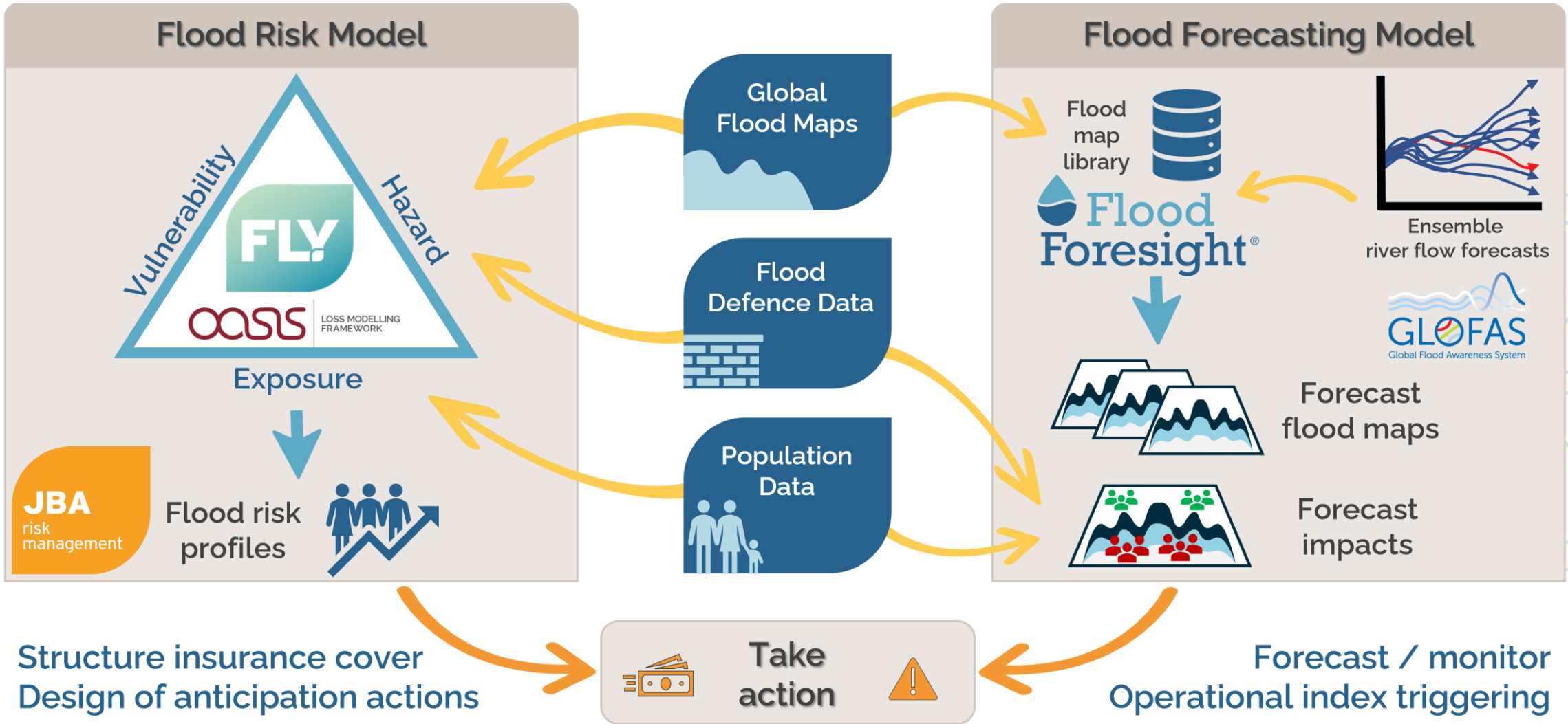 - Pakistan, Bangladesh, DR Congo

  START NETWORK

- **Sovereign catastrophe risk pools / parametric insurance:**
  - Togo, Ghana, Cote d'Ivoire, Mozambique, Malawi, Madagascar

  African Risk Capacity
  Sovereign Disaster Risk Solutions

Recent development activities

JBA's Global Flood Maps – global 30m flood hazard data

JBA flood models

Case study: Pakistan floods 2022

Pakistan floods: One third of country is under water - minister

🕐 30 August 2022

EPA-EFE/REX/SHUTTERSTOCK

| A flooded street on Monday in Nowshera district

Khyber Pakhtunkhwa. Source: BBC News

Pakistan – Almost 1,000 Dead, 33 Million Affected in Worst Floods in a Decade

ECMWF

ECMWF

FloodList is funded by European Centre for Medium-Range Weather Forecasts

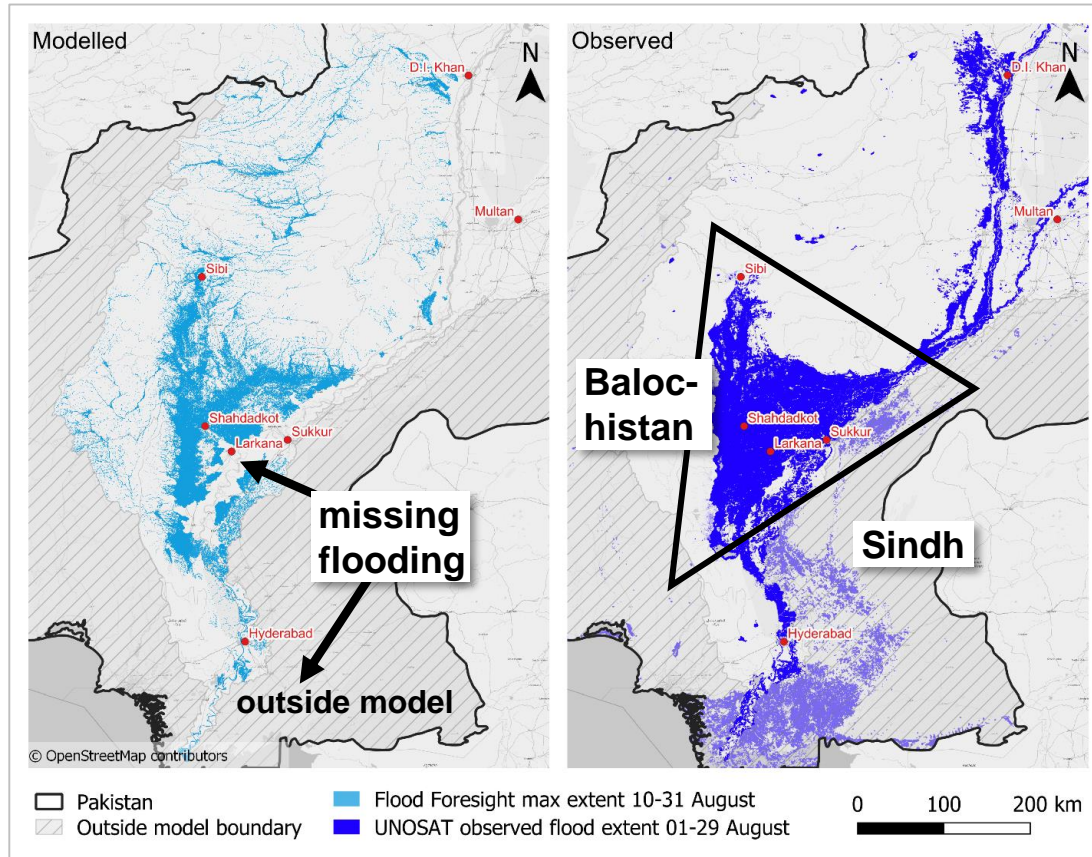27 AUGUST, 2022 BY RICHARD DAVIES IN ASIA, NEWS

Source: FloodList

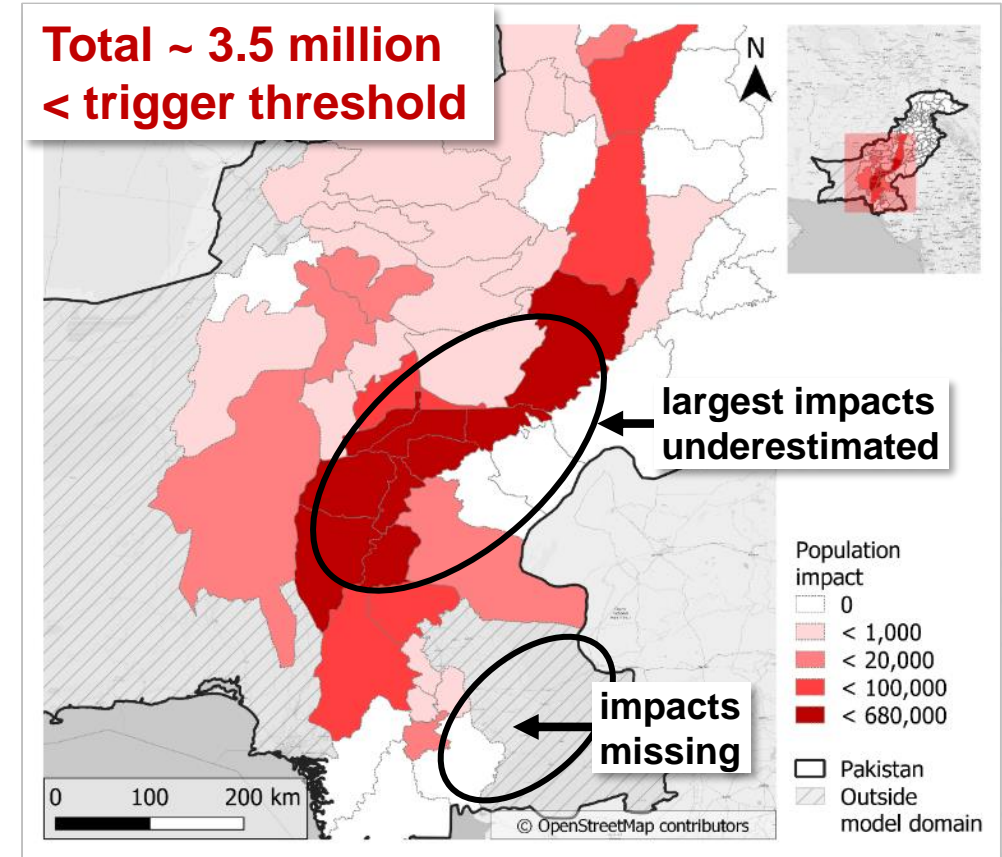*Balochistan, 4 Sep 2022. Source: Bloomberg. Photographer: Fida Hussain/AFP/Getty Images.*

Punjab, August 2022. Source: FloodList. Photo: Punjab Emergency Service Dept.

Flood modelling

Modelled versus observed maximum flood extent, August 2022. Reported flood locations labelled in red.

Modelled population impacts by district, 28 August 2022.

Lessons learned

Flooding was under-estimated by Flood Foresight and disaster risk financing trigger not met because:

- Flooding occurred outside the selected model

- Limitations of GloFAS (v3) streamflow modelling:
    - Uncalibrated in Pakistan
    - Does not account for human interactions with river (e.g., storage and release of water in dams, barrages)
    - Glacial/snow melt complex and can happen in a short time, a process that may be underestimated

Model updates implemented / currently being implemented within Flood Foresight:

- Reassessment of triggering threshold – Start Network have lowered it to ~ 1.5 million (RP3.5)

- Update of model domain to include whole of Pakistan

- Update to use GloFAS v4:
    - Improved calibration for ungauged catchments using knowledge transfer from gauged catchments
    - Improved representation of hydrological and anthropogenic processes

Other changes that could be made:

- Source local hydrological model and local data for calibration