Flood Forecast Information to Support Rapid Humanitarian Response: Cyclone Idai & Kenneth

Lessons Learnt

(from a University of Bristol Perspective)

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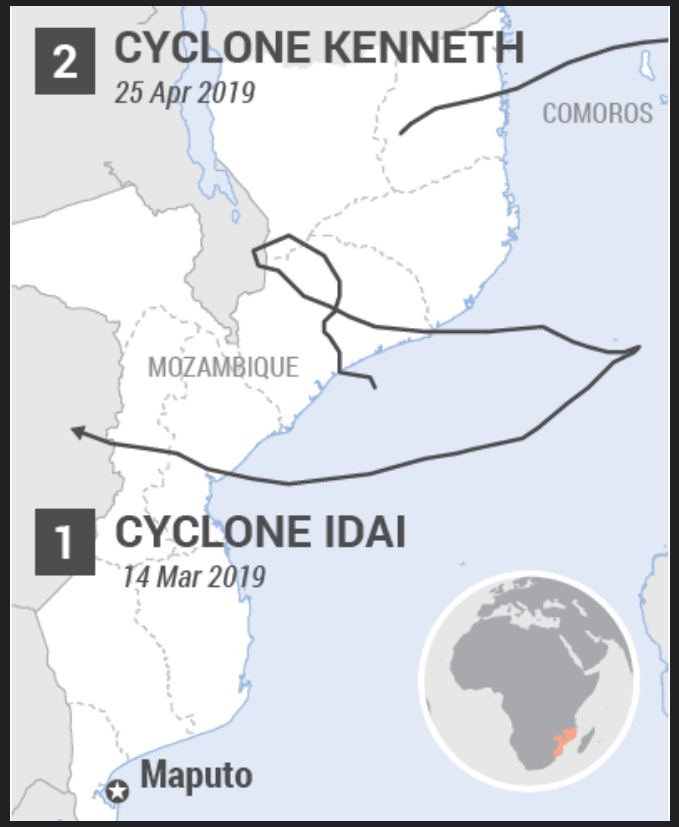
ECMWF

University of Reading

UKaid from the British people | Department for International Development

Background



Source: OCHA

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So the story begins….

First Contact 20th March!!!!!

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Estimate exposure and resources at risk to inform rapid humanitarian response

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OK, but when do you want it?

The Scientists

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OK, but when do you want it?

By mid-afternoon at the latest

The Scientists

The User

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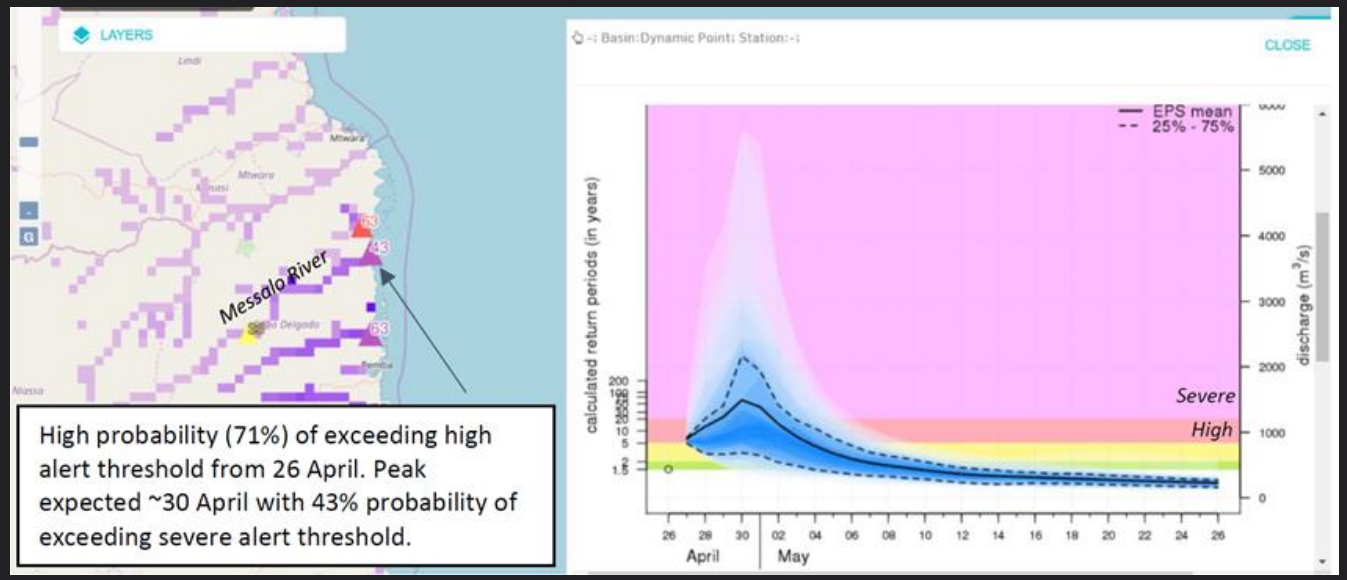
Practicalities

- Receive GLOFAS Data at ~10am
- Resample GLOFAS data from 10km to 90m



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Practicalities

- Overlay our 90m hazard maps (1 in 20/100/250 year events) with GLOFAS exceedance probability data
- Estimate potentially exposed population using High Resolution Settlement Layer (HRSL) by administrative area for different exceedance probability thresholds
- Compare to satellite imagery (when available)

- Write up first draft report by 1pm!!!
- Merge with University of Reading/ECWMF Report

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The Report

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Flood hazard & impact Emergency Report - Cyclone Kenneth

Flood forecast

- GloFAS forecasts (issued 26 April) indicate that river flows will increase beyond the severe alert threshold (20-year return period) with moderate to high probability, on the Messalo, Montepuez and Megaruma rivers in the Cabo Delgado province.
- Exceedance of (at least) the high alert threshold (5-year return period) is estimated from 26 (Messalo), 27 (Montepuez) and 29 (Megaruma) April onwards. The flood peak for these rivers is currently estimated to occur around 30 April.
- GloFAS flood probabilities have decreased to the north and west of Cabo Delgado province, compared to previous forecasts issued on 24 and 25 April, due to the stalling of the cyclone.

Flood Impact

- Exposure is for river flow risk only (i.e. excludes urban, storm surge and windstorm risk). Out of the estimated ~700k people at risk, over 65k people across Cabo Delgado and Nampula are exposed to river flooding of at least 10% probability, and more than 14k people are exposed in areas with at least 50% chance of river flooding
- In Cabo Delgado province the districts most at risk are Pemba (~10k people) and Mecufi (>5k people). Significant exposure (1k-4k each) is forecast in Macomia, Mueda, Muidumbe, Ancuabe, Quissanga, Montepuez, Mocimboa da Praia, Chiúre, Meluco and Balama.
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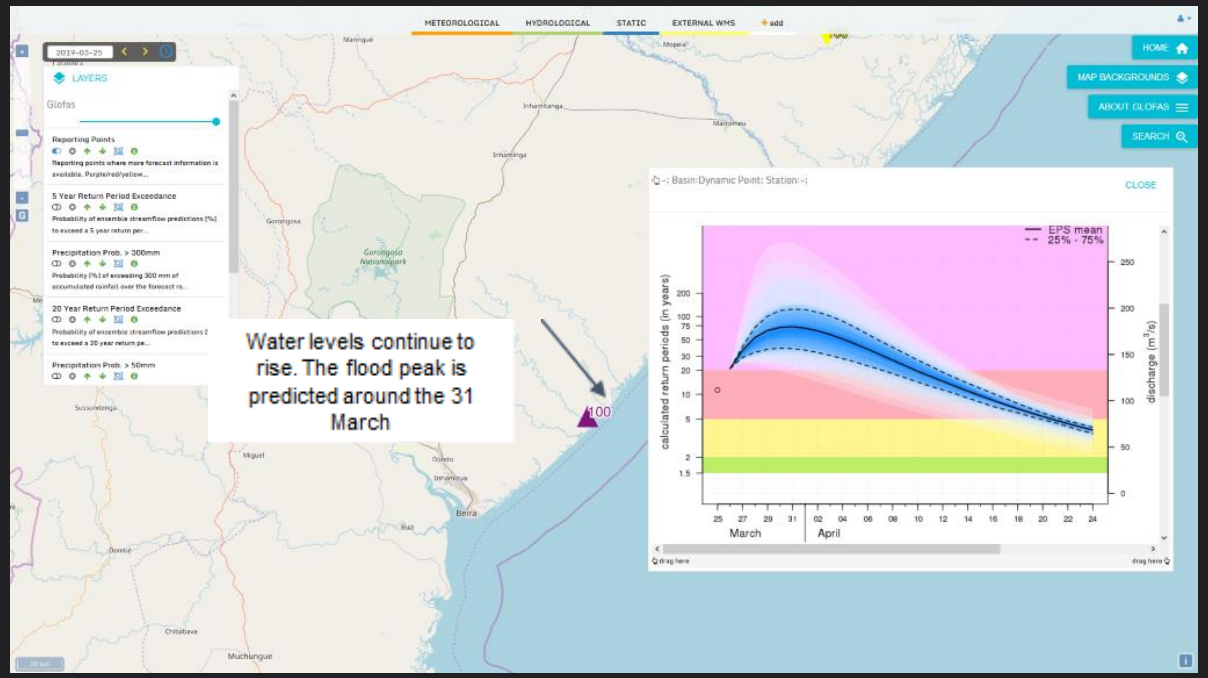

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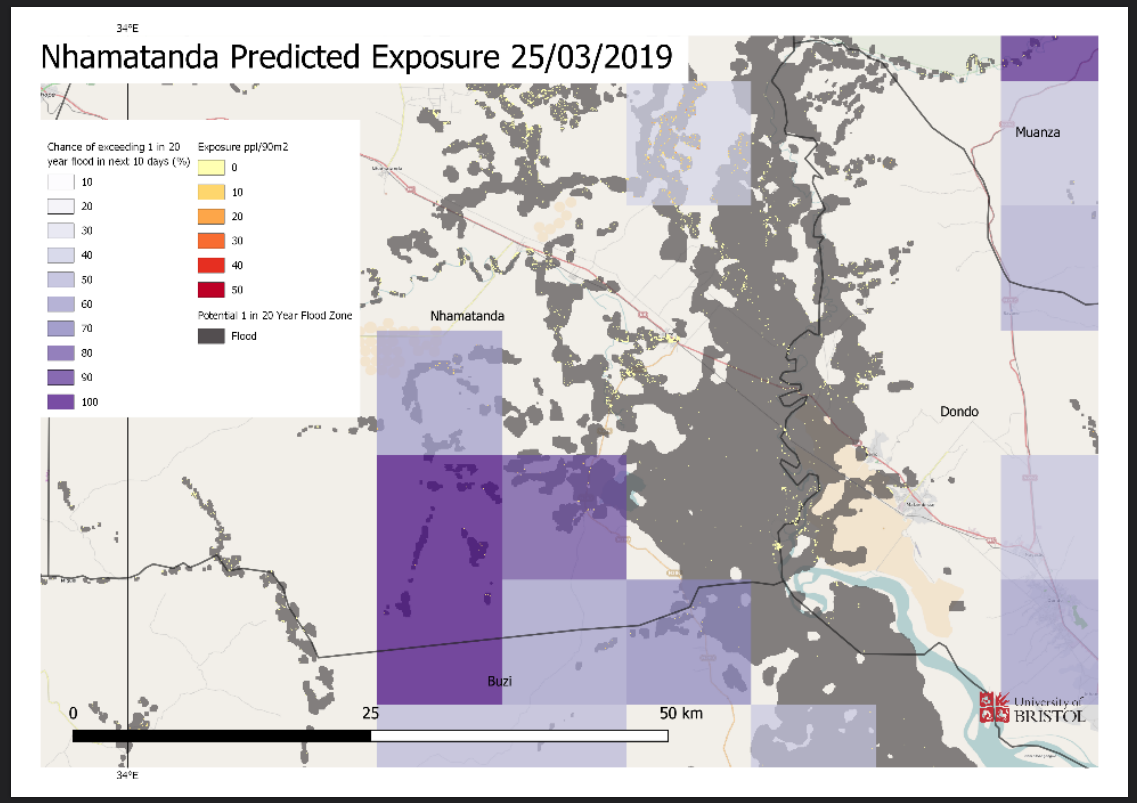
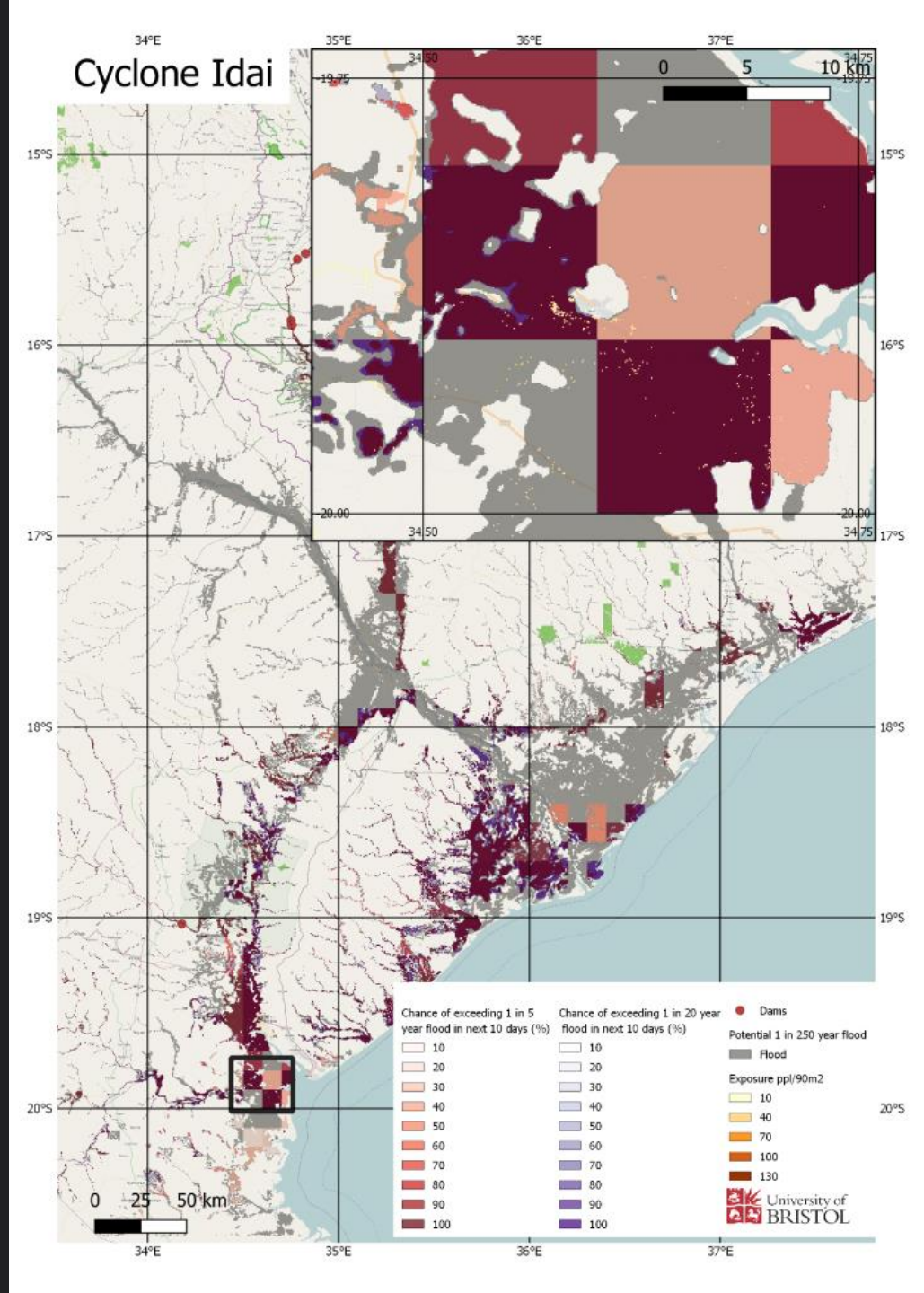
Early Attempts



Very blocky and hard to read!!!



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For Cyclone Kenneth, activation 1 day before event

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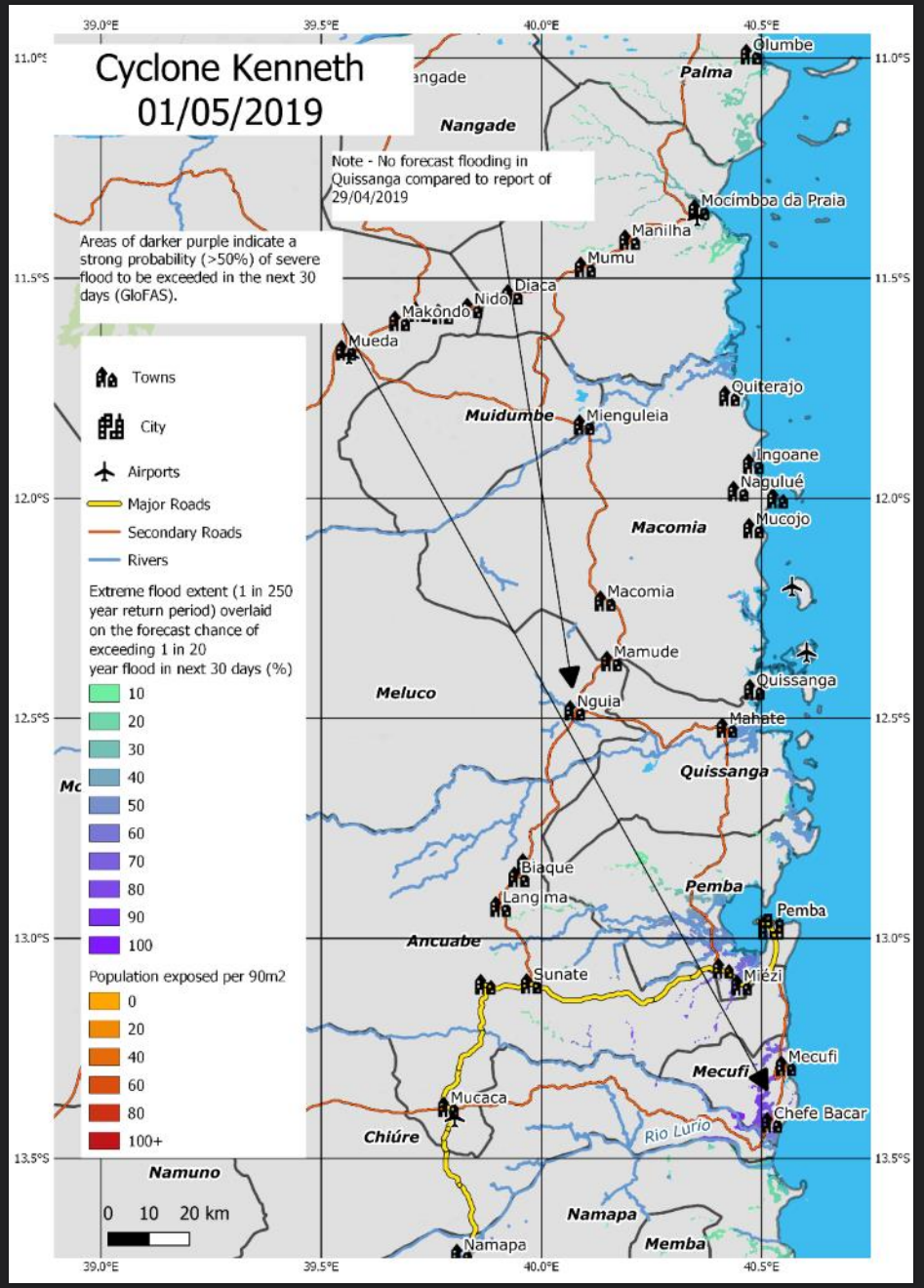
Later Attempts

Province	District	Population exposed to 1 in 20 year flood zone when GloFAS probability of exceedance over 10%	Population exposed to 1 in 20 year flood zone when GloFAS probability of exceedance over 50%	Population exposed to 1 in 250 year flood zone when GloFAS probability of exceedance over 10%	Population exposed to 1 in 250 year flood zone when GloFAS probability of exceedance over 50%	Maximum Probability of exceeding the severe flood level alert (1 in 20 year return period)
Cabo Delgado	Pemba	6246	5120	9952	8246	70
Cabo Delgado	Mecufi	4583	4583	5386	5386	100
Cabo Delgado	Mocimboa da Praia	887	0	1622	0	31
Cabo Delgado	Chiúre	830	516	1243	870	100
Cabo Delgado	Ancuabe	547	208	671	260	99
Nampula	Namapa	425	119	572	119	81
Nampula	Memba	173	0	231	0	23
Cabo Delgado	Palma	113	0	153	0	31
Cabo Delgado	Nangade	22	0	26	0	13
Cabo Delgado	Quissanga	26	0	26	0	13
	Total	13852	10546	19882	14880	



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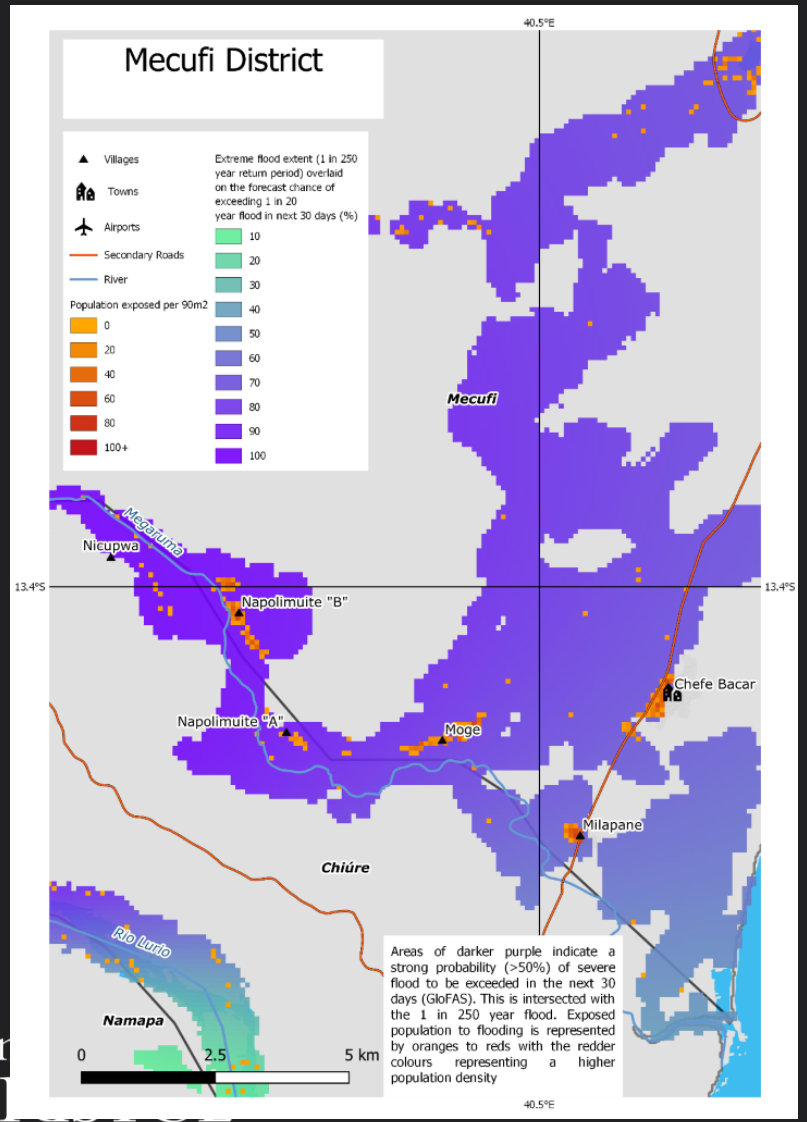

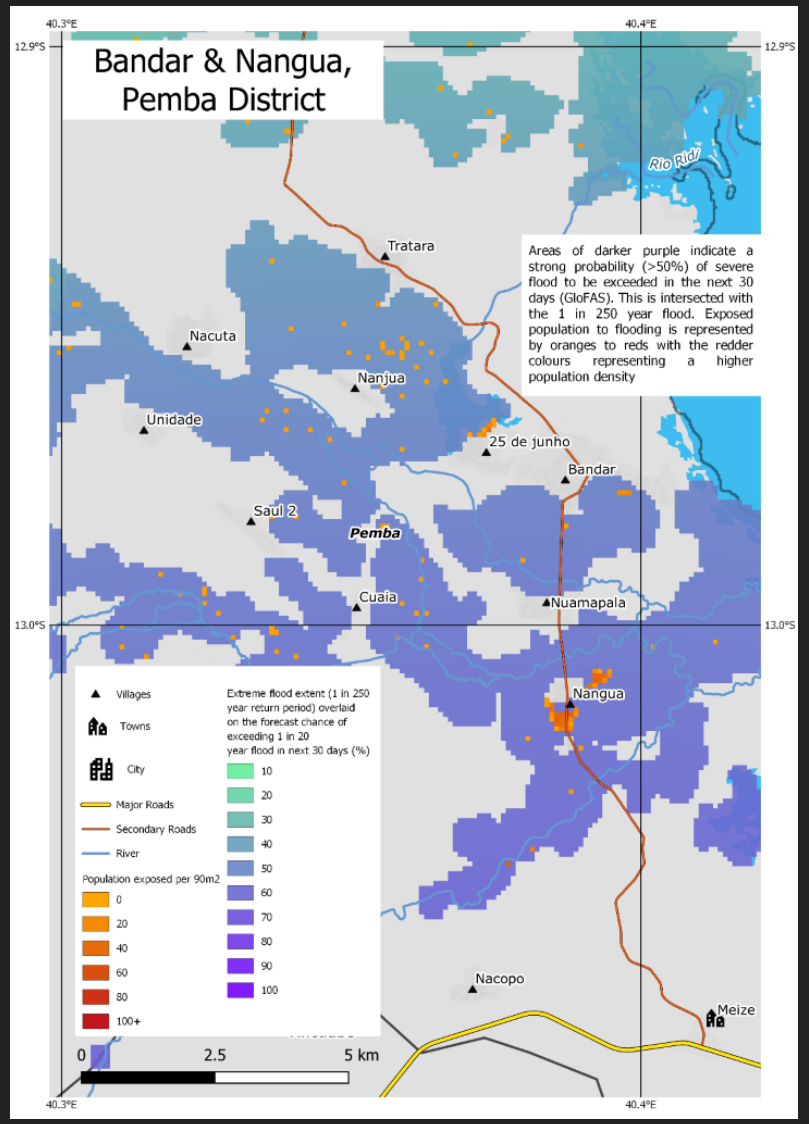

Who used it?

- Still largely unknown

- UN OCHA (Office for the Coordination of Humanitarian Affairs)
- Mozambique Red Cross
- DFID

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The (many) Challenges

- Extremely Short Turnaround
- Changing Criteria
- Consistent Language
- Sharing and merging reports

The (many) Challenges Part 2

- Reporting Exposure Figures – What do we mean by affected?
- Communicating Probability to Users
- Making Recommendations based on dodgy data
- Knowing what users want!!!

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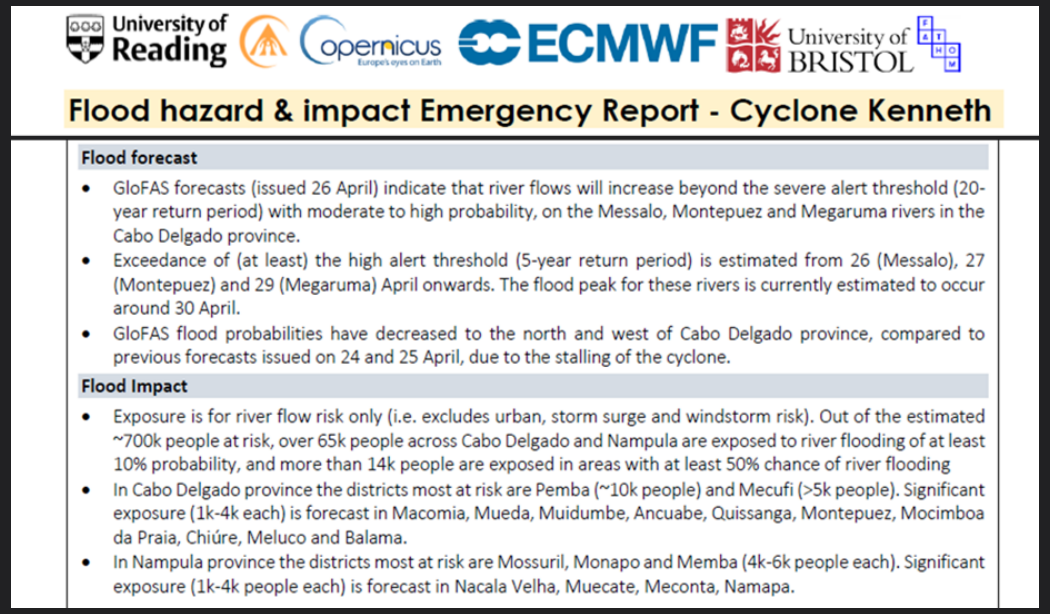
What did users want?

- A clear report abstract
- Interpretation of maps
- Recommendations
- Rapid production of reports



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What users did not want

- A load of maps
- A detailed discussion of probability
- A detailed discussion of methods
- GIS Data (in this case)

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Will there be a sequel?

- Streamline, Document & Disseminate
- Validate hazard maps with satellite images
- Evaluate different exposure data
- Training

- Find out what users need!!!