



Flood footprint assessment: a new approach for flood-induced indirect economic impact measurement and post-flood recovery

Explainer

An explainer on research from the Climate Science for Service Partnership (CSSP) China for decision-makers in China // No. 11



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Summary

For investment in flood risk management options, it is crucial to identify the 'blind spots' in critical infrastructure and vulnerable sectors in economic supply chains and social networks. The Flood Footprint Model enables measurement of natural disasters' indirect economic impact and allows for different post-flood economic recovery plans to be explored by policy-makers. It focuses on post-disaster demand and supply imbalances, the distribution of remaining resources and the role of producer and consumer adaptive behaviour.

Why?

Many studies pay close attention to the social and economic impacts of natural hazards, such as floods, and are often focused primarily on direct losses (short-term physical impacts on natural resources, people, and tangible assets). However, these are only a fraction of the total loss. Indirect loss refers to the economic impact and/or loss resulting from flood-induced losses, delays, disruption of economic activities and the costs of reconstruction.

Direct economic loss due to a natural disaster is often estimated by government authorities or insurance companies through first-hand data surveys and interviews, or it is calculated using disaster models based on physical properties (e.g. infrastructure). There are four main approaches to estimating the indirect economic losses of a natural disaster: post-disaster economic surveying; econometric modelling (these are both from primary data sources); input-output and computable general equilibrium models. The two models have been combined to create an Adaptive Regional Input-Output model (ARIO) (Hallegatte, 2008).

How?

The concept of a 'flood footprint' (first proposed by Mendoza-Tinoco et al. (2017)), belonging to the ARIO class of models is applied to characterise the total

(direct and indirect) economic impact of a flood. The idea is extended to include the role of consumer and producer flexibility and adaptability, and the role of alternative options in starting and maintaining the recovery process.

Two assumptions are made: one is that foreign relations are stable in the pre-disaster situation; and the other is that imports, as external resources, are allowed during the post-flood recovery period.

What now?

This study offers a broader perspective to disaster risk analysis and management and offers several post-flood economic recovery plans to policymakers by simulating various recovery conditions in the aftermath of a flood, such as alternative labour (workforce) or infrastructure recovery plans. However, since there is no statistical data about how sectors and economic systems recover after a disaster, the model is difficult to evaluate.

More specific information on novel recovery methods and impacts needs to be collected and more effort needs to be put into future research. Since the model is currently suitable only for one sudden-onset natural disaster in a single region, it will be continually improved and applied into practical single/multiple disaster events in single/multiple regions.

References

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