

# Indonesia Disaster Knowledge Update - May 2022



## Research Publications about Disaster Risk Financing in Indonesia

CARI! is releasing the **Indonesia Disaster Knowledge Update (IDKU) May 2022** edition with the disaster risk financing theme in Indonesia. It includes all articles with topics about financial-related research in disaster management. Moreover, we conducted an analysis of how common instruments for financial planning in disasters were studied. Financing for DRR and risk-informed investments and development is one of the main themes in [GPDRR 2022](#).

The disaster risk financing policy is stated as one of the National Medium-term Development Plan (RPJMN) 2020-2024 strategies, namely "Increasing the development and innovation of alternative schemes for disaster management financing". Disaster management financing is part of disaster management policies to protect the government, the public, and the private sector against the impact of disasters. The government has an obligation to provide sufficient funds through the State Revenue and Expenditure Budget (APBN) and Regional Revenue and Expenditure Budget (APBD). Disaster management financing includes financing for periods of non-disaster, for emergency response, and for recovery. Communities and the private sector that have the financial capacity are encouraged to provide funds to protect their businesses and assets against the risks and impacts of disasters. However, insufficient incentive mechanisms and clear guidelines hindered various awareness of disaster risk financing by non-state actors from having meaningful contributions to DRR so far.

To highlight the importance of disaster risk financing, in 2019, the Government of Indonesia has prepared a Disaster Risk Insurance and Financing Strategy Implementation Map (PARB). The PARB strategy combines several different financing schemes or instruments to obtain an efficient financing scheme. PARB strategies are divided into two broad groups. The first is the group of financing borne by the Government (retain) through financing sourced from the APBN/APBD, pooling funds, and contingent credit. The second is a scheme for transferring the risk of loss to other parties through insurance. This strategy also accommodates financing in the form of assistance from outside the government, especially when a disaster occurs on a catastrophic scale (residual risk).

The Integrated Climate Risk Management Cycle

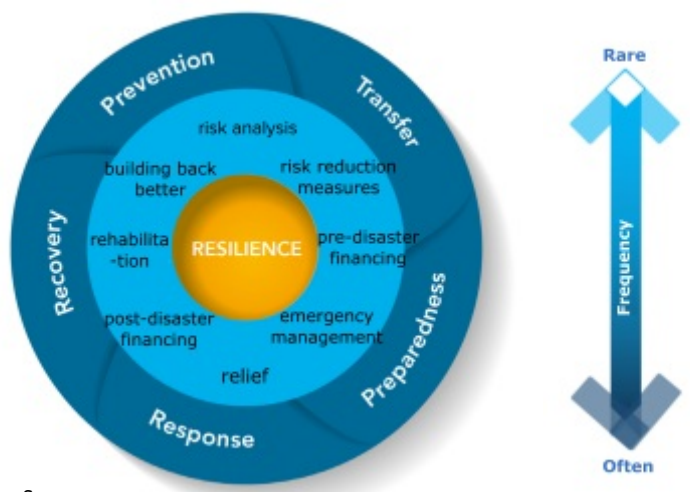
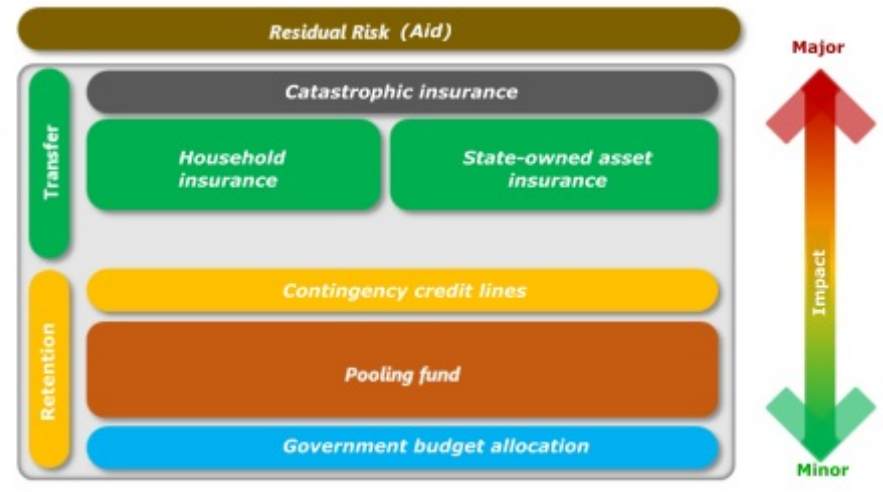
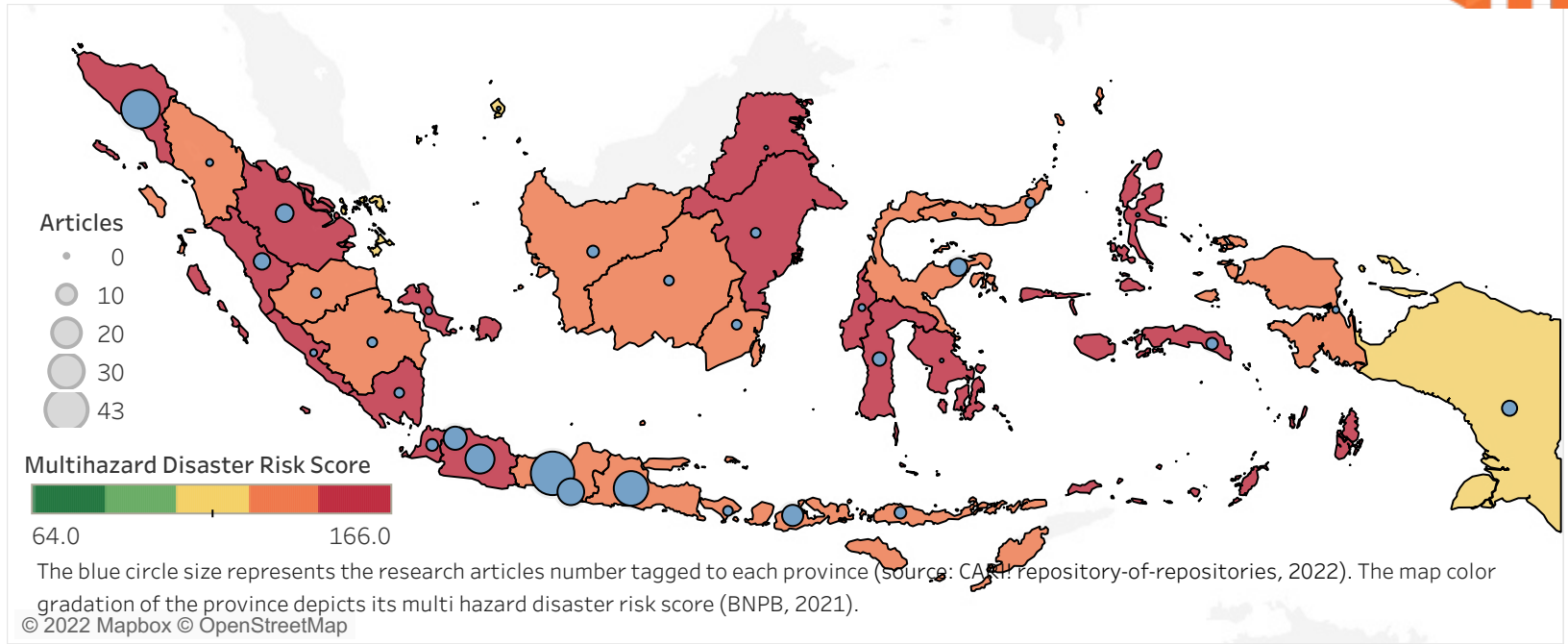


Image Source: UNU-EHS, 2021, "Climate and Disaster Risk Financing Instruments: An Overview", available online at <https://www.uncdf.org/article/6767/climate-and-disaster-risk-financing-instruments> Ministry of Finance, 2018, "Strategi Pembiayaan dan Asuransi Risiko Bencana - Revised edition", Jakarta: Badan Kebijakan Fiskal Kementerian Keuangan

Disaster Risk Finance and Insurance Strategy

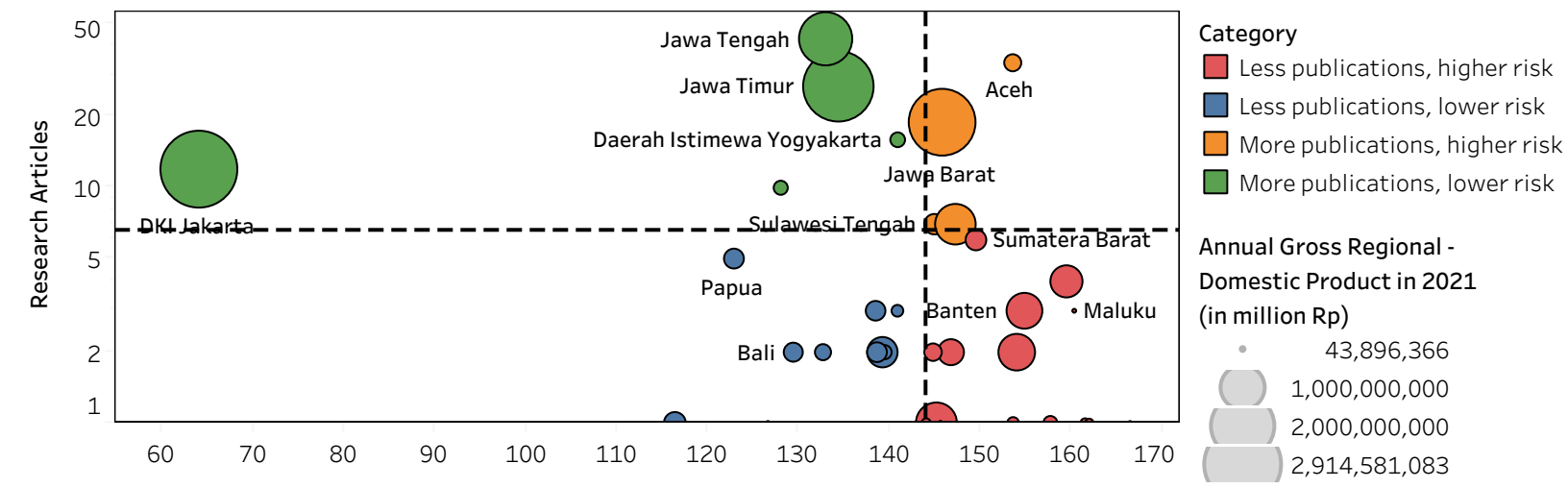


Research Articles Distribution Map



In general, research on disaster risk financing in Indonesia is still limited. Of 251 articles, 199 articles explored disaster risk financing topics at the sub-national level, either province or regency level. The province with a relatively high number of articles i.e. Aceh (34 articles), Central Java (43 articles), and East Java (27 articles). Provinces in Java Island commonly have a relatively high research number compared to other provinces outside of Java. There are provinces with higher risk level that have a limited number of research on disaster risk financing, e.g. provinces in Kalimantan, Sulawesi, and Maluku.

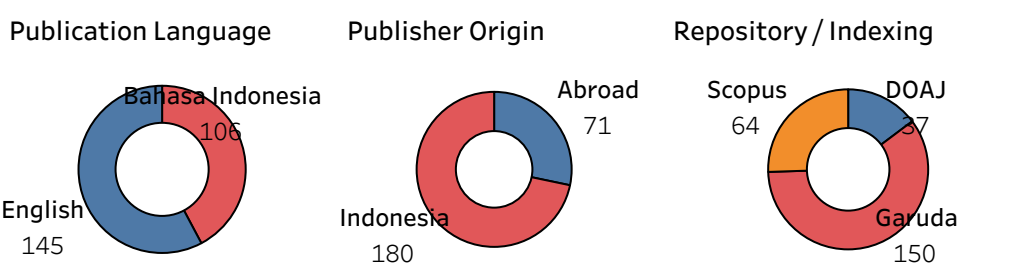
Research Articles VS Multihazard Disaster Risk Score



The quadrant plot shows the province's category (represented by different colors) based on the number of research articles and multihazard disaster risk score (source: BNPB, 2021). The circle's size depicts the province's gross regional domestic product (GRP in million Rp) (source: BPS, 2022).

## Research Articles Statistics

251 Publications | 192 Publishers | 238 Authors



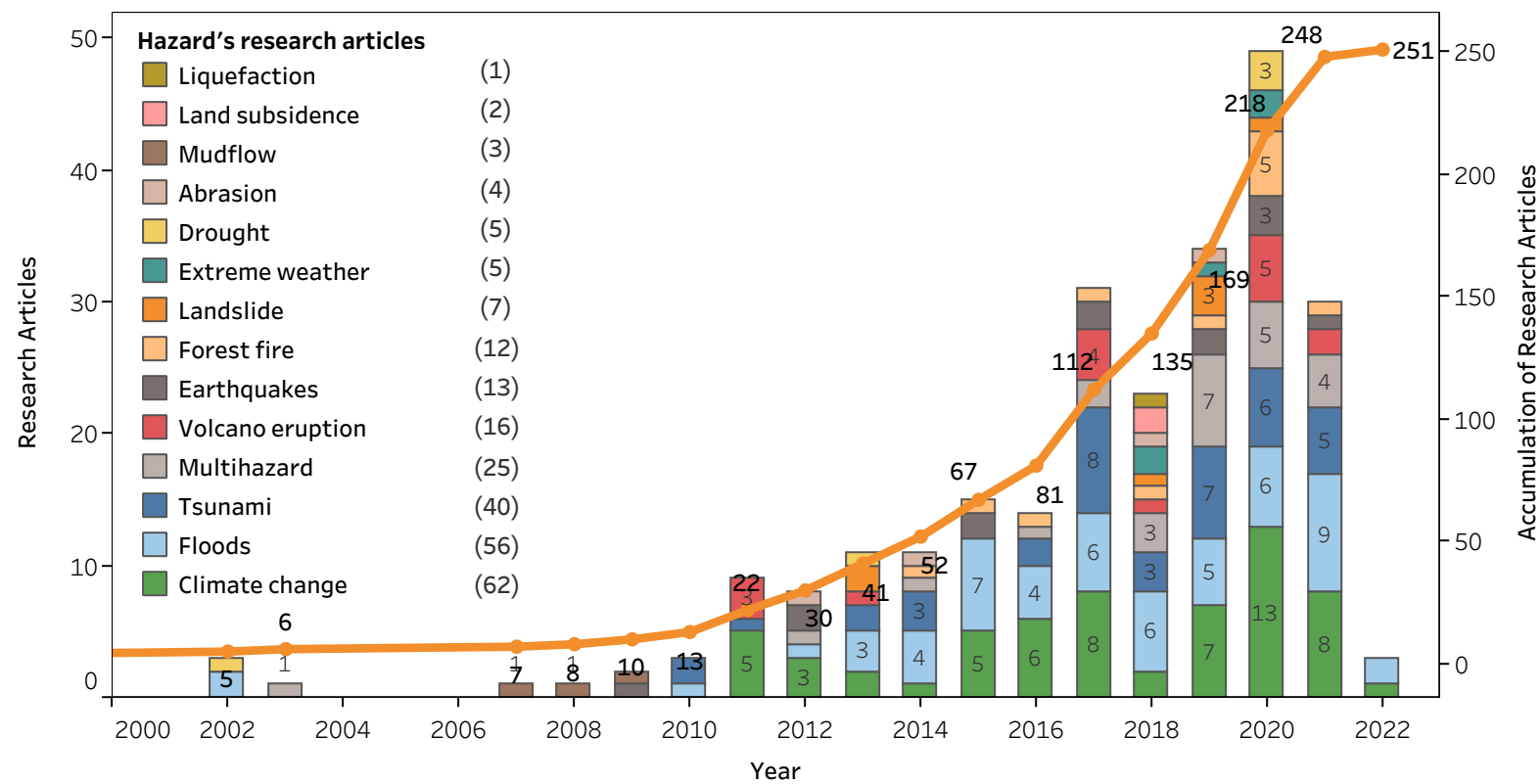
For the purposes of analysis on IDKU, we examined research articles that have the main theme of finance and economy related to disaster research. Based on the filtration process that we conducted by using selecting keywords and systematic review, we obtained 251 research articles publications for our in-depth analysis.

Research on disaster risk funding in Indonesia is still largely unequal, this can be seen from the distribution of articles. Of the 34 provinces in Indonesia, only 9 provinces have a higher number of articles than the average score. Four of them have a higher risk, i.e. Aceh, Riau, West Java, and Central Sulawesi. Five others have a lower risk, mainly provinces in Java Island and West Nusa Tenggara. Fourteen provinces are in the red category which indicates a high disaster risk level with a limited number of research. Arguably, the larger economy size of provinces (based on GRDP) already generated interest from scholars to study the topic of disaster risk financing in those locations. This is with the exception of Aceh and Central Sulawesi provinces as the location of a recent catastrophic disaster in Indonesia.

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## Growth of Research Articles



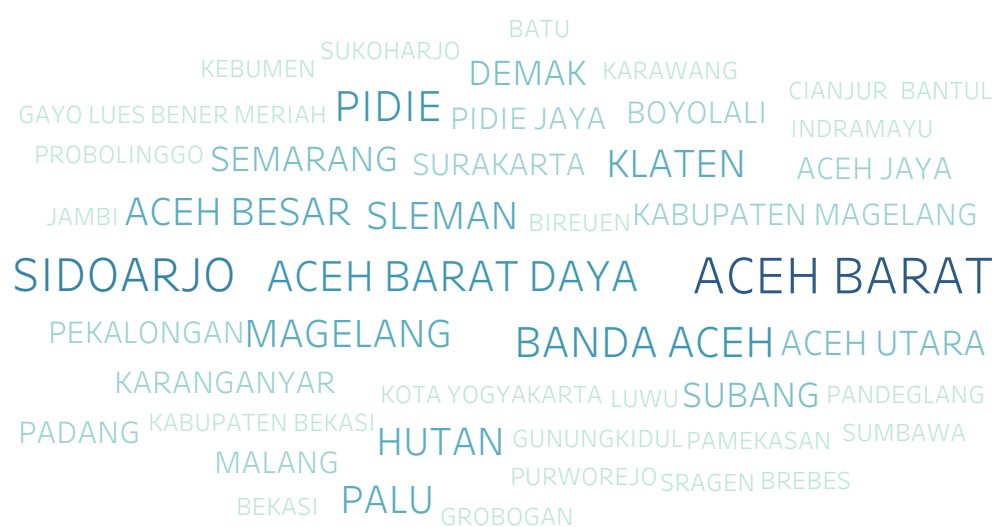
The bar chart above indicates the research articles' growth trend from 2000 to 2022, the color shows different hazard types, and the line shows the cumulative number of research articles. Finance-topic research on climate change-related topics is the most studied since 2011 till now, with the highest number achieved in 2020. The second most studied hazard type is floods, followed by tsunami, multihazard, volcano eruption, earthquakes, and forest fire.

## Top Research Articles

- The lapindo mudflow disaster: Environmental, infrastructure and economic impact**  
McMichael H. | Publisher: Bulletin of Indonesian Economic Studies  
Published on 2009-07-17 | Cited by 14 articles
- The Asset Drivers, Well-being Interaction Matrix (ADWIM): A participatory tool for estimating future impacts on ecosystem services and livelihoods**  
Skewes T. | Publisher: Climate Risk Management  
Published on 2016-01-01 | Cited by 13 articles
- Disaster capitalism? Examining the politicisation of land subsidence crisis in pushing Jakarta's seawall megaproject**  
Octavianti T. | Publisher: Water Alternatives  
Published on 2018-06-01 | Cited by 8 articles
- Evaluating economic costs and benefits of climate resilient livelihood strategies**  
Liu S. | Publisher: Climate Risk Management  
Published on 2016-01-01 | Cited by 8 articles
- Does social capital matter in climate change adaptation? A lesson from agricultural sector in Yogyakarta, Indonesia**  
Saptutyningsih E. | Publisher: Land Use Policy  
Published on 2020-06-01 | Cited by 7 articles

The list above is the top-five publications on disaster financing themes in Indonesia ranked by the number of citations from 1970 to 2022 sourced from the Scopus directory.

## Top Investigated Cities



## Top Investigated Topics by Sub-Phase



## The Investigated Finance Topics



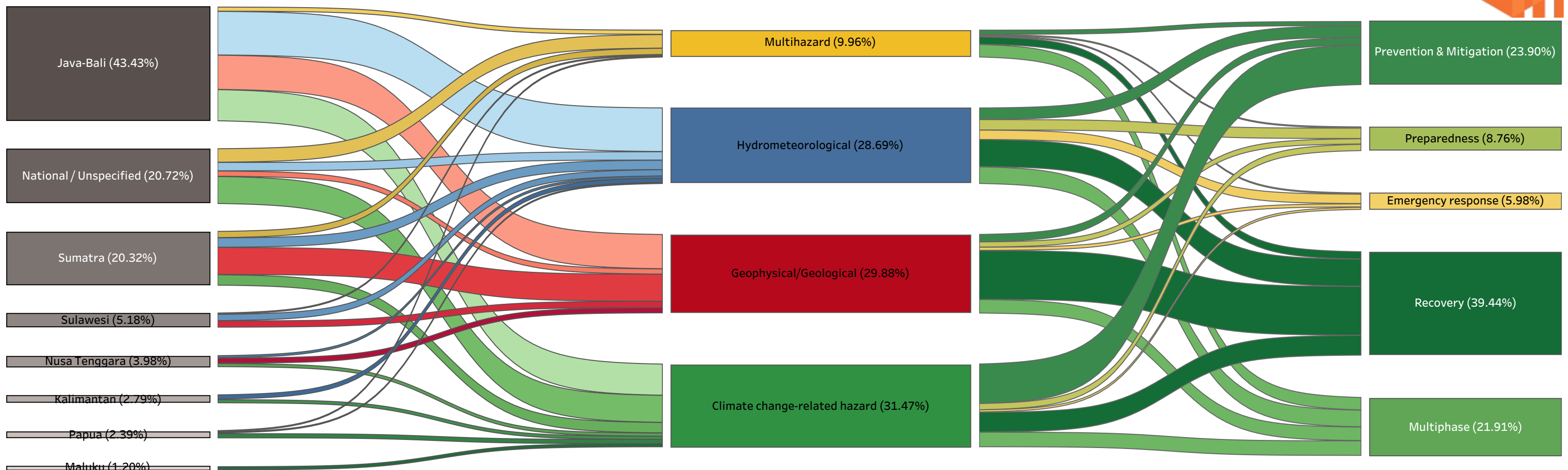
Disaster risk financing research in Aceh province is investigated down to city/regency levels. This is different from research on Java Island which generally discussed more than cities/regencies as could be seen on the word clouds above. By filtering the disaster management sub-phase topics contained in each article, we found that restoring or improving infrastructure, impact assessment, and hazard assessment topics were frequently studied in disaster risk financing themes. As depicted in WordCloud, the followings are the most frequently investigated finance topics: economic impact, climate finance, economic recovery, livelihood impact, economic resilience, disaster insurance, economic valuation, and government budgeting. This underline that disaster risk financing research in Indonesia is still much focused on post-disaster, even though the demand for knowledge of disaster finance planning or pre-disaster is urgently needed. The heavy financial burden of central and sub-national governments in responding to and recovering from natural disasters in Indonesia is skyrocketed in the last decade. Pioneering research could improve alternative methods and modalities for a more sustainable financial planning strategy.



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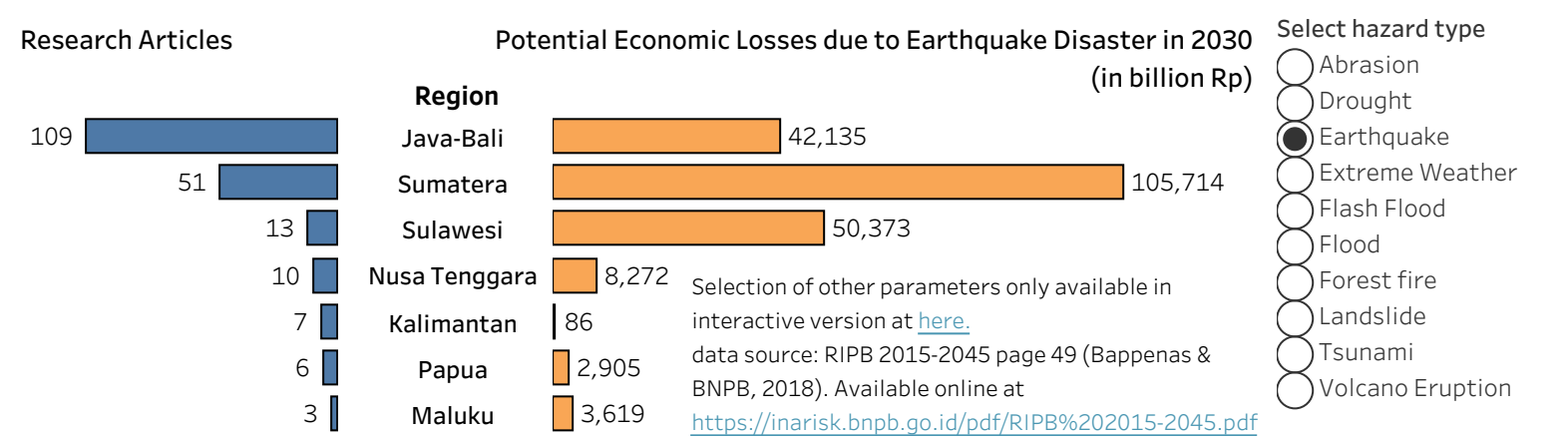
## Sankey Diagram of Research Articles: Location to Hazard type to Element of Disaster Management Phase



The Sankey diagram is visualized proportionally to the number of publications. The larger size of the box and the wider lines indicate a greater number of publications accounted for them. The Sankey diagram illustrates the distribution of scientific publications and their relations across locations, type of hazards, and element (i.e. the box) as well as the number of publications connecting between the boxes.

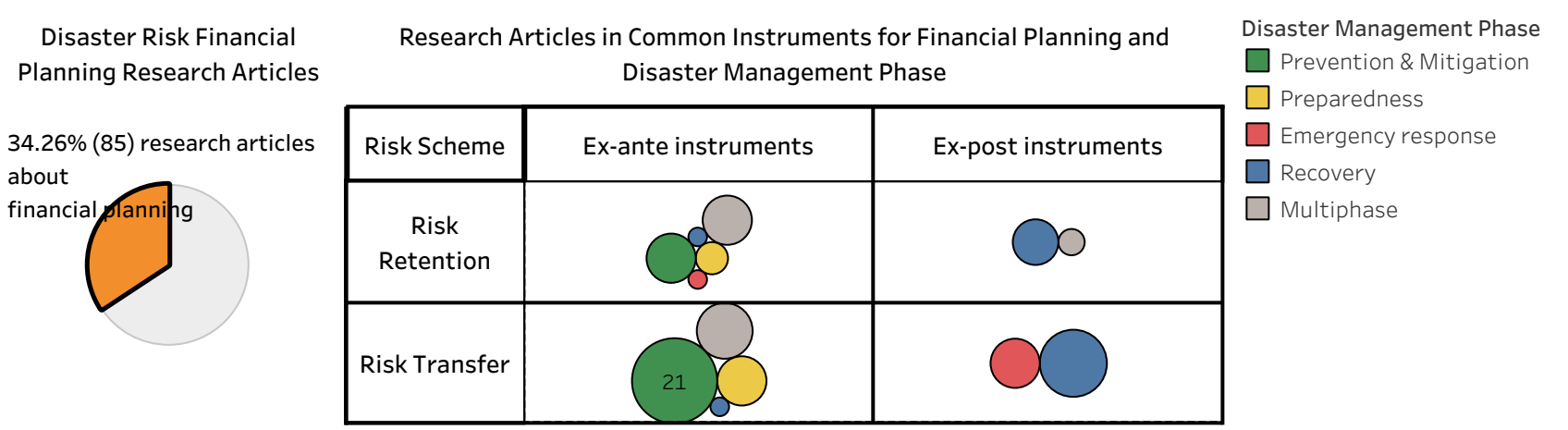
Based on the Sankey above, disaster risk financing research studies in the Java-Bali region quite equally investigated the hydrometeorological, geological, and climate change-related hazards. While research studies at the national level or without a specified location are largely related to climate change. In Sumatra, research articles on financing are mostly related to geological hazards. Studies on geological and hydrometeorological hazards are mainly about recovery phase topics, significantly greater than other phases. Research on climate change-related topics is mostly relevant to prevention and mitigation phase. Alas, disaster risk financing research relevant for preparedness and emergency response phase against geological hazards is extremely limited.

### Regional Brief



Java-Bali region predominantly has more research articles, doubled than in Sumatra, and even much greater than other rest regions. The notable gap between research articles number and potential economic losses due to the earthquake disaster in 2030 is observed in the Sulawesi region. Another is Papua and Maluku region, despite having higher potential economic losses but the research in disaster risk financing is still behind the Kalimantan region.

### Disaster Risk Financial Planning Research



Research topics on financial plans are comprised about 34,26% of disaster risk financial articles. We fitted the research articles into a common framework of financial planning. Found out that research on ex-ante instruments plan or pre-disaster is higher, mostly in risk transfer topics. It includes topics such as insurance, alternative crowdsourcing fund, and other capital market instruments.