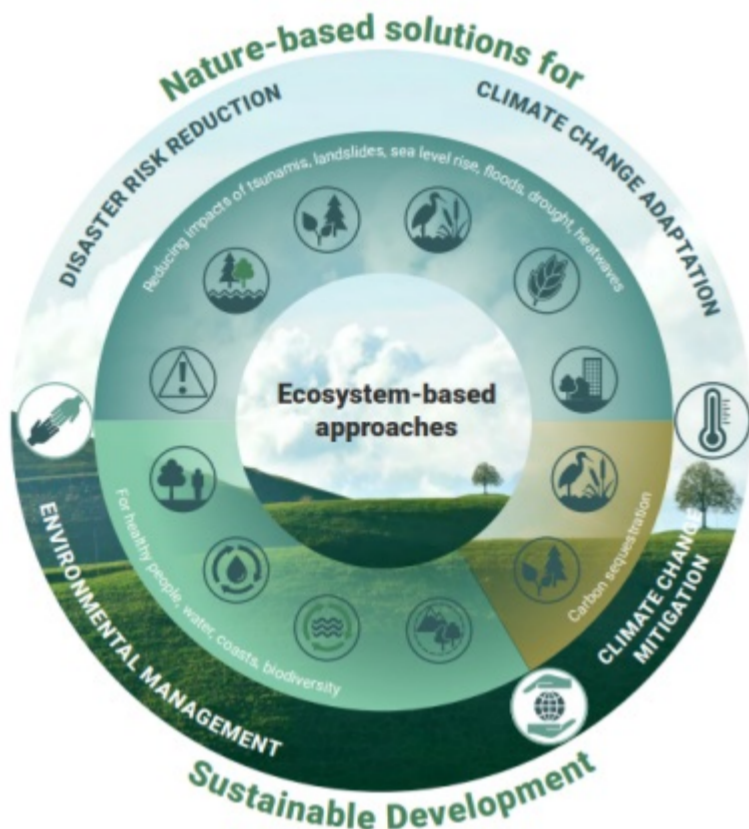


# Indonesia Disaster Knowledge Update - February 2022



## Research publications about Nature-based Solutions for Disaster Risk Reduction and Climate Change Adaptation in Indonesia

What is Nature-based Solutions?

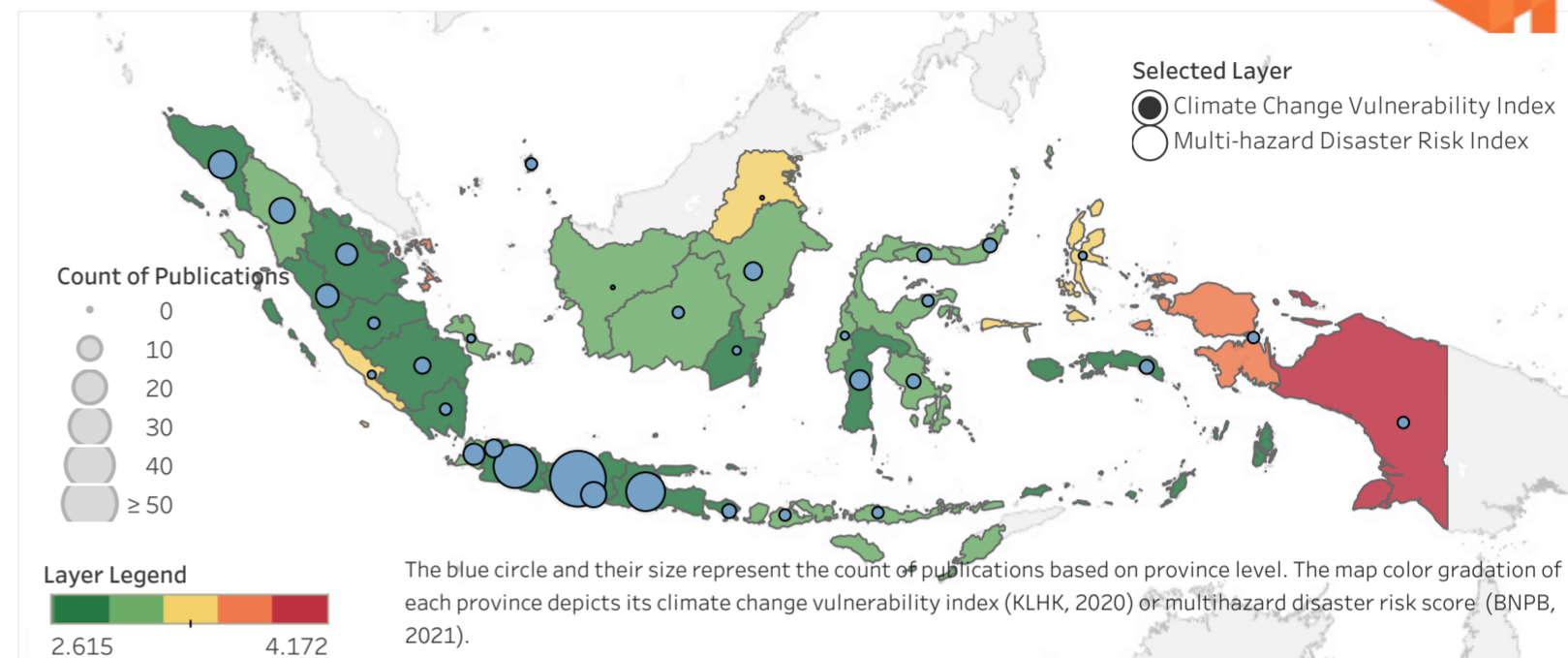


" Nature-based solutions (Nbs) are actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges, such as climate change and disaster risk, effectively and adaptively, simultaneously providing human well-being and biodiversity benefit. They are an umbrella concept that encompasses ecosystem-based approaches for climate change adaptation (EbA) and disaster risk reduction (Eco-DRR), and many other environmental management, restoration and conservation approaches and activities." UNDRR, 2021, p.15

" Ecosystem-based disaster risk reduction (Eco-DRR) and ecosystem-based adaptation (EbA) are related approaches and can also be thought of as a continuum, from mitigating large-scale disasters, such as tsunamis and landslides, to adapting to different climatic conditions. As mentioned above, both EbA and Eco-DRR make use of environmental management approaches. By definition, they both involve sustainable land management and conservation and restoration of ecosystems. Eco-DRR addresses climatic and non-climatic hazards, while EbA addresses climatic hazards and adaptation to long-term climatic change and its impacts." UNDRR, 2021, p.29

Figure sourced from Words into Action: Nature-based Solutions for Disaster Risk Reduction (UNDRR, 2021) [ <https://www.undrr.org/publication/words-action-nature-based-solutions-disaster-risk-reduction> ]

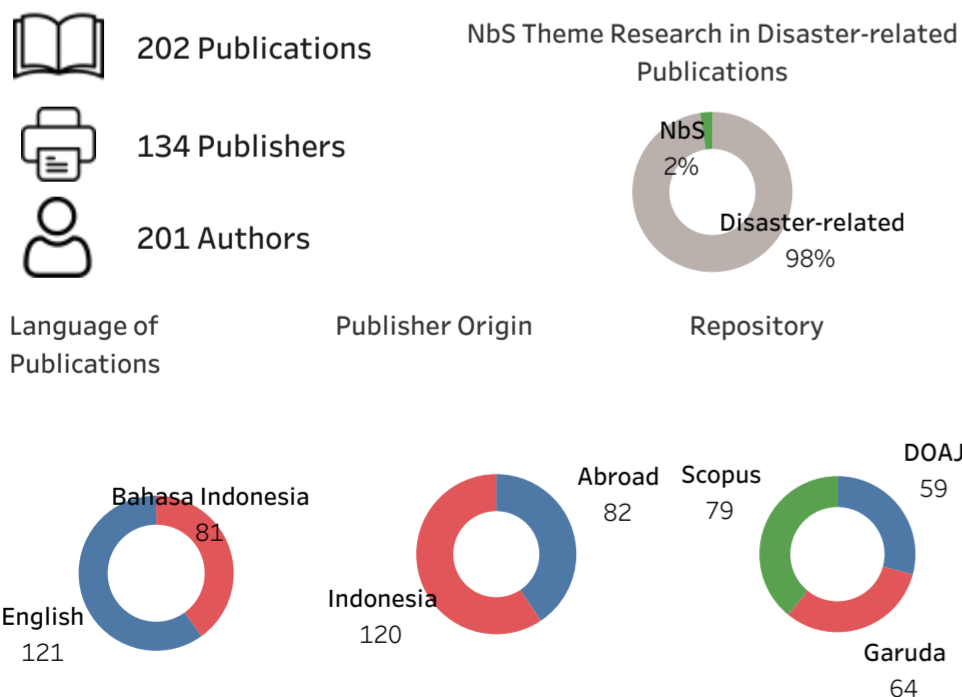
Distribution of NbS for DRR and CCA Publication Map



The map shows research publications distribution of NbS for DRR & CCA in Indonesia by province (source: CARI! repository-of-repositories, 2022). From 2022 collected publications about topics with relevance to Indonesia, 156 conducted research at the city/district level, 17 at the provincial level, 20 at the national level, and 9 publications at the global level in attribution to Indonesia. Publications were majorly located in western Indonesia, Java Island and Northern Sumatera have relatively high publications. Research publications distribution is not corresponding nor has any relation to the multi-hazards disaster risk score of the province. Notably, provinces with a lower climate change vulnerability index have more research publications than the others.

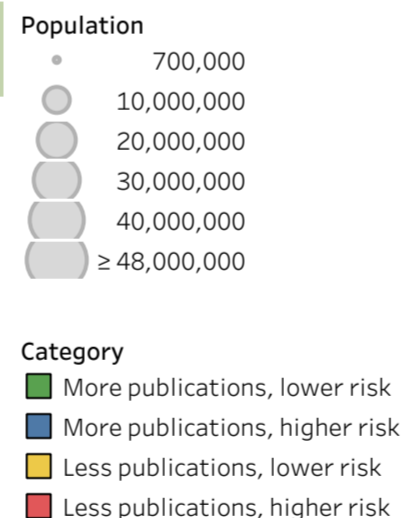
Level of Research Scope	
Global	9
National	20
Province	17
Cities	156

### Publication Statistics

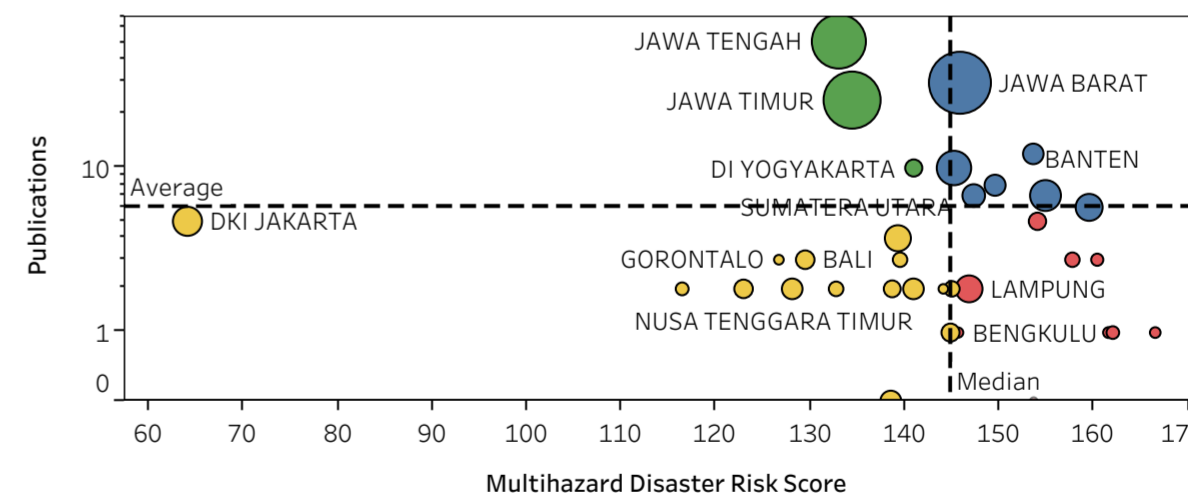


Based on CARI! repository-of-repositories, NbS research theme comprised of 2% from all disaster-related publications in Indonesia. Identification of NbS publications is done by selecting title and abstract using 101 keywords that correspond to NbS for DRR & CCA concepts.

The charts show the number of research publications about NbS for DRR & CCA in Indonesia published between 2003 and January 2022. These publications were extracted from Scopus, 59 publications from the DOAJ directory, and 64 publications from Portal Garuda. 121 publications were written in English and 81 publications were written in Bahasa Indonesia. A total of 120 publication titles are published by Indonesian publishers and 82 from abroad.



### NbS for DRR & CCA Publications VS Multihazard Disaster Risk Score

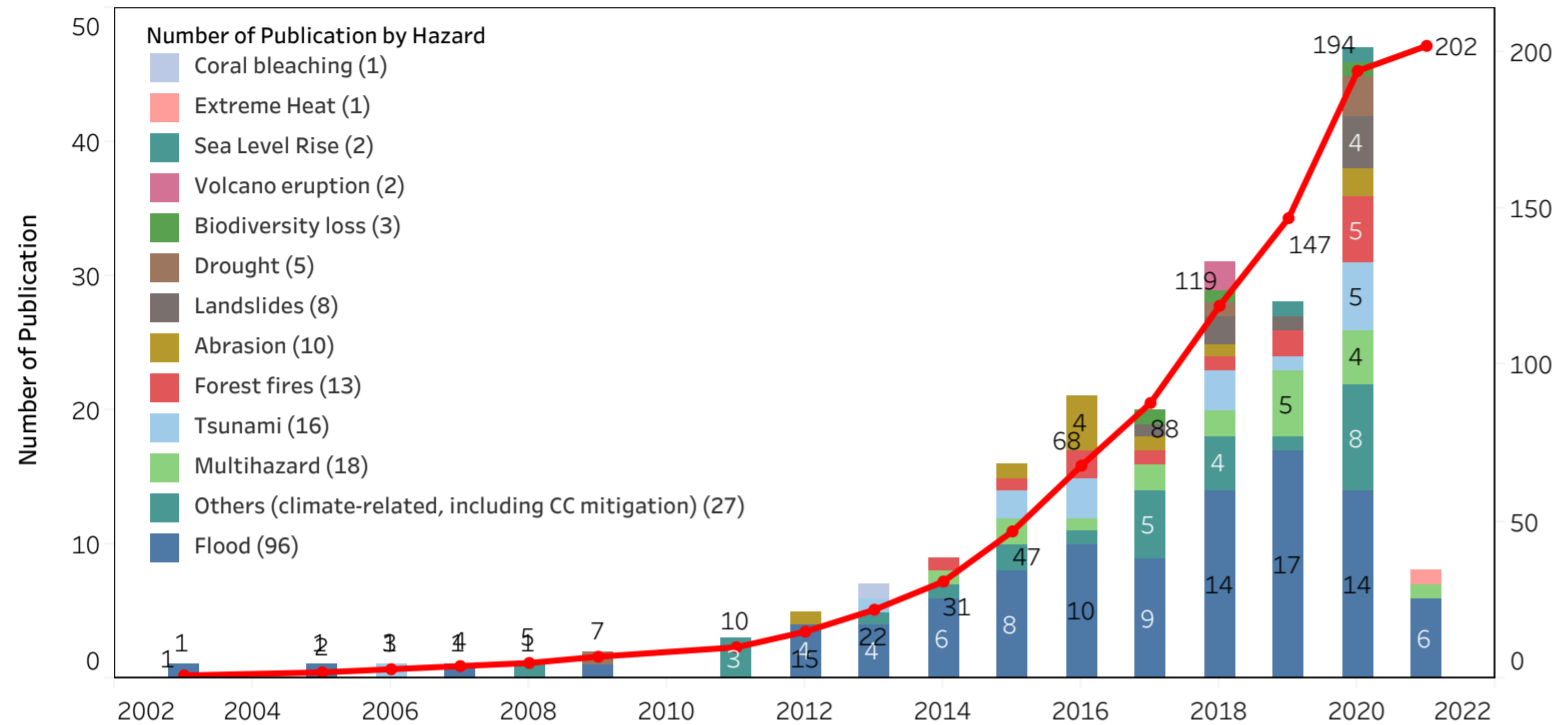


The quadrant plot shows the provinces category (represented by different colors) based on the number of NbS for DRR and CCA publications and multi-hazard disaster risk score (source: BNPB, 2021). The dot size depicts its province's total population (BPS, 2020). There are 3 provinces in green category which are Jawa Tengah, Jawa Timur, and DI Yogyakarta province, and the other 6 provinces in blue category located in Java, Sulawesi, and Sumatera. In the lower publication category, there are 16 provinces in yellow category and 9 provinces in red category. There is no record of research publication about NbS in Kalimantan Barat and Kalimantan Utara Province, even though their risk score is quite high. There is an urgent need to increase NbS related research for supporting DRR and CCA in these provinces.

# Indonesia Disaster Knowledge Update - February 2022



Research Publication Trend of Nature-based Solutions for DRR & CCA



The bar chart above indicates the NbS for DRR & CCA research publication trend from 2003 to 2021, the color code has attributed to the hazard type that was investigated. Although the NbS related topics have only gained traction in the last 5 years, research containing the NbS concept has been carried out since the early 2000s, and subsequently has increased significantly since the early 2010s. NbS research in connection with flood hazard is the most studied, the second most are about the climate-related hazard and climate change adaptation and mitigation. Multihazard is also studied widely, followed by tsunami, forest fires, abrasion, and so forth.

## Top Publications based on Scopus directory

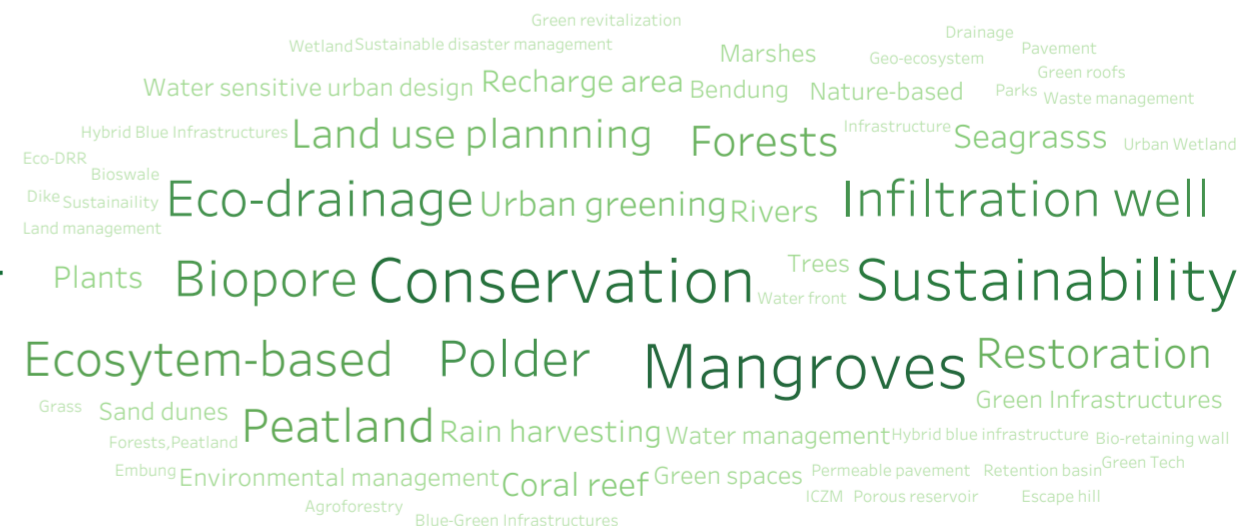
- Climate change impacts on seagrass meadows and macroalgal forests: An integrative perspective on and adaptation potential  
Duarte B. | Frontiers in Marine Science  
Published on 2018-06-04 | Cited by 30 articles
- Indonesia's globally significant seagrass meadows are under widespread threat  
Unsworth R.K.F. | Science of the Total Environment  
Published on 2018-09-01 | Cited by 29 articles
- Natural regeneration in a degraded tropical peatland, Central Kalimantan, Indonesia: Implications for forest restoration  
Blackham G. | Forest Ecology and Management  
Published on 2014-07-15 | Cited by 29 articles
- Shades of green and REDD: Local and global contestations over the value of forest versus plantation development on the Indonesian forest frontier  
Eilenberg M. | Asia Pacific Viewpoint  
Published on 2015-01-01 | Cited by 28 articles
- Species richness accelerates marine ecosystem restoration in the Coral Triangle  
Williams S.L. | Proceedings of the National Academy of Sciences of the United States of America  
Published on 2017-11-07 | Cited by 24 articles

The list above is the top-five publications on NbS for DRR and CCA themes in Indonesia which ranked by the number of citations from 2003 to 2021 sourced from the Scopus directory. The NbS adapted in coastal and forest ecosystems are prominently attracts other researchers to investigate. The ecosystem service function of seagrass, macroalgae, coral, peatland, and the forest are frequently studied.

### Top Investigated Cities

### Frequently Used Words

### Top Investigated NbS Topics



City or regency that most investigated about NbS for DRR & CCA were Kota Semarang, Kota Bandung, Kota Yogyakarta, Kota Samarinda, Cirebon, and Pandeglang. The most frequent words used in the research title were "banjir" or flood hazard, and notable words about the environment-wise such as "conservation", "sustainable", "ekosistem", "management", "green", "kota", and "resapan". The most prominent solution mentioned in publications is "Conservation", use of "Mangroves", "Sustainability", and other infrastructure solution such as eco-drainage, infiltration well, polder, biopore, urban greening, and so on.