

EGU22-1574, updated on 12 Aug 2022  
<https://doi.org/10.5194/egusphere-egu22-1574>  
EGU General Assembly 2022  
© Author(s) 2022. This work is distributed under  
the Creative Commons Attribution 4.0 License.



## **Potential Flood-Prone Areas in the Municipality of Saint Bernard, Southern Leyte, Philippines: Risk Evaluation and Flood Susceptibility Mapping using GIS-based Analytical Hierarchy Process (AHP)**

**John Reige Bendijo** and Maria Divina Morales

Mapua University, School of Civil, Environmental, and Geological Engineering, Manila, Philippines  
(jrbendijo@mymail.mapua.edu.ph)

Floods are processes that significantly affect populations, the environment, economy and infrastructure. The Municipality of Saint Bernard, a rural, data-scarce locality, is one of the areas in the Philippines frequently affected by flooding. Risk Evaluation and Flood Susceptibility Mapping are critical components of flood prevention and mitigation techniques because they identify the most susceptible locations based on physiographic attributes that influence flooding propensity. The first objective of this study is to generate a flood susceptibility map for the identification of barangays or zones susceptible to flood in the Municipality of Saint Bernard based on the eight (8) physiographic maps, namely: (i) Fluvial Geomorphology, (ii) Slope, (iii) Elevation, (iv) Lithology, (v) Land cover, (vi) Topographic Wetness Index (TWI), (vii) Drainage density, and (viii) Distance from the Rivers and Streams. AHP serves to determine the weights of the aforementioned factors. The distance to rivers and streams is ranked as the essential factor for finding areas susceptible to flooding, with the highest weighted rate of 20.10%. The authors utilized a quantitative approach to validate the generated flood susceptibility map by correlating with the historical flood datasets. The quantitative validation showed an excellent agreement between the susceptibility zones and historical flood events, of which 74.6% were coincident with high or very high susceptibility levels, thus confirming the effectiveness of AHP. The second objective of this study is to evaluate the relative percentage risk of flooding in every barangays or zones and the generation of risk exposure maps, which is essential to visualize each barangays' or zones' builtups, roads, and the population at risk.