

Stability analysis in the lower Manglaralto river basin, Ecuador, with a focus on conservation of the UNESCO ecohydrology demonstration site

PROBLEM

The lower Manglaralto River basin is part of a UNESCO Ecohydrology Demonstration Site with high hydrogeological and environmental value. However, riverbank erosion, unconsolidated sediments, climatic variability, and human pressure may increase landslide susceptibility, affecting ecosystems, infrastructure, and community safety.

MAIN OBJECTIVE

This study aimed to identify landslide-susceptible areas in the lower Manglaralto River basin by integrating geological, geophysical, and multicriteria modelling approaches to support conservation strategies for the UNESCO Ecohydrology Demonstration Site.

PROPOSAL

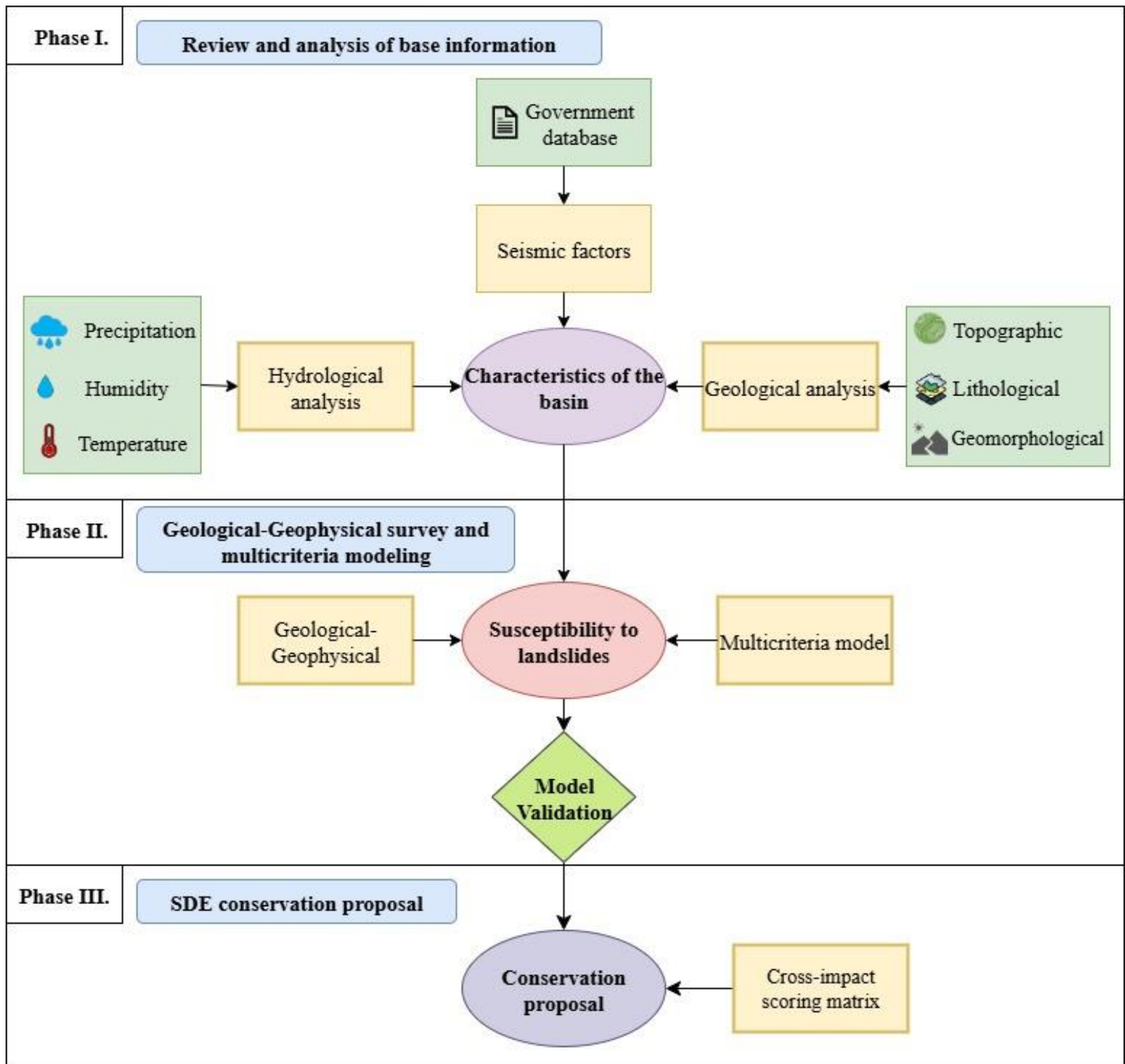


Figure 2. Methodological sequential scheme of the research process.

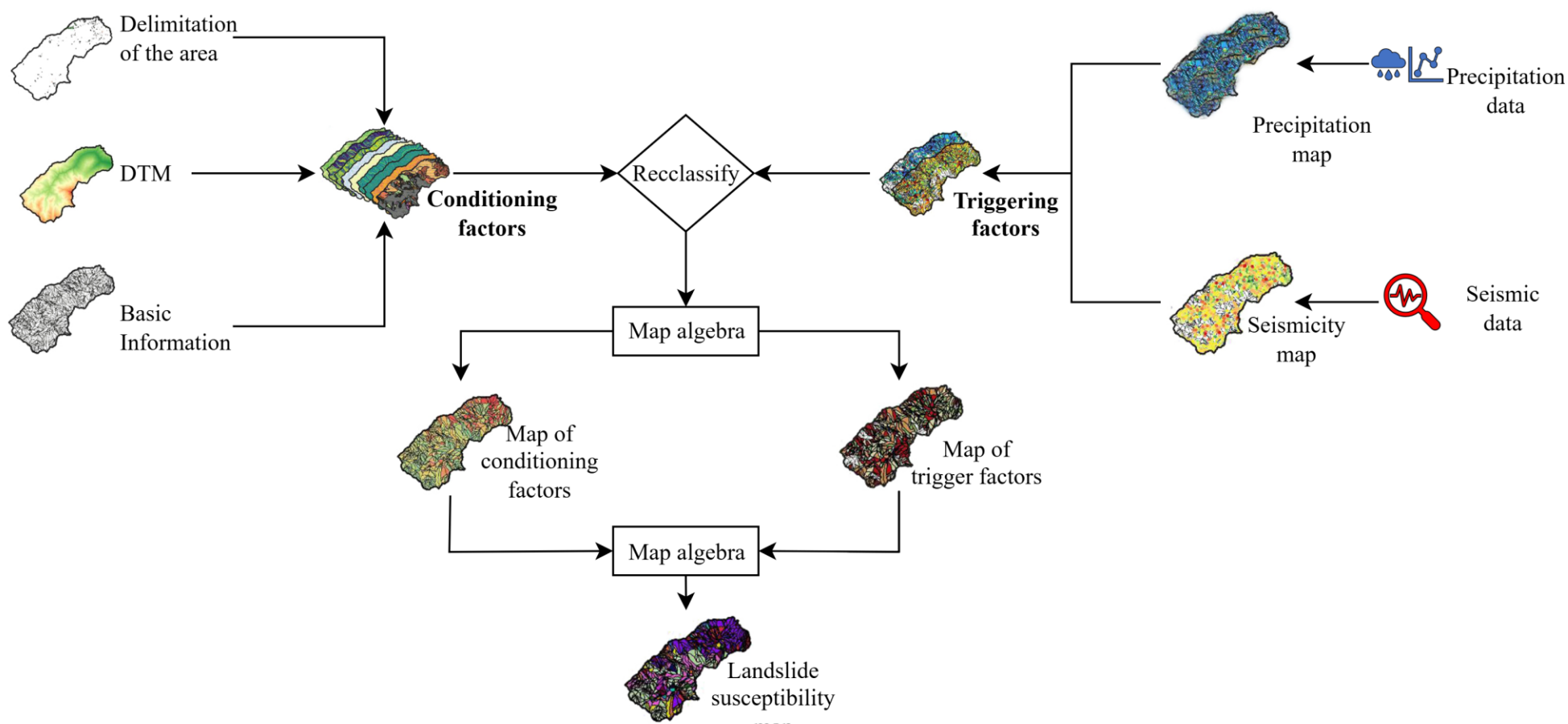


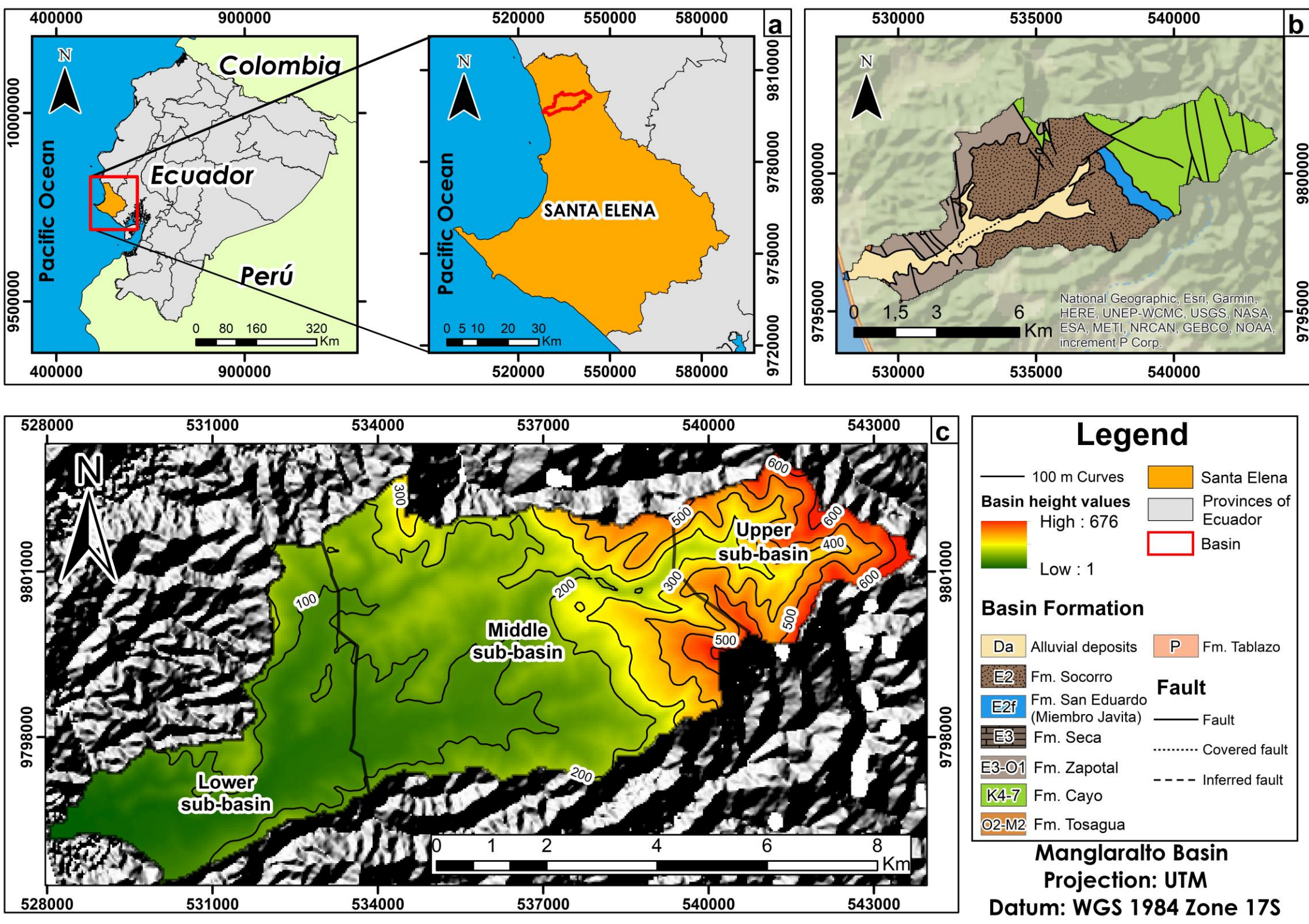
Figure 3. Workflow for the multicriteria model.

CONCLUSIONS

- The integration of Mora–Vahrson modelling, geophysical techniques, and GIS analysis allowed the identification of landslide-susceptible areas in the lower Manglaralto River sub-basin.
- Lithology and slope were the main conditioning factors controlling landslide susceptibility, while anthropogenic activities also influenced riverbank stability.
- Conservation strategies should include native revegetation, slope bioengineering, riverbank protection, environmental education, and continuous community monitoring.

ACKNOWLEDGMENTS

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RESULTS

High and very high susceptibility zones represent 29.78% and 17.19% of the basin, respectively. Nearly 47% of the study area shows high to very high landslide susceptibility.

