

Marine spatial planning in data-limited sites: integrating biophysical, socio-economic and governance information in Bayesian network models



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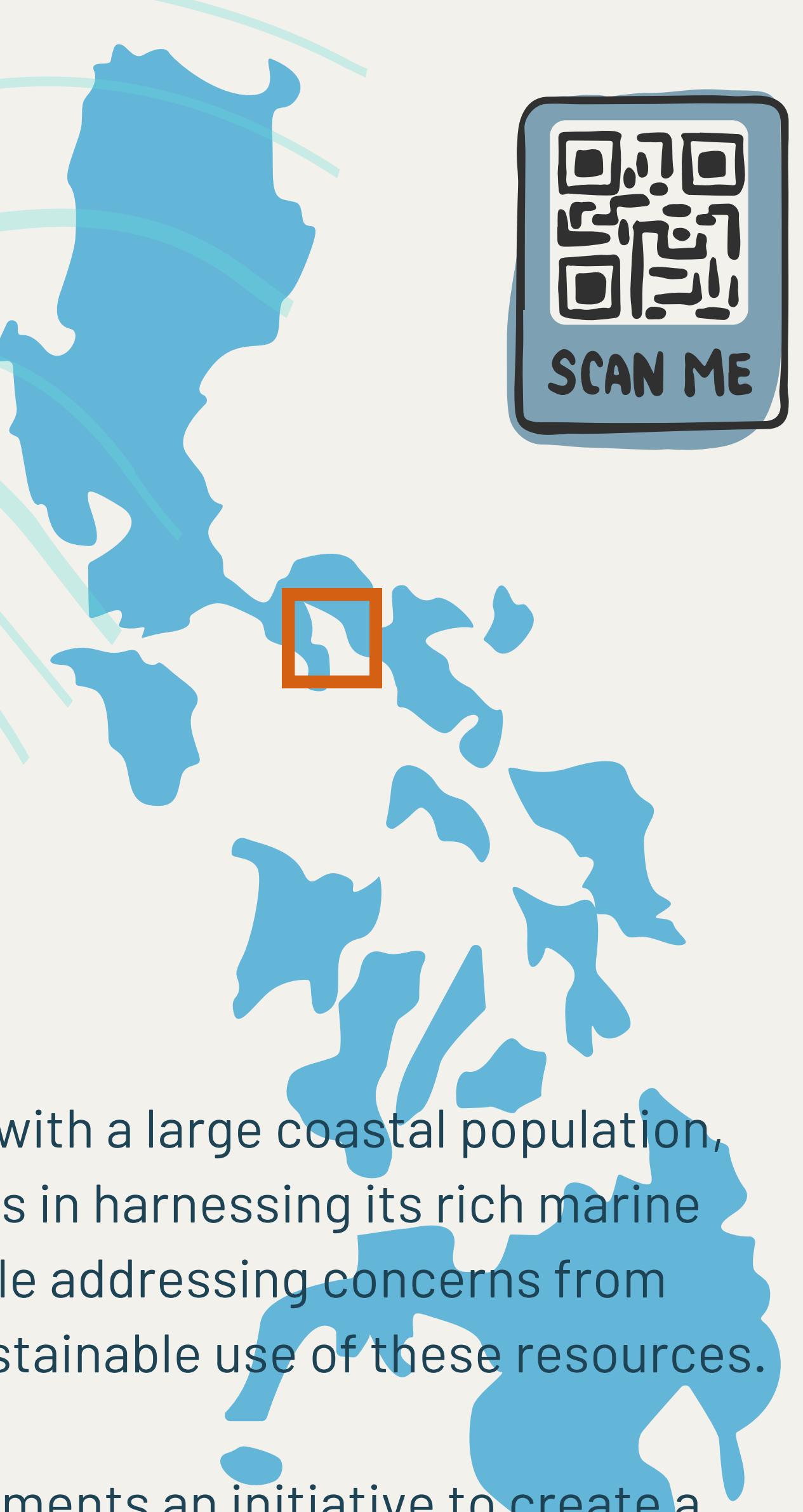
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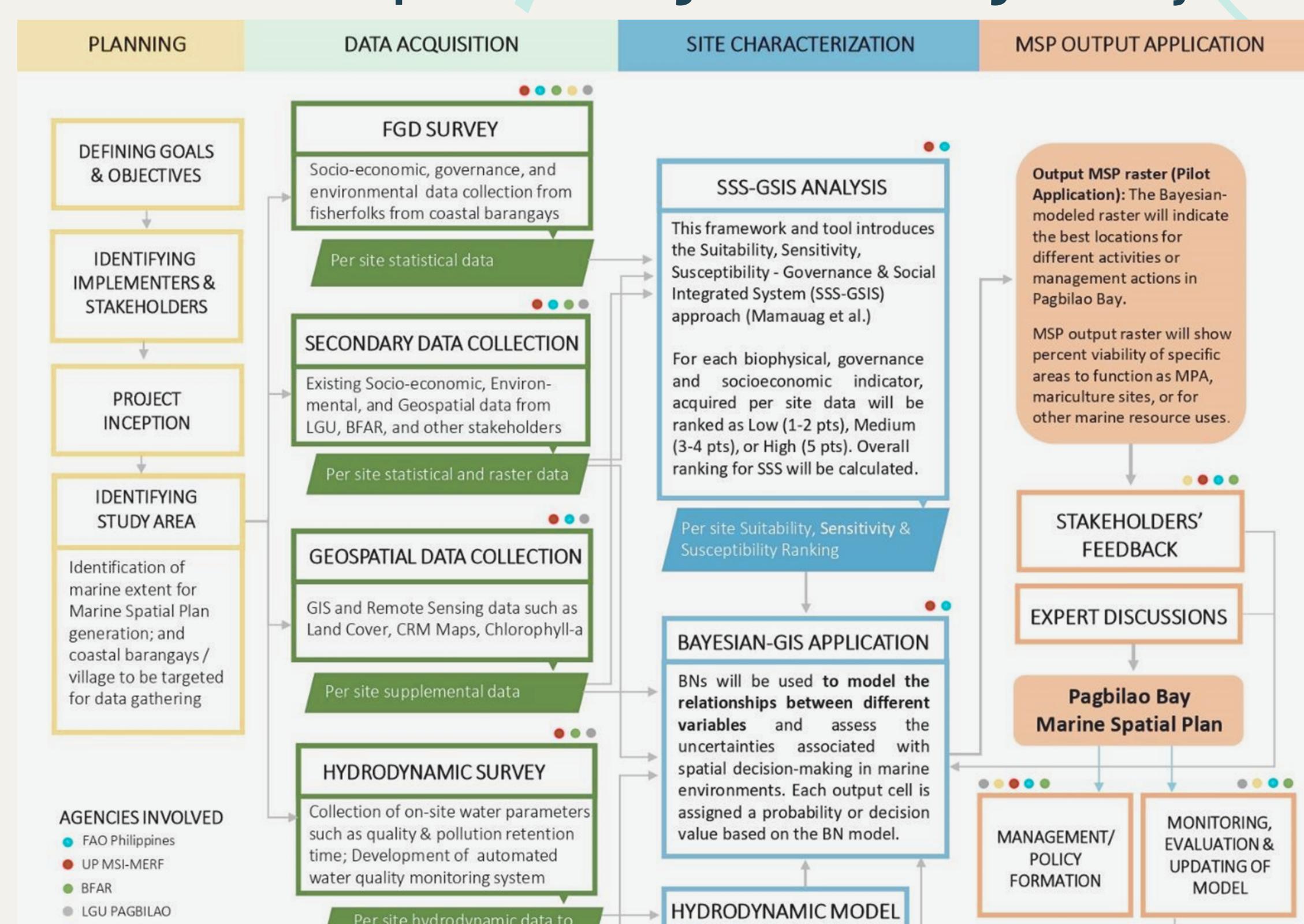
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The Philippines, with a large coastal population, faces challenges in harnessing its rich marine resources while addressing concerns from conflicting and unsustainable use of these resources.

The Marine Spatial Planning Process at Pagbilao Bay



This study documents an initiative to create a holistic framework and decision-support tool for marine spatial planning in areas with limited data. This makes use of novel approaches (SSS-GSIS and Bayesian network-GIS (BN-GIS) models) together with active stakeholder engagement. This is first applied to Pagbilao Bay, an area with rich capture fisheries and mangrove and coral reef ecosystems, that is considering establishing a mariculture area.

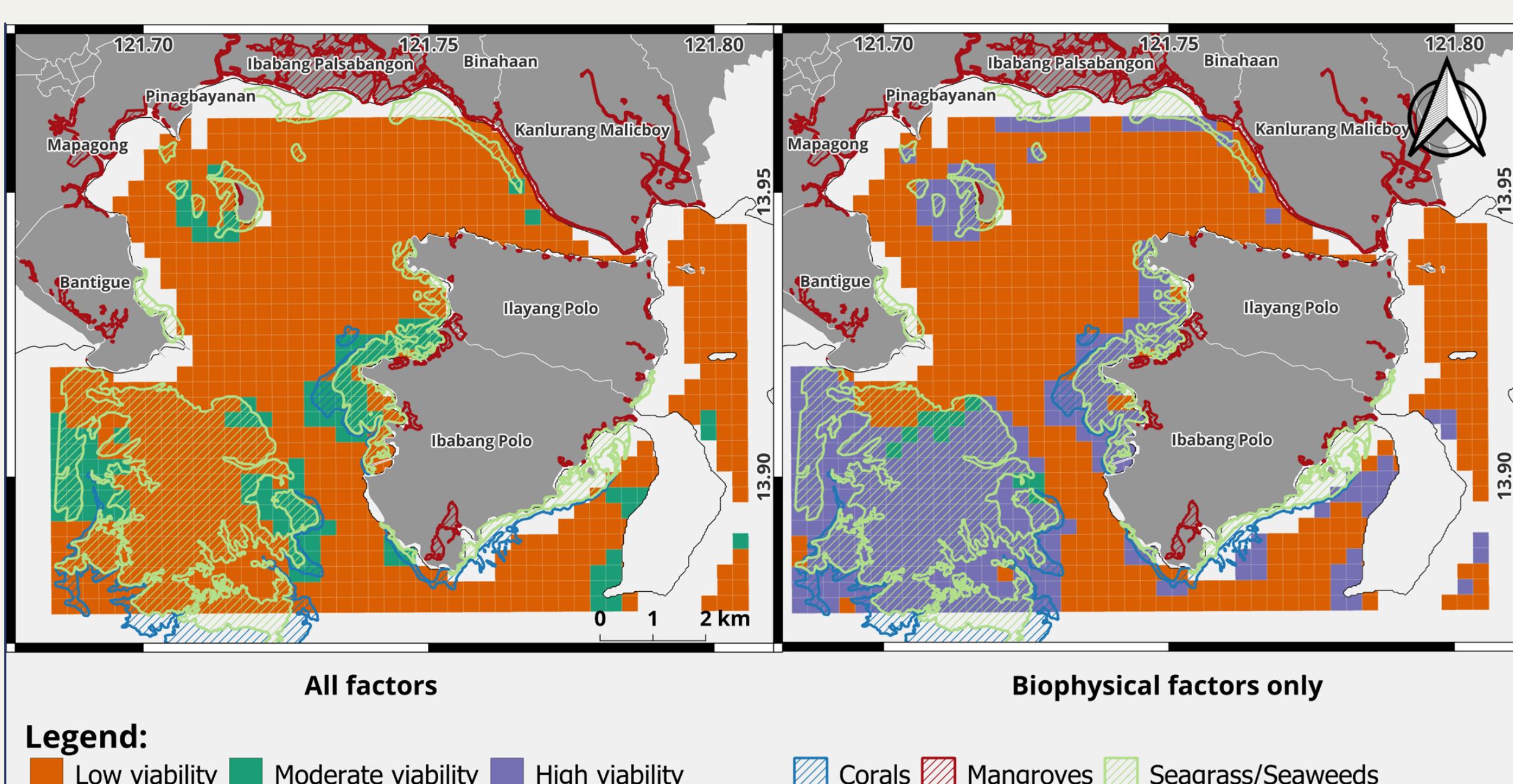
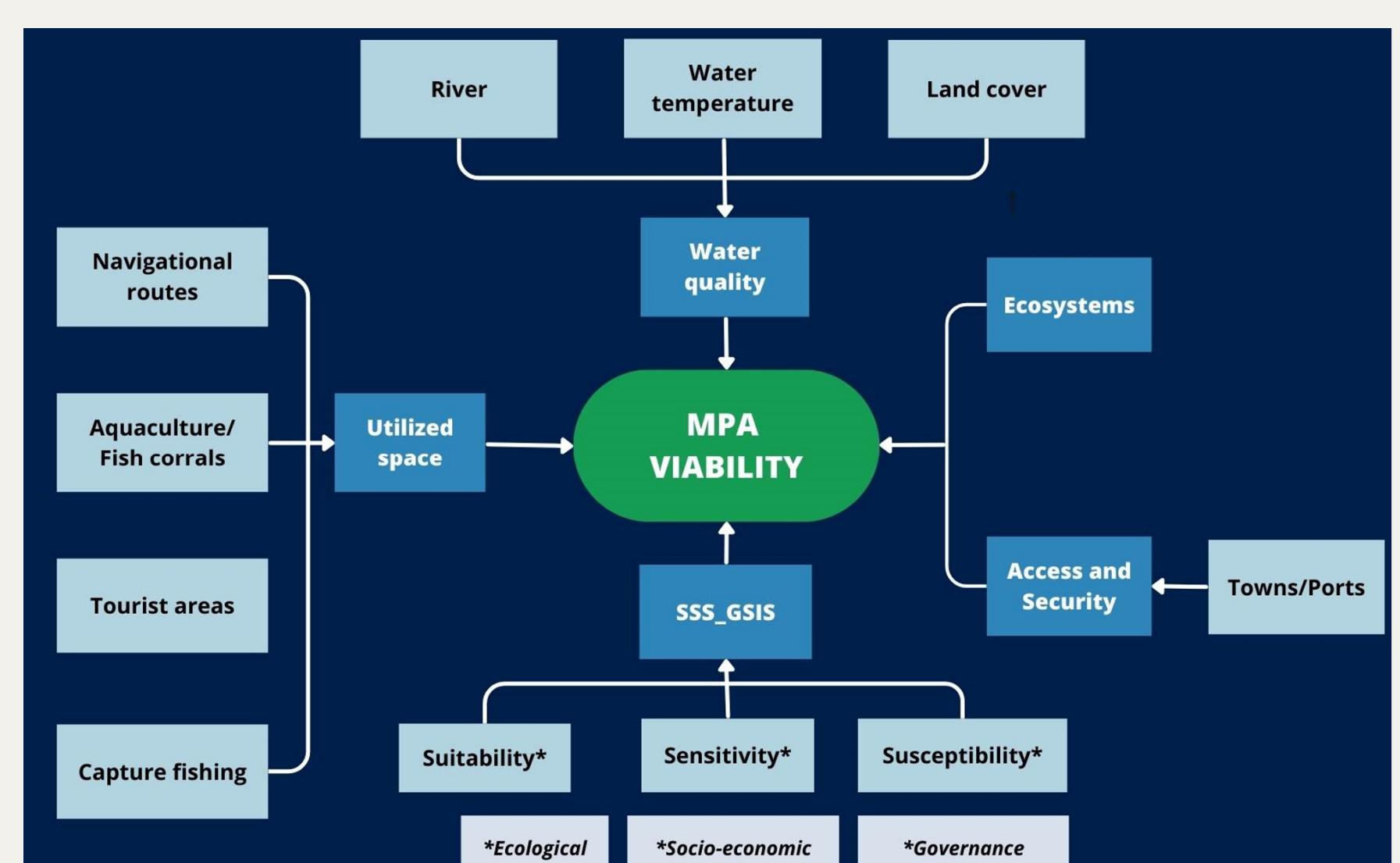
SSS-GSIS



Barangay	Suitability	Sensitivity	Susceptibility	Overall Score
Bantigue	Medium	High	High	High SSS
Mapagong	Medium	High	Medium	High SSS
Pinagbayanan	Medium	High	Medium	High SSS
Daungan	Medium	High	High	High SSS
Iba. Palsabangon	Medium	High	Medium	High SSS
Binahaan	Medium	High	Medium	High SSS
Kanlurang Malicboy	Medium	High	Medium	High SSS
Ilayang Polo	Medium	High	Medium	High SSS
Ibabang Polo	High	Medium	Medium	Low SSS

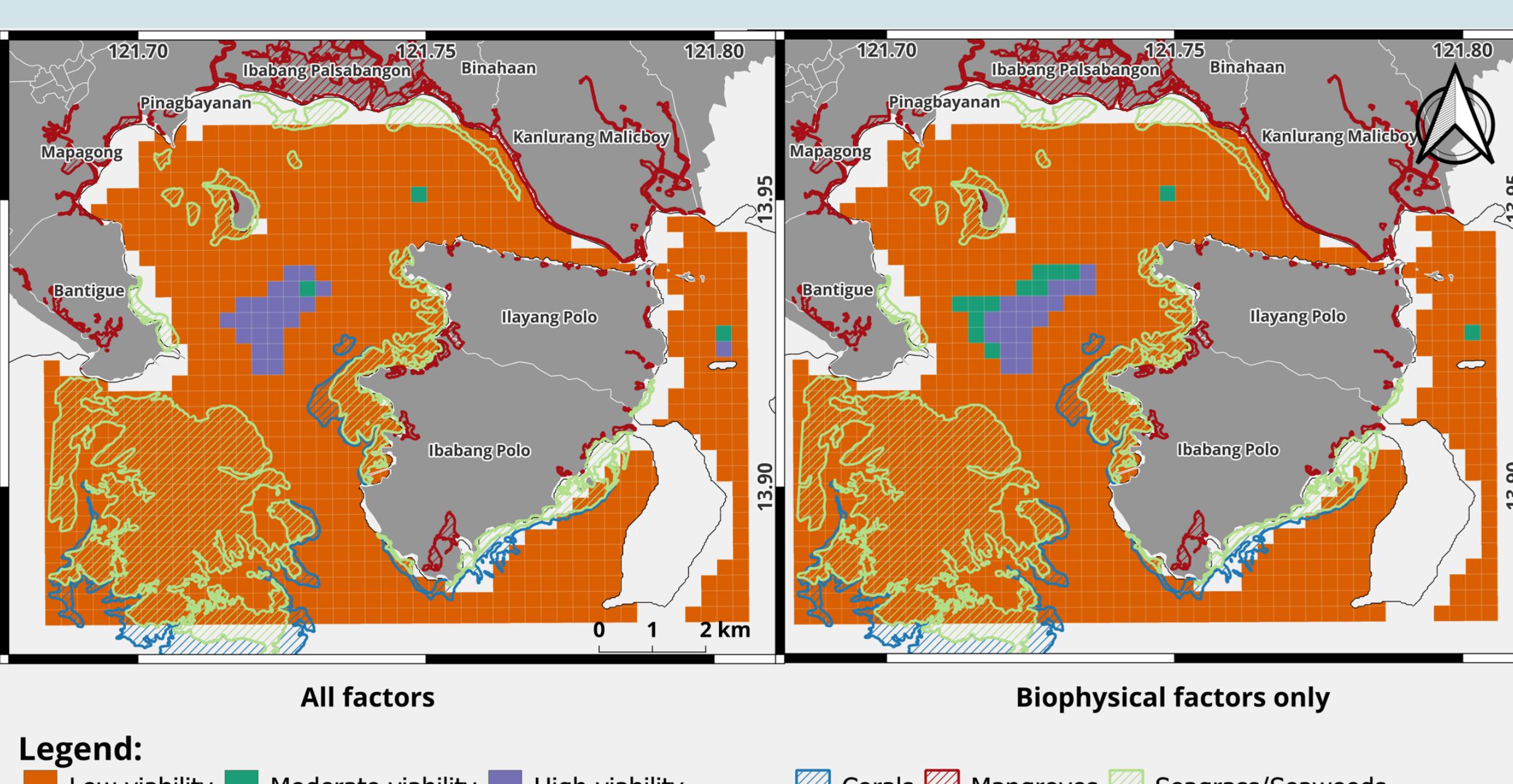
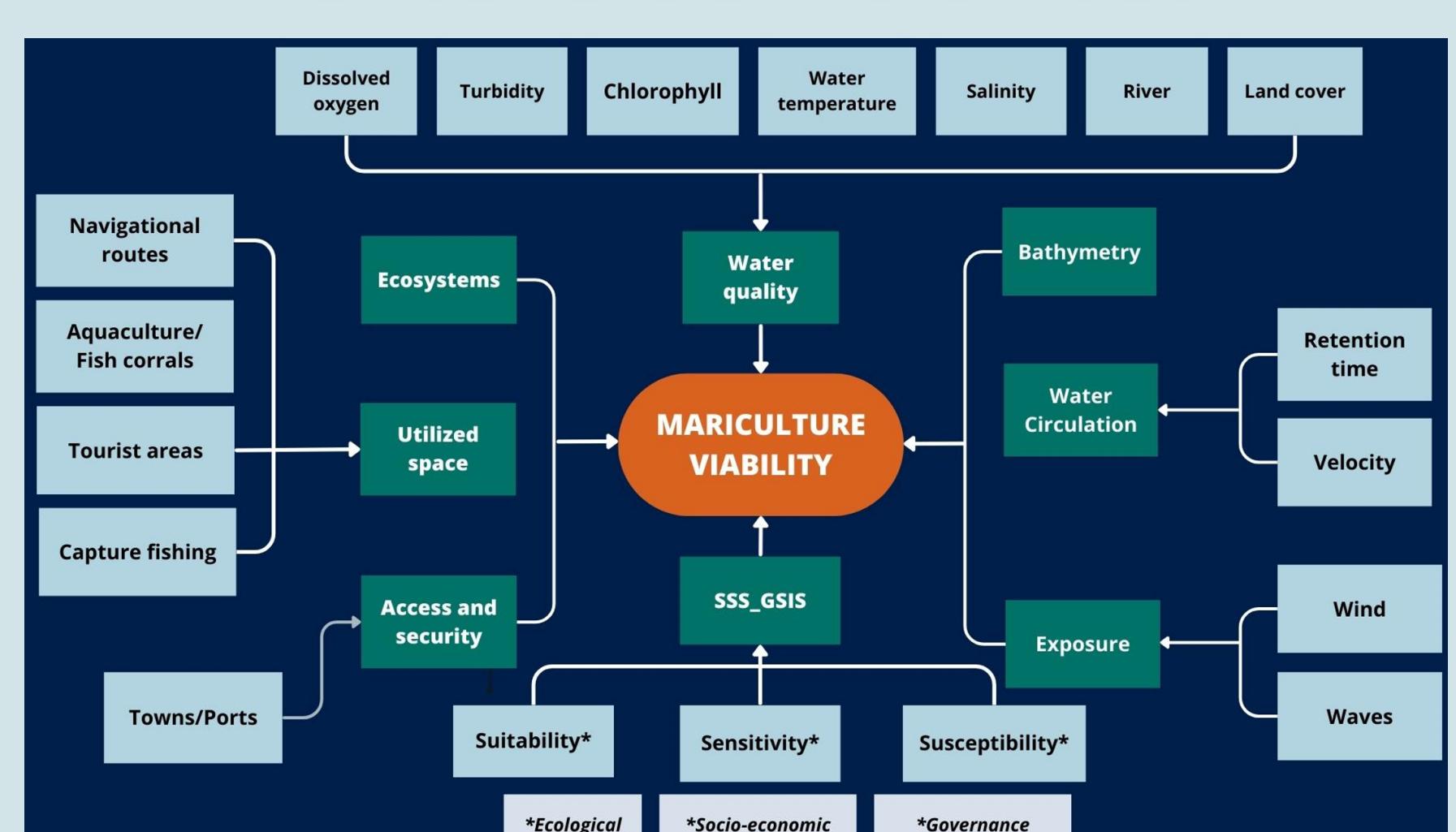
The SSS-GSIS, aligns with the Driver-Pressure-State-Impact-Response framework, incorporates indicators categorized into biophysical, governance, and socioeconomic aspects in accordance with established ecosystem-based management frameworks. Structured FGDs with stakeholders yielded scores that characterized Pagbilao barangays accordingly. The GSIS component also provided a means to integrate these results into management responses.

MPA BN-GIS Model



Viability of sites for Marine Protected Area (MPA) was influenced by biophysical, socio-economic, and governance factors including contribution from the SSS data in the BN-GIS model. Current MPAs can be expanded still, while some areas that could be large MPAs were smaller due to conflicts with existing traditional fishing grounds.

Mariculture BN-GIS Model



A combination of community and expert knowledge, and scientific data and hydrodynamic models were needed to fully form the BN-GIS model for mariculture viability. Middle portions of the bay could be considered for mariculture particularly since these did not conflict with other uses. However, during the stakeholder discussions, concerns on equity and assurance of water quality were raised.

Summary and Conclusions

- The SSS-GSIS approach provides holistic information and context; information, insights and management responses derived from this can be useful by itself
- The spatial Bayesian network model enables developing marine spatial maps despite some limitations in data through capturing knowledge from stakeholders and experts
- The MSP process in Pagbilao has proven to be a successful initiative, showcasing effective collaboration and transparency among stakeholders, resource managers, government units, and technical specialists
- These approaches are proposed to be continued and enhanced through the UN Ocean Decade project SUSTAIN-PH Ocean Observing and Coastal Resource Management that looks at providing decision support tools for different use cases in the Philippines

Acknowledgments

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