

Mikaela Gomez

Popular Science Summary

Title: Examining the protective services of mangroves at a regional scale in Indonesia

Mangrove ecosystems have the potential to provide a host of ecosystem services to the communities surrounding them. Dense, healthy, networks of mangroves are able to provide a buffer to coastlines against the increasingly frequent and intense storms, expected under the influence of climate change. Additionally, healthy, mangrove ecosystem provide coastal communities with other benefits such as more diverse livelihood opportunities, food, and resources. Despite these many benefits, many mangrove ecosystems have been deforested and degraded due to urban development and, conversion to agricultural land and aquaculture farms.

Although Indonesia currently hosts more than 20% of the world's mangroves, there are concerns that the massive land use changes that have been occurring in the three decades has led to substantial deforestation and degradation of the mangroves in Indonesia. This thesis uses a case study approach to examine how the exposure of the coastal population of Kalimantan, Indonesia has changed as a result of coastal mangrove loss and population growth. To answer how exposure has increased, the change in population density has been calculated between 2000- 2020 in relation to the distance from the various mangrove classes. People living in proximity to undisturbed and degraded mangroves may be more exposed to consequences of coastal hazards than those who receive more protection from many undisturbed mangroves.

The results of this study show that, in the last thirty years undisturbed mangroves in Kalimantan have declined by a total extent of 1208km² between 1990 and 2020. The net loss of mangroves is not evenly distributed across Kalimantan, and this study further reveals that degradation of mangroves is occurring more extensively than deforestation of mangroves. The primary cause for the deforestation is the conversion of mangroves to other land use types, namely, aquaculture, oil palm, agriculture, and mining. Degradation of mangroves, on the other hand, appears to be more closely linked to small scale anthropogenic pressures and the unsustainable use of mangroves close to settlements and development areas.

This study additionally reveals that, the government of Indonesia is actively working towards increasing the sustainable management of mangroves for disaster risk reduction and climate change adaptation purposes. Evidence of this, is found in Indonesia's NDCs, where there is a clear link to the use of mangroves as a mechanism for pursuing climate change adaptation activities, as well as through a vast array of laws and governing bodies that manage mangroves across the country. That said, whilst there are structures in place for the management of mangroves, they are fragmented across multiple different governing bodies and stakeholders, which may be hindering their effectivity. Lastly, there is a strong need to ensure that actions any actions taken are translated to the local level by incorporating local stakeholders, to achieve sustainable use of the ecosystem to prevent the continued loss of mangrove forests.