

Areas of Vulnerability to Sea-level Rises in Vietnam's Mekong Delta

Purpose

In 2007, a World Bank study found Vietnam to be one of the most threatened countries in the world in terms of climate change vulnerability. The country's Mekong Delta in southern Vietnam is at particular risk. Marked by fertile soils and abundant waters, the Mekong Delta is home to 17 million people, 75 percent of whom rely on agriculture for their livelihoods. As the country's main agricultural region, the Delta produces more than 18 million tons of rice annually as well as a number of other fruit and vegetable crops that supply both domestic and export needs. The threat of climate change and a potential 1-meter rise in sea level now threatens this agriculturally vital region. This study highlights the Mekong Delta and its most vulnerable provinces in terms of poverty and reliance upon agriculture, projecting out to the year 2019.

Methodology

The primary source for this data was 1999 census data collected by the General Statistics Office in Vietnam; this was the most recent completed census available to me for this project. Within this dataset, I was interested in population density in the Mekong Delta; the percentage of this population living under the poverty line; and the percentage of the population working in agriculture. I also used data from GTOPO30 to determine land areas in Vietnam above and below 1 meter in height. Lastly, I used Global Land Cover data to determine types of land cover in the Delta.

To determine the areas vulnerable to sea-rise flooding, I used GTOPO30 data from USGS and performed a Reclass function that delineated areas above 1 meter in height as "0" and areas below 1 meter in height as "1." To make projections on estimated affected populations, I used trends from 1999 to 2009 to determine the likely direction in 2019 of agriculture as a percentage of GDP as well as population in the region.

Results

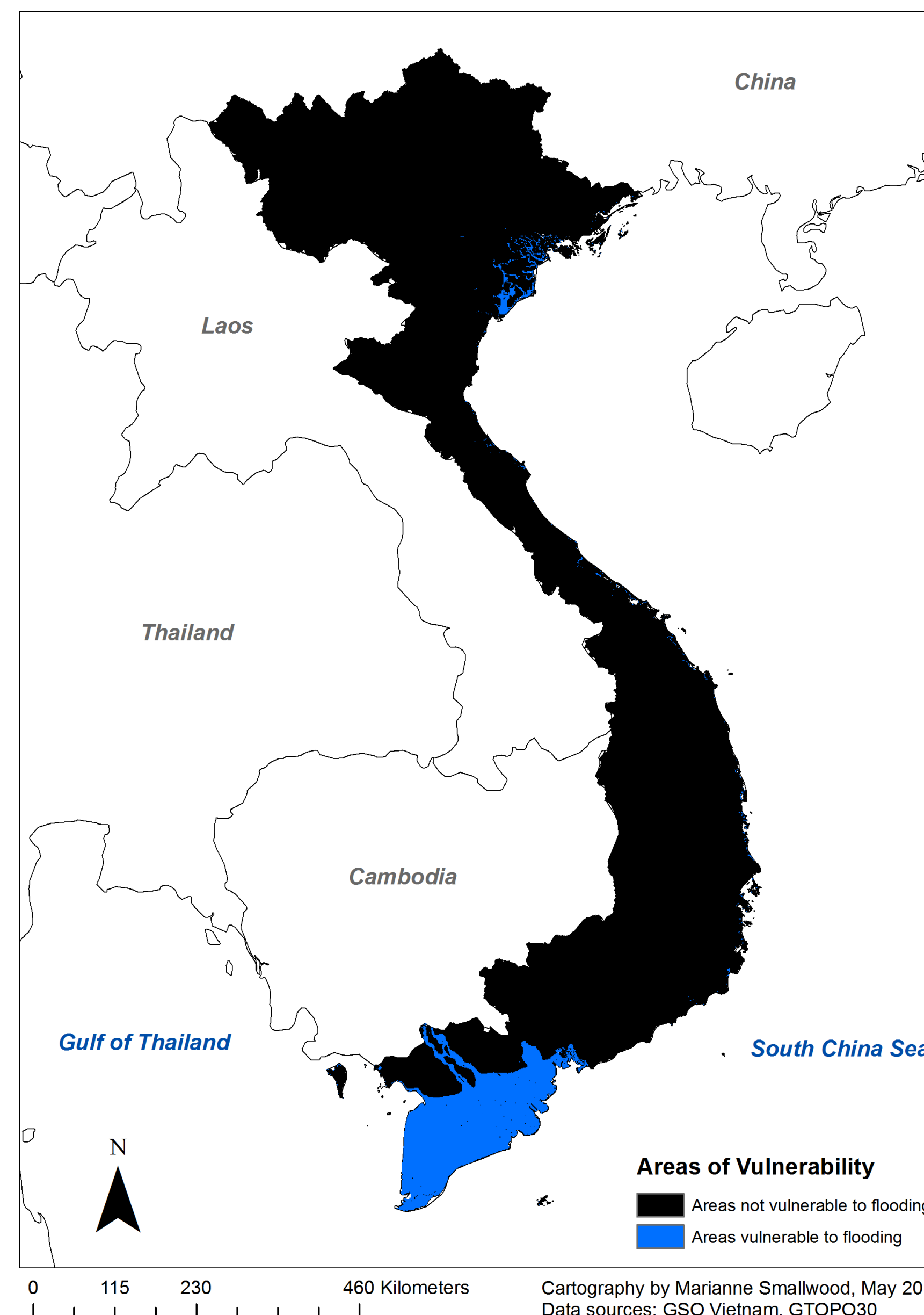
As seen in the map of Vietnam at left, the Delta is indeed the most vulnerable area in Vietnam in terms of affected population and vulnerability to sea-level rises. The poverty density map shows that the Mekong provinces in the north and west areas of the region— Dong Thap, An Giang, and Kien Giang— would be hardest hit if sea-level rises were to eliminate their agricultural-based livelihoods. Some of the southeastern provinces such as Soc Trang and Tra Vinh would also be severely affected. Based on the land cover map, it is clear that most of the Delta has been cultivated with little to no idly used land.

Additionally, projections made from population trends give us a clearer idea of numbers of affected persons in the Delta if no mitigating efforts were put in place to combat climate change. In 2019, an estimated 19.7 million people will live in the Delta. Agriculture as a percentage of national GDP has decreased from 27.7 percent in 1996 to 21.8 percent in 2004 and is projected to decrease even further to 17 percent by 2019. Although agricultural contributions to regional Mekong Delta GDP remain high at 45 percent in 2008, the agriculture sector's contribution to regional GDP has also been decreasing at 3.2 percent per year. Not only are the Delta's poor reliant on an agricultural sector that has been decreasing in size, they are also located in an area of the country that will be hardest hit in the event of sea-level rise.

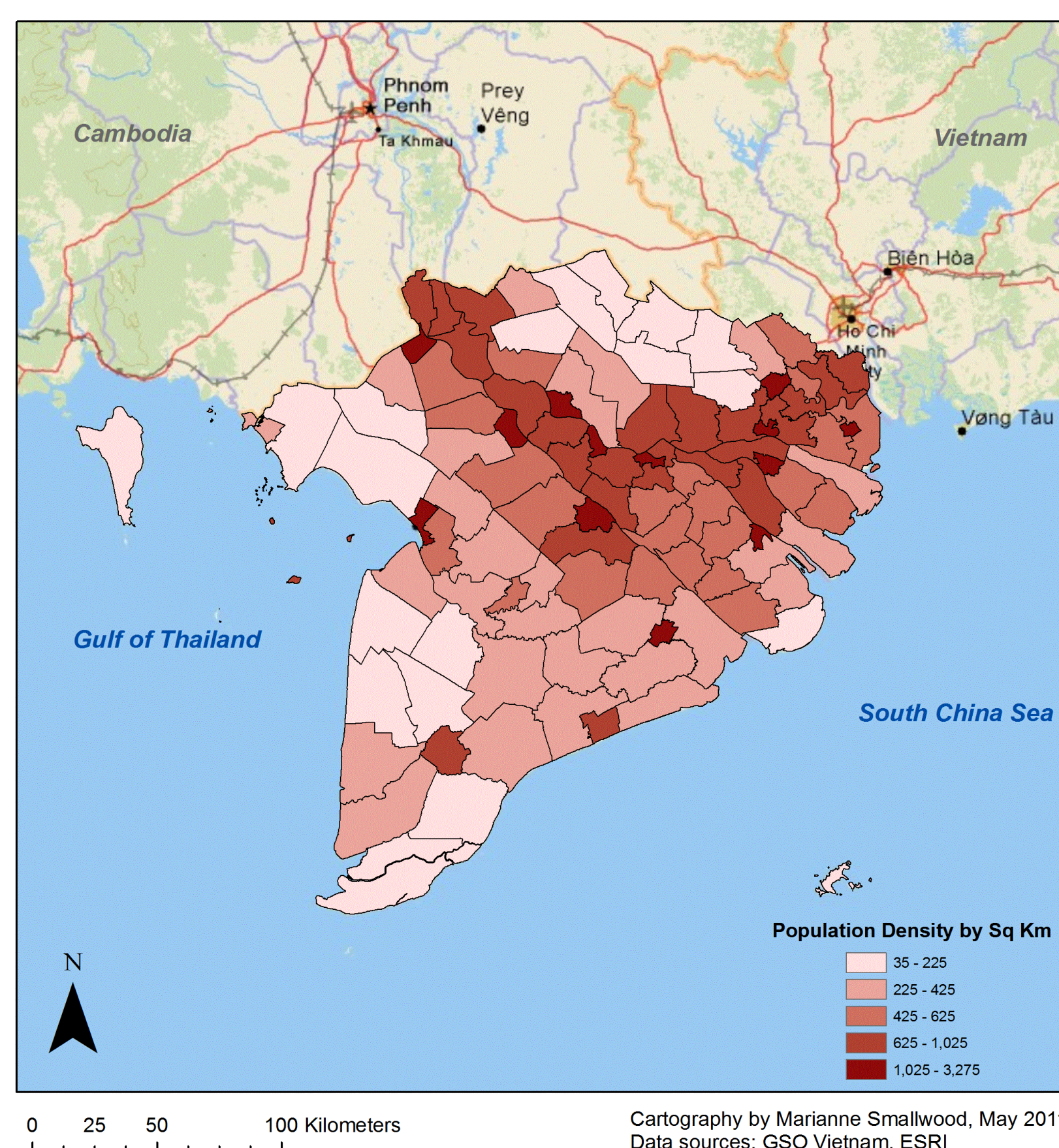
Summary

Given that the majority of the population in the Mekong Delta are reliant on agriculture for their livelihoods- one-third of whom may be displaced by sea-rise flooding- it is crucial that the government of Vietnam and other international actors work together to anticipate the adverse effects of climate change on the Delta. Preventative measures such as building dikes must also be combined with planning for possible migration of displaced Delta residents as well as ensuring that agricultural production does not fall below levels needed to sustain Vietnam's population and maintain its strength in exports.

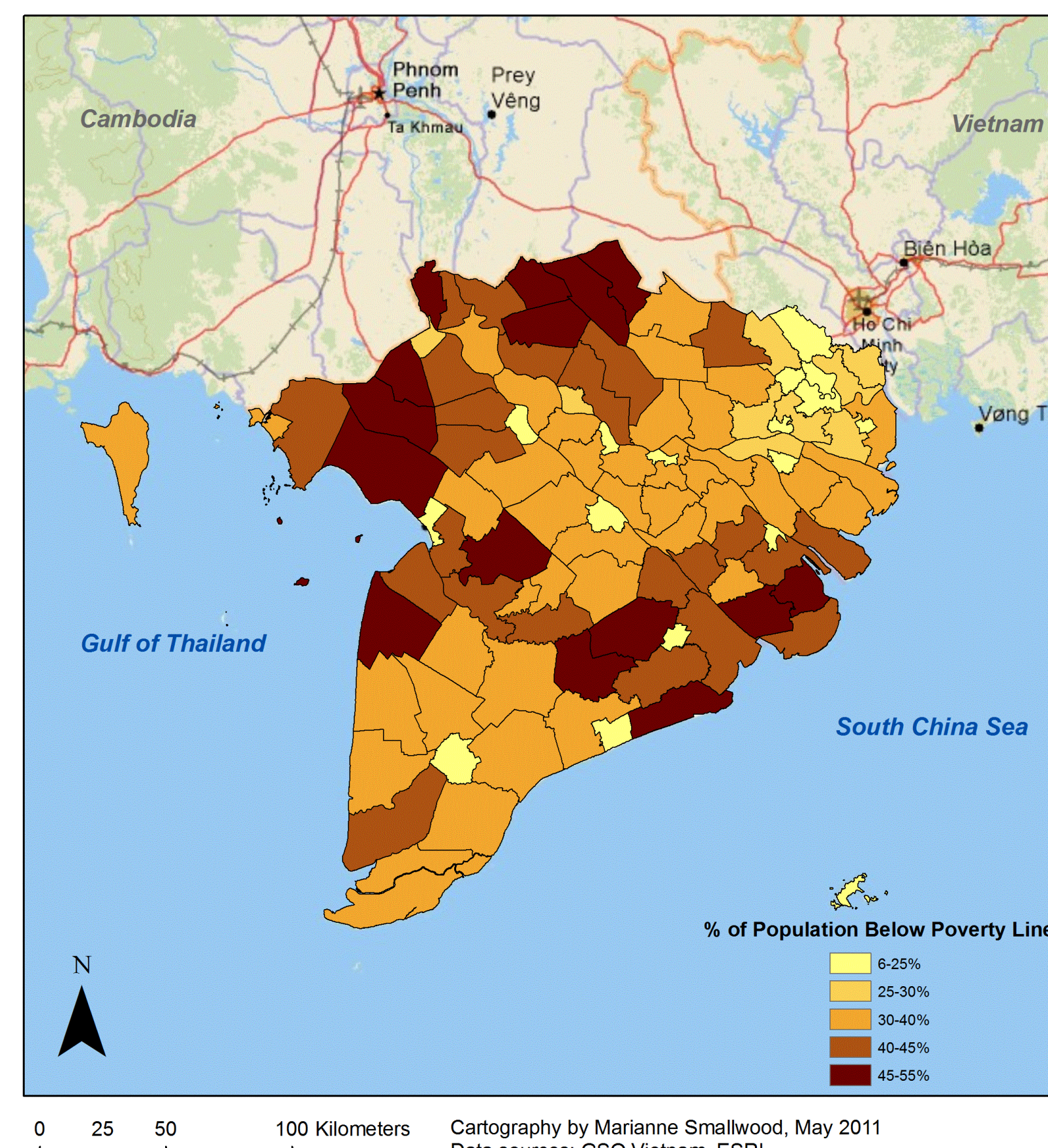
Areas of Sea-Level Rise Vulnerability in Vietnam



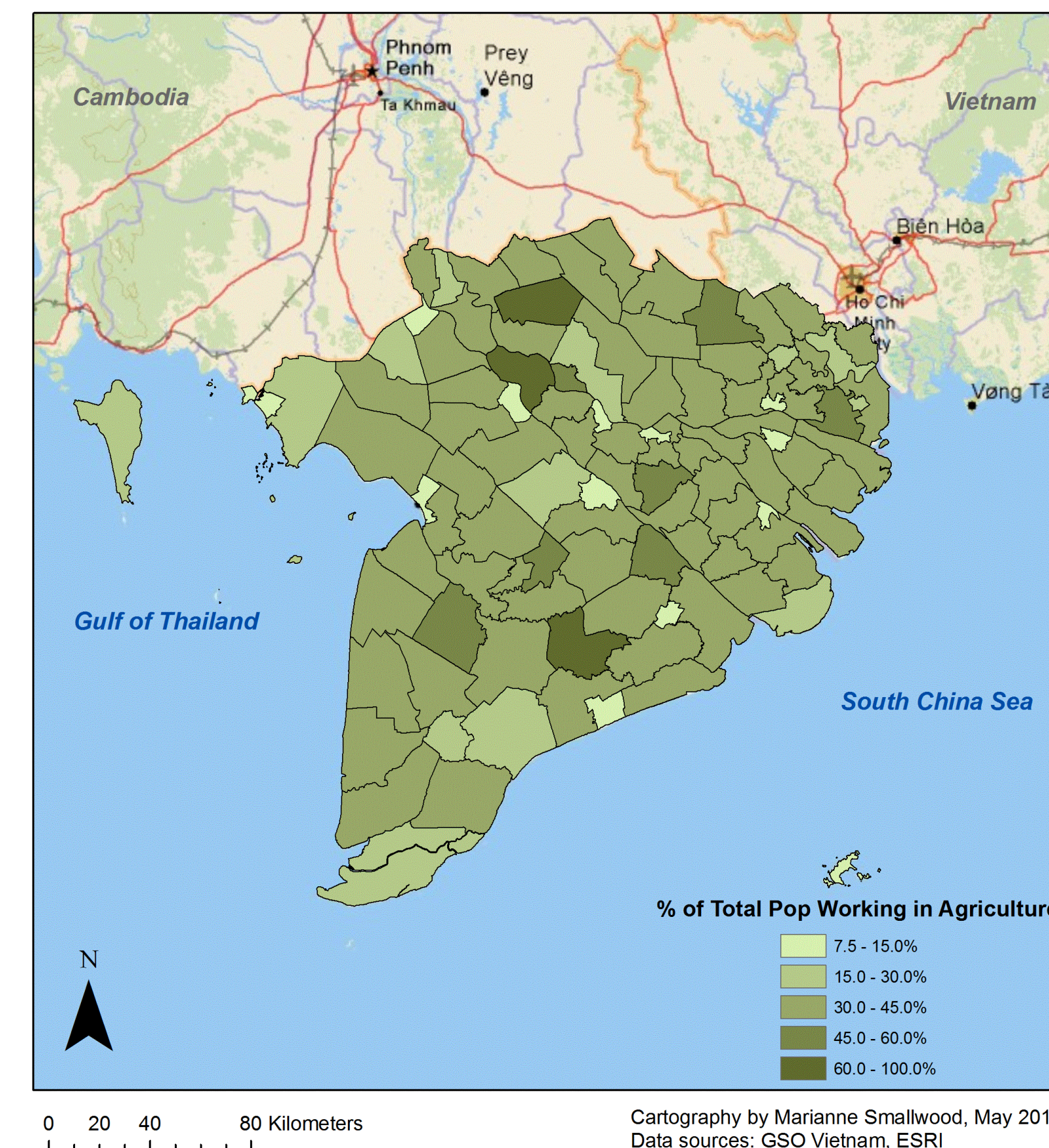
Population Density in Mekong Delta



Poverty in the Mekong Delta



Population Working in Agriculture in the Mekong Delta



Land Cover in the Mekong Delta

