A comparative analysis of mangrove cover at two mangrove sites of India for climate adaptation strategy

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To combat climate change, increase in carbon sink or forest cover is the most important adaptation technique. India has committed to create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent by 2030 in the Intended Nationally Determined Contribution (INDC) submitted to the Paris meet COP 21 (Conference Of Parties).
As mangroves are reported to trap more carbon compared to terrestrial plants it can be of high significance from the aspect of land crunch concern.
A combined analysis of aerial extent, vegetation health, and carbon emission due to loss of vegetation can give a better snapshot of Indian mangrove resource. Though individual detailed level study is done for different mangrove sites but a comparative mangrove extent and health study for mangrove sites of India is not done.
We quantify the loss of mangrove cover at two sites of India (Sundarbans, Gujarat) and calculate Tier II estimation of carbon emission due to loss of above ground biomass alone employing carbon stock value of mangrove of each site for a time period of 2001 to 2016.
After analysing loss of vegetation, we investigated the health of mangrove vegetation along with Land surface temperature and precipitation at these sites.
In this study, mangrove cover at the sites of Sundarbans and Gujarat is analyzed using Landsat imagery, employing supervised classification techniques. Land surface temperature is also extracted from the same. Precipitation data is taken from the CHIRPS (Climate Hazards Group InfraRed Precipitation with Station data) dataset.
We find that the mangroves in Sundarbans undergo comparatively higher deforestation owing to different natural and anthropogenic threats than the mangroves in Gujarat site. As the carbon emission value of above ground biomass of Sundarbans is higher than that of Gujarat, a higher carbon emission profile is observed for Sundarbans site. We found that in terms of vegetation health, Sundarbans have better forest cover and a no –declining trend but Gujarat site has comparatively low mangrove health and shows decreasing vegetation health trend over time. Precipitation is higher in Sundarbans than Gujarat site. LST is a little higher on the Sundarbans site and shows an increasing trend. Gujarat also show slow increasing trend of LST but with lower side of value.
Therefore there is a need to investigate the nature of driving reasons for loss and degradation of mangrove cover at these sites. Climate adaptation strategy for these sites needs customized attention suitable for local climatic conditions. This paper presents a sub-national level analysis for strategic knowledge base aid to policy making process to adhere to INDC proposal to combat climate change.