**Code Description**

**OVERVIEW**

This set of .py files (and one R script) serves to take the raw vegetation data from TMF[[1]](#footnote-1) and compile it into a usable database. The results are multiple .csv file containing information for (i) mangrove distribution and (ii) forest distribution on (i) the shortest path between centroid of each village and (ii) a spatial IV regions constructed based on shortest path.

The process can be completed if you run all the files contained in this folder orderly.

**PURPOSE OF EACH FILE**

1\_mangrove\_cleaning.py

This file serves to read the raw vegetation data relies on loop to generate raster data represents annual distribution of mangroves that are not degraded and deforested. Since TMF only provide land use type for all years, I assume there is no land use change across time except for temporal degradation and deforestation

First, the code classifies 94 kinds of land use types in the raw dataset into four categories: mangroves, other forests, water, and other. Then, the code overlays the land use type with annual deforestation statues in each year, and setup value matrixes (VM) so that each land use type and deforestation statues are jointly represented as unique value.

Finally, this file saves a series of raster files in format “mangrove\_2010.tif” used by “3\_zonal\_historgram.R”

2\_spatial\_IV.py

This file serves to generate regions that can be served spatial IV for mangrove width. The main intuition is that mangrove distributions outside of the village A can help mitigate cyclone damage while do not affect the night light change in the village A.

First, the code read the shapefile of each village and the shapefile of buffer area around shortest distance from the centroid of village to the shoreline. Then, the code generate shapefile for buffer areas outside of the village by subtracting village boundaries from the buffer areas for each village.

Finally, this file saves a series of csv files in format “mangrove\_iv\_1600.shp” used by “3\_zonal\_historgram.R”

3\_zonal\_historgram.R

This file serves to calculate zonal statistics that calculate VM distribution in each village for (i) village itself (ii) buffer areas between village and coastal line, (iii) buffer areas outside of the village.

First, the code read the shapefile of each village and the shapefile of buffer area around shortest distance from the centroid of village to the shoreline. Then, the code generate shapefile for regions outside of the village by subtracting village boundaries from the buffer areas for each village.

Finally, this file saves a series of csv files in format “new\_village\_shore\_lines\_1600\_2010.csv” used by 4\_mangrove\_output\_cleaning

4\_mangrove\_output\_cleaning.py

This file serves to gather multiple zonal statistics results from different types and gather all data within a one long panel that represents.

First, the code reads all the .csv files generated by “3\_zonal\_historgram.R” and identifies year and buffer range based on title of .csv file. Then, the code calculate annual variation in deforestation area, degraded areas, and active forest areas for mangroves and other forests.

Finally, this file saves a series of csv files represent temporal variation of mangrove percentages with different types of calculation methods.

1. https://forobs.jrc.ec.europa.eu/TMF/data [↑](#footnote-ref-1)