

Supplementary Material

Assessment of Climate Change Impacts on the Water, Food, and Energy Sectors in Sittaung River Basin, Myanmar

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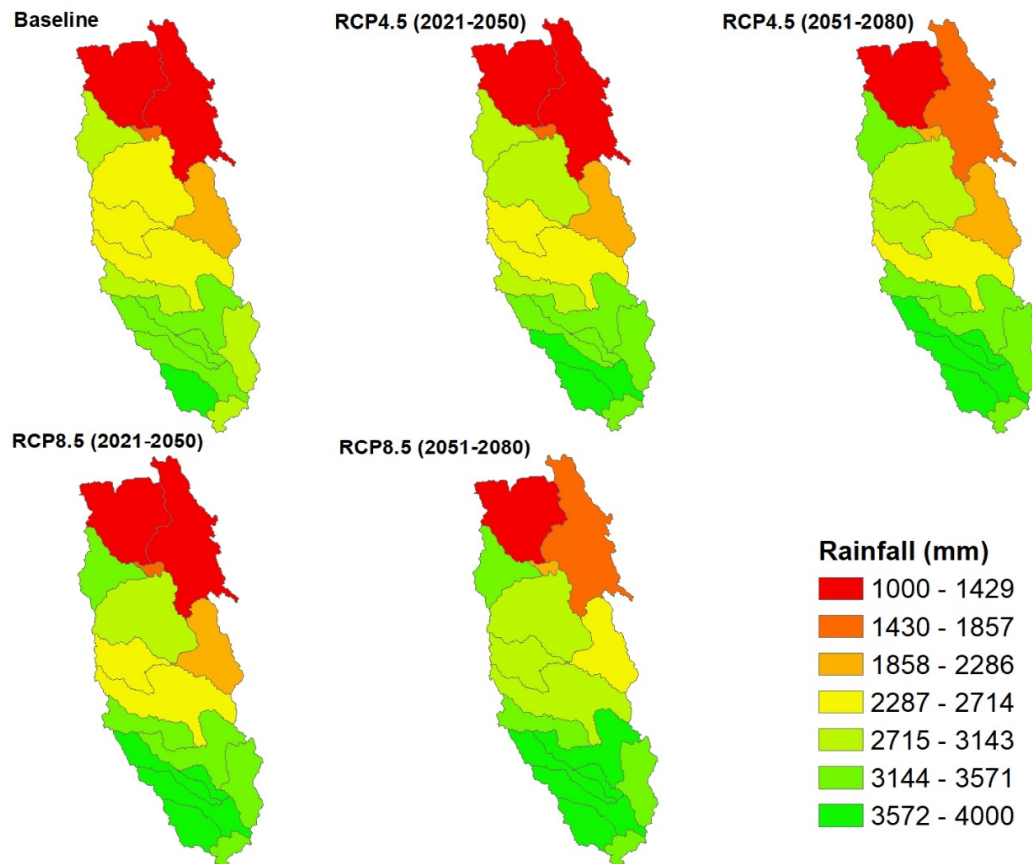


Figure S1. Baseline (1985–2014) and projected future rainfall for RCP4.5 and RCP8.5 scenarios in Sittaung river basin.

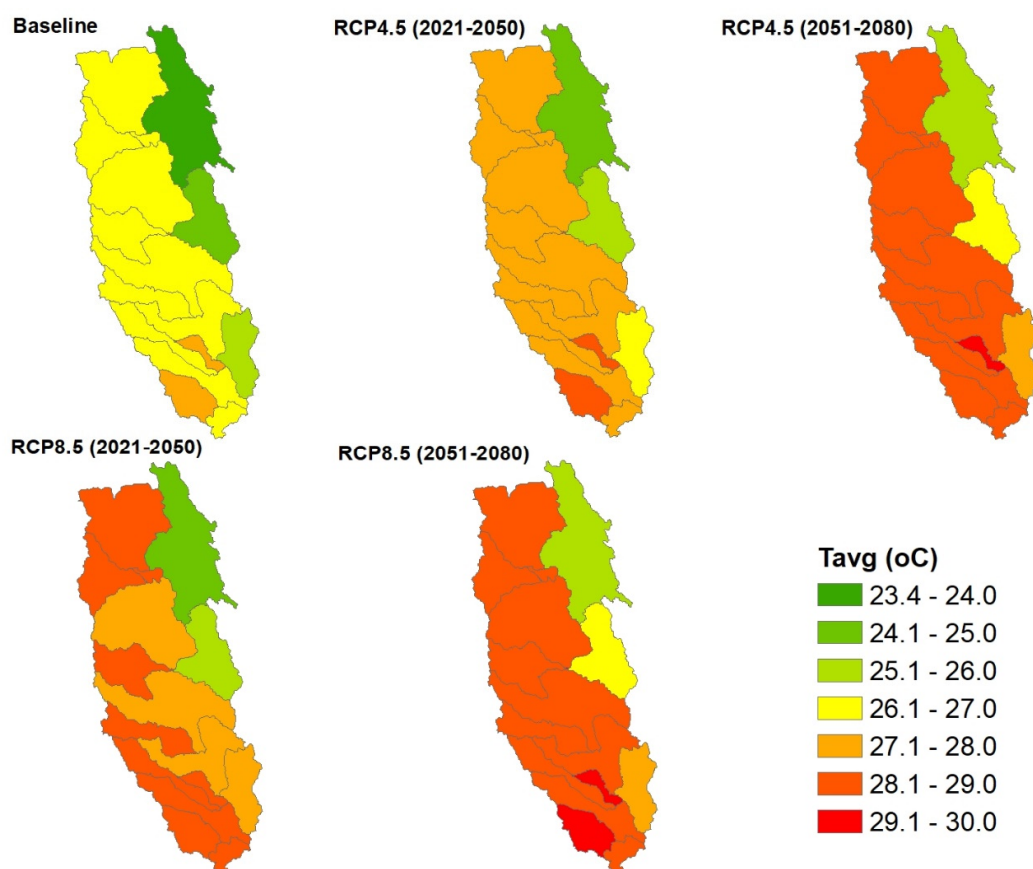


Figure S2. Baseline (1985–2014) and projected future average temperature for RCP4.5 and RCP8.5 scenarios in Sittaung river basin.

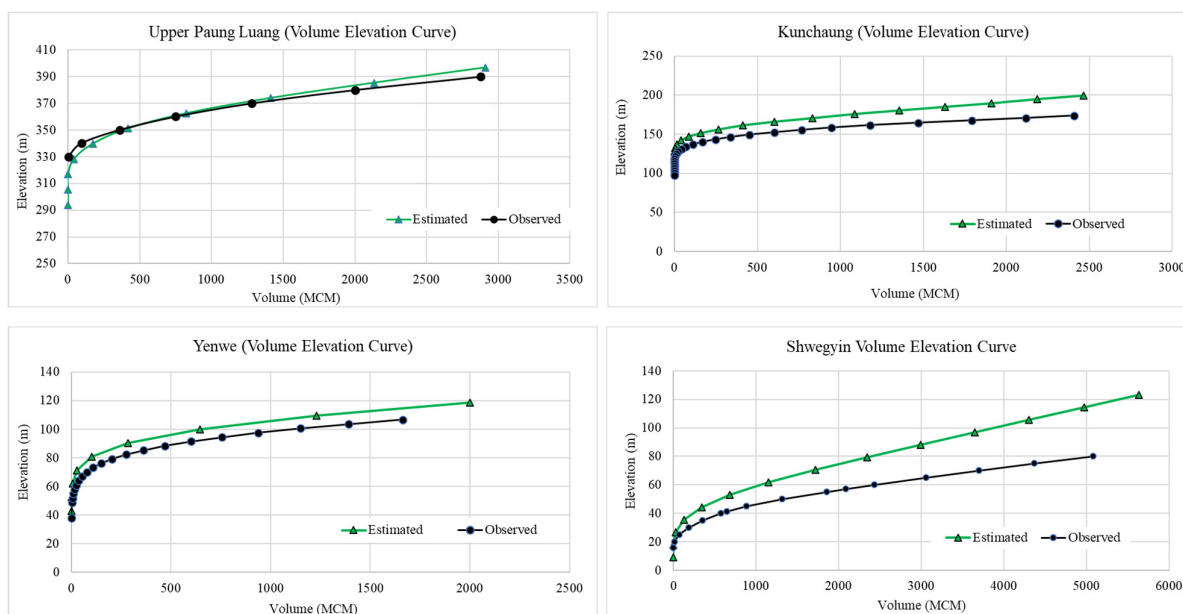


Figure S3. Observed and estimated volume elevation curves at the selected reservoirs in Sittaung.

Table S1. Python script to generate reservoir volume elevation curve.

```

import pandas as pd
import numpy as np
import rasterio
import matplotlib.pyplot as plt
from mpl_toolkits.axes_grid1 import make_axes_locatable
#Open a raster file
lakeRst = rasterio.open("C:\\Users\\12265\\OneDrive - SEI\\Sittaung_WEAP\\0_Raw\\Reser-
voir\\Kabaung\\KabaungUTM47.tif")
lakeRst.count
lakeRst.res
lakeRst.crs.wkt
lakeBottom=lakeRst.read(1)
lakeBottom[:,1:]
#replace value for np.nan
noDataValue = np.copy(lakeBottom[0,0])
lakeBottom[lakeBottom==noDataValue]= np.nan
plt.figure(figsize=(12,12))
plt.imshow(lakeBottom)
plt.show()
#Lake volume calculation
minElev = np.nanmin(lakeBottom)
maxElev = np.nanmax(lakeBottom)
print('Min bottom elevation %.2f m., max bottom elevation %.2f m.'%(minElev,maxElev))
#steps for calculation
nSteps = 50
# lake bottom elevation intervals
elevSteps = np.round(np.linspace(minElev,maxElev,nSteps),2)
elevSteps

# definition of volume function
def calculateVol(elevStep,elevDem,lakeRst):
    tempDem = elevStep - elevDem[elevDem<elevStep]
    tempVol = tempDem.sum()*lakeRst.res[0]*lakeRst.res[1]
    return tempVol
# calculate volumes for each elevation
volArray = []
for elev in elevSteps:
    tempVol = calculateVol(elev,lakeBottom,lakeRst)
    volArray.append(tempVol)
print("Lake bottom elevations %s"%elevSteps)
volArrayMCM = [round(i/1000000,2) for i in volArray]
print("Lake volume in million of cubic meters %s"%volArrayMCM)
# plot values
fig, ax = plt.subplots(figsize=(12,5))
ax.plot(volArrayMCM,elevSteps,label='Kabaung')
ax.grid()
ax.legend()
ax.set_xlabel('Volume MCM')
ax.set_ylabel('Elevation (masl)')
plt.show()

```

```
# plot values
fig, [ax1, ax2] = plt.subplots(1,2,figsize=(20,10),gridspec_kw={'width_ratios': [2, 1]})
ax1.set_title('Kabaung elevation')
botElev = ax1.imshow(lakeBottom)
divider = make_axes_locatable(ax1)
cax = divider.append_axes('bottom', size='5%', pad=0.5)
fig.colorbar(botElev, cax=cax, orientation='horizontal', label='Elevation (masl)')

ax2.plot(volArrayMCM,elevSteps,label='Kabaung reservoir')
ax2.grid()
ax2.legend()
ax2.set_xlabel('Volume MCM')
ax2.set_ylabel('Elevation (masl)')
plt.show()
elevSteps
volArrayMCM
data= pd.DataFrame(elevSteps,volArrayMCM)
data.to_csv("C:\\Users\\12265\\OneDrive - SEI\\Sittaung_WEAP\\0_Raw\\Reservoir\\Kabaung\\KabaungElevVol1.csv")
```
