CE203: Geospatial Engineering

Assignment 1: Google Earth Pro

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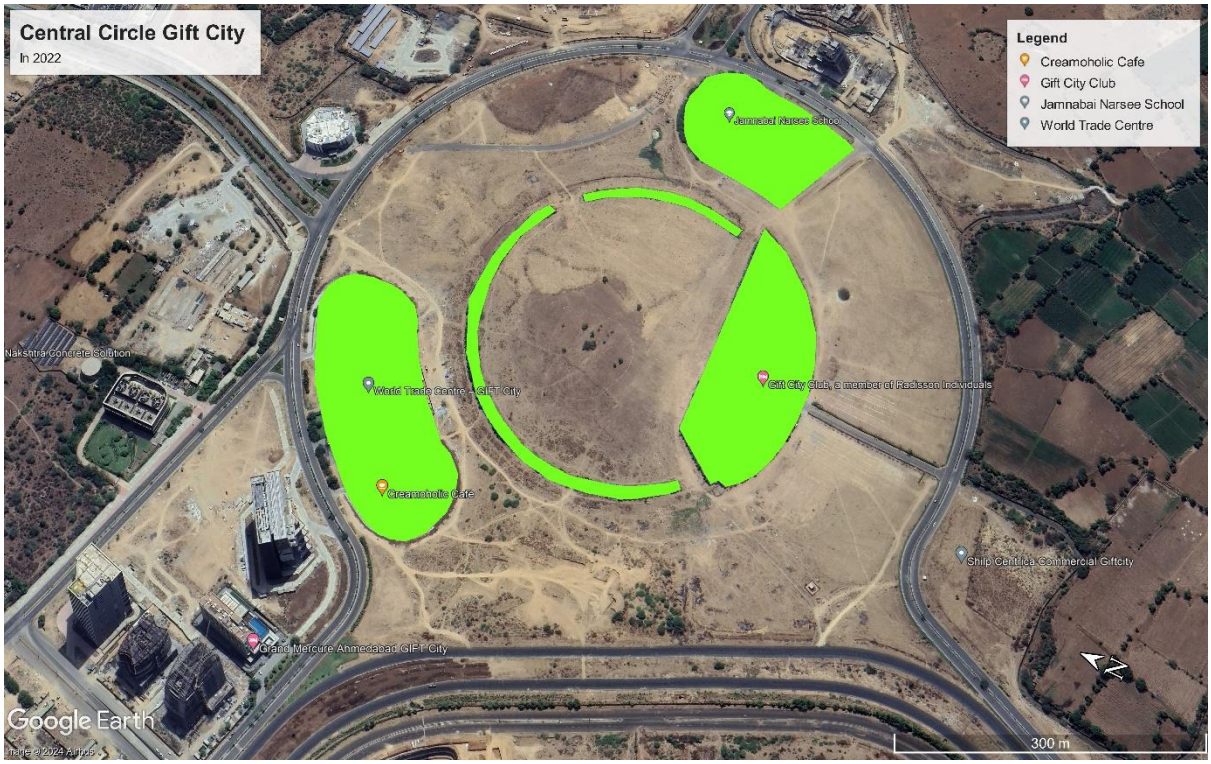
Question 1. Urban Dynamics at GIFT City

In recent years, urbanization has been an ongoing global phenomenon, with cities expanding and evolving at a rapid pace. To comprehend the extent of urban area, change in the past decade, you will be utilizing the powerful mapping and analysis capabilities of Google Earth Pro. Select an area of GIFT city that evolved significantly over the last ten years (2012-2022) and prepare a map showing urbanization. Also, estimate the change in the urbanization area. (Data: Central_Circle_Gift.kmz).

To compare urbanization, we should first start by marking the major constructions take that took place in the area within the years 2012 to 2022. To compare let's check the map of the place of year 2012,

Since we can observe that there was no sign of urbanization in 2012. Now let us look at map from year 2022,



As marked in the map we can observe that there had been large scale construction work going on in the area lately. If we talk about the amount of urbanization we can first check the area in which construction had been done.

Total area of marked polygon = $84790\ m^2$,

Total area under observation = $396153\ m^2$,

So, area unurbanized = $311363\ m^2$,

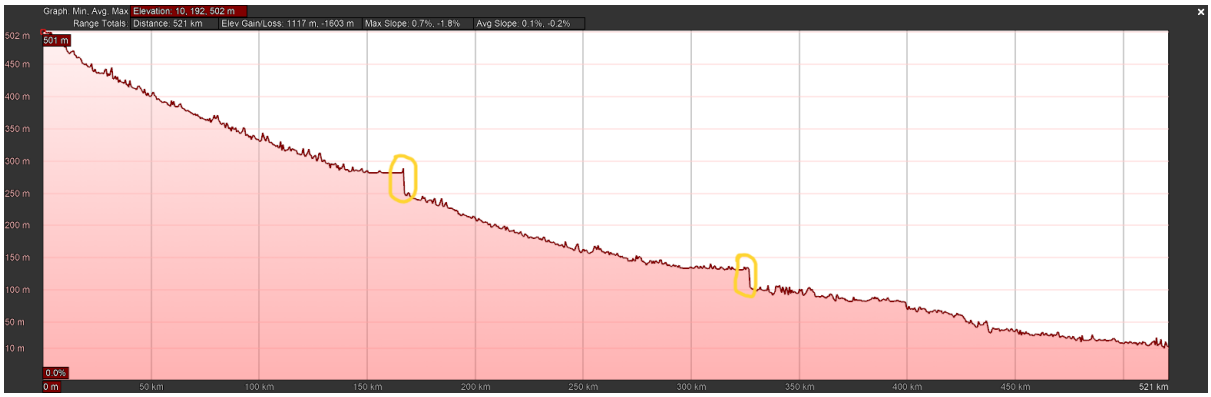
To appreciate the change in urbanization area lets calculate the percentage of area urbanized = $21.4\ \%$

Question 2: Locating Major Dams Projects

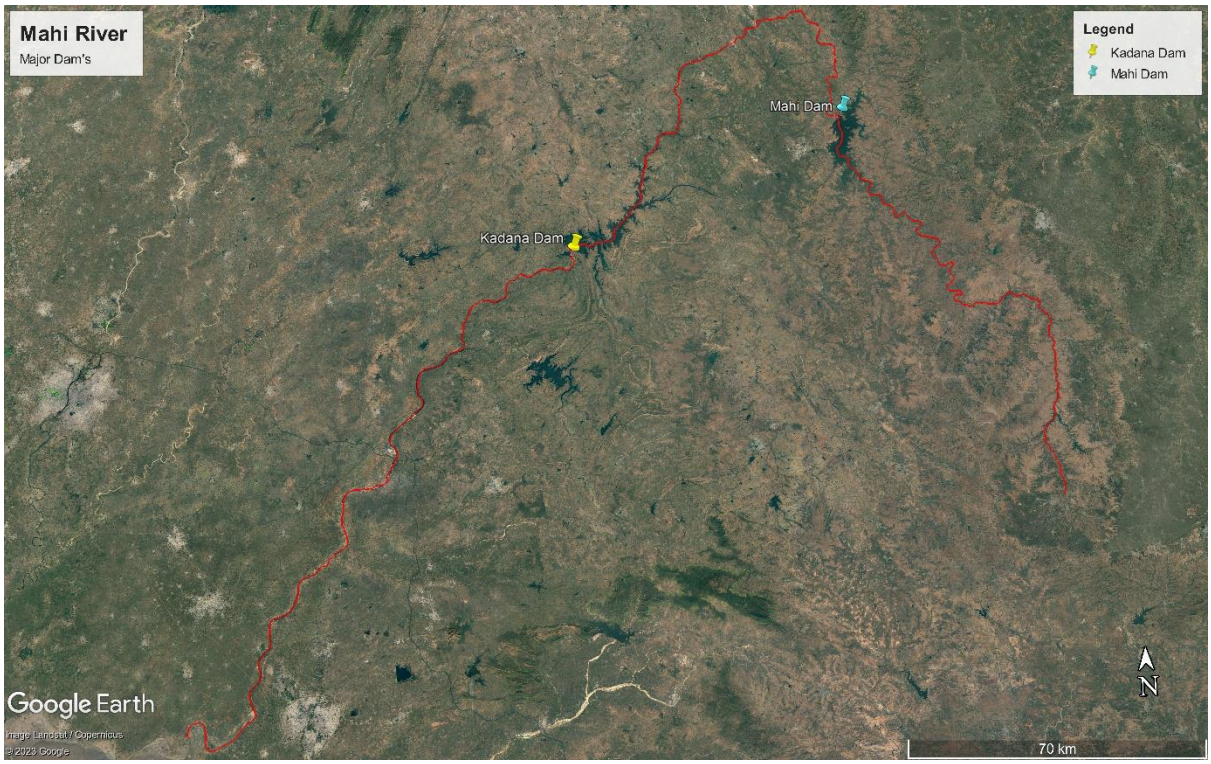
Locate the Major Dams situated on the Mahi River. Also, find the longitudinal profile of the river and comment on how elevation is changing from upstream to downstream. (Data: Mahi.kml)

As we know that water level of river drops drastically at a Dam. So, if we check the elevation profile of the river we can easily locate the position of the Dam's on the river. Here is the elevation profile of Mahi River,

As we notice the elevation of the river from upstream to downstream is almost linearly decreasing except the 2 points where the Dams are located. In the elevation profile diagram, we can notice two positions where there is noticeable change in elevation.



Let's locate the marked positions from the diagram on the map.

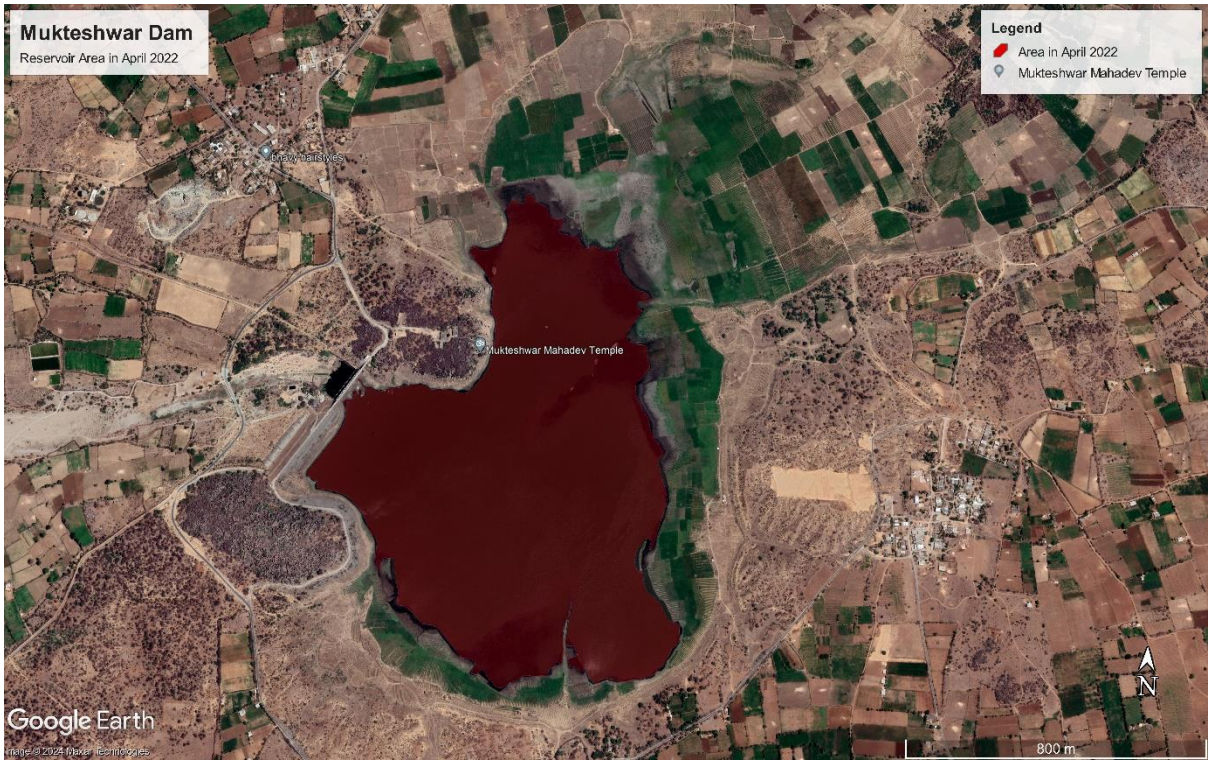


Question 3. Reservoir Dynamics

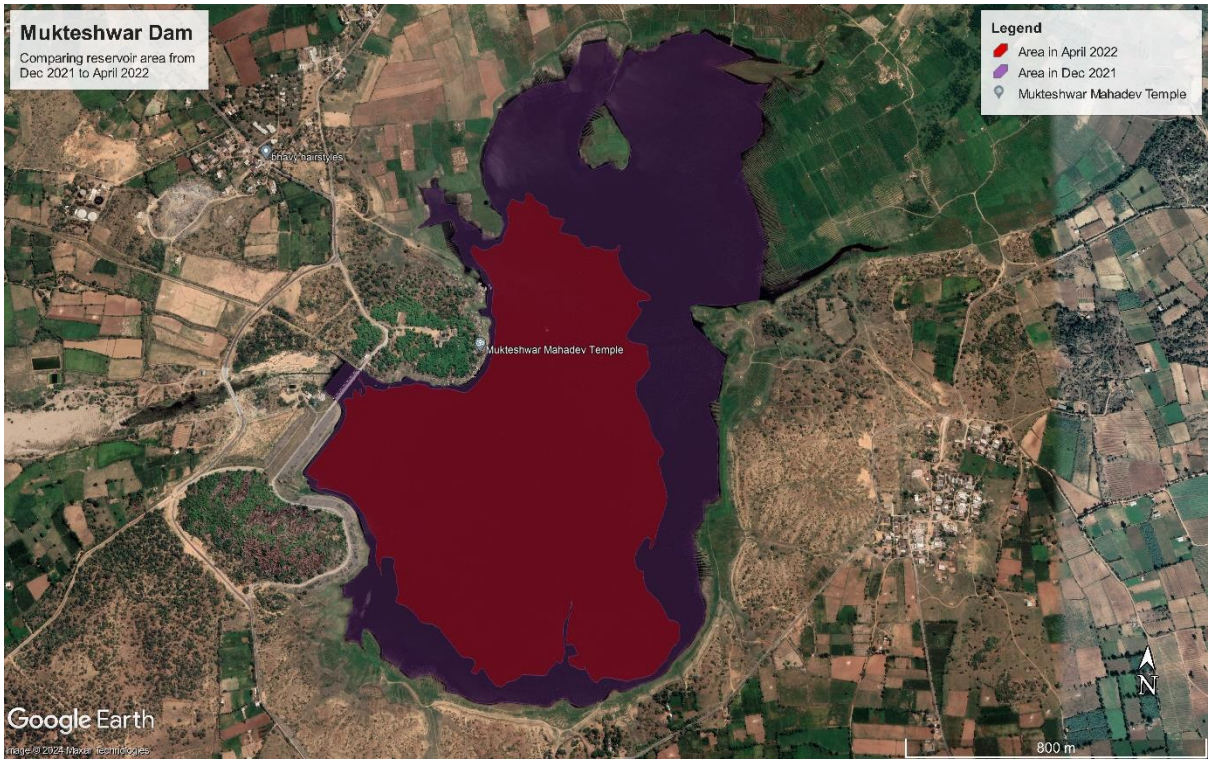
Open Google Earth Pro and navigate to the Mukteshwar Dam (Gujarat) site located at 24.0412025 °N and 72.6312301 °E. It's essential to closely monitor changes in the reservoir area, as it can have significant implications for the local ecosystem, agriculture, and human activities. Satellite data reveals that between December 2021 and April 2022, there were observable changes in the Mukteshwar Dam's water levels, which might indicate a drying trend. To assess the situation accurately, digitize the reservoir area for both images and quantify the changes that occurred in the reservoir area during this five-month period.

The area of reservoir in December 2021,

The decrease area in April 2022,



If we compare the decrease in reservoir area by putting them over each other,



Area of the reservoir in Dec 2021 = 1537008 m^2,

Area of the reservoir in April 2022 = 798643 m^2,

So, in conclusion the area of the reservoir in April 2022 had almost **reduced to half** of its area in December 2021.