



Using Earth Observations to Calculate SDG Indicator 15.4.2, Mountain Green Cover Index, in the United Arab Emirates



Source: UAE SDG Data Hub <https://uae-sustainable-wildlife-fcsa.hub.arcgis.com/>

The United Arab Emirates (UAE) Federal Competitiveness and Statistics Center (FCSC) in its capacity as the Secretariat of the UAE National Committee to track and report SDG indicators, is continuously trying to utilize the latest techniques and tools available such as Earth observations, geospatial information and big data to calculate SDG indicators. To help calculate SDG indicator 15.4.2, Earth observations and open data were used.

Relevant Indicators

15.4: Conservation of mountain ecosystems

15.4.2: Mountain Green Cover Index (MGCI)

Additional Resources

[Digital Elevation Model 30M](#)

[United Arab Emirates SDG Data Hub](#)

Partners

Mohammed Bin Rashid Space Centre

Points of Contact

UAE Federal Competitiveness and Statistics Centre (FCSC)

Data Inputs:

1. [Digital Elevation Model](#) (DEM) 30 meters resolution
2. Green Areas Dataset
 - Green areas extracted from Dubai-SAT2 (1 meter resolution) for Ras Al khaimah and Fujairah Emirates
 - Green areas extracted from Landsat (30 meters resolution) for the remaining 5 emirates

Calculation Method 1 - based on vector area:

1. Use Clip tool (Clip DEM with UAE Country Boundaries Layer) to obtain DEM for the UAE
2. Use Raster Calculator tool to retrieve Total Mountain Area Raster (Con ("UAE Clipped">300,1))
3. Convert Total Mountain Area Raster to Vector
4. Calculate Area for the vector layer obtained in step 3

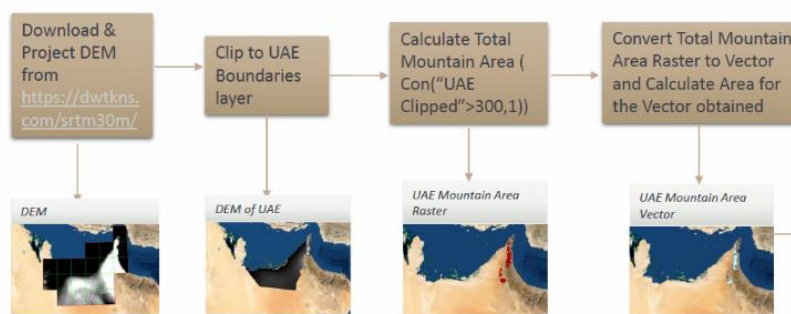


5. Intersect the total mountain area vector with the green areas vector layer to obtain the green mountain area
6. Calculate Area for the vector layer obtained in step 5
7. Divide (Total Mountain Green Area / Total Mountain Area) * 100 to get MGCI

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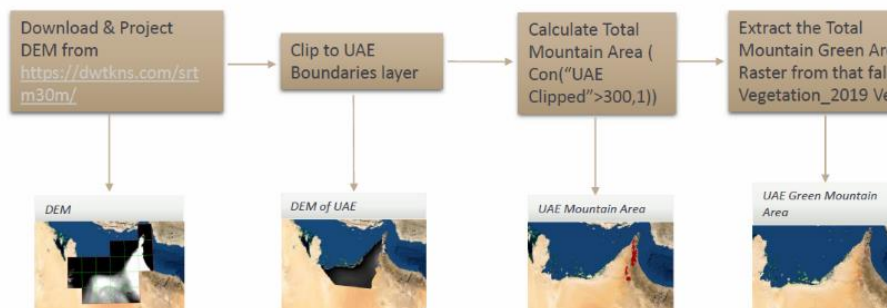
Calculation Workflow - Vector



Calculation Method 2 - based on raster inputs which is constrained by pixel square shape and size:

1. Use Clip tool (Clip DEM with UAE Country Boundaries Layer) to obtain DEM for the UAE
2. Use Raster Calculator tool to retrieve Total Mountain Area Raster(Con("UAE Clipped">300,1))
3. Use the Extract mask tool to extract the Total Mountain Green Area Raster from the green areas vector layer
4. Divide pixels count of the layer created in step 3/count of pixels of the layer created in step 2

Calculation Workflow – Raster Approach





Results & Impact

- Initial calculations based on vector analysis following natural green areas polygons shapes resulted in value of MGCI = 2.40%
- Initial calculations based on raster inputs - constrained by pixel shape and size resulted in value of MGCI = 1.46%

Enabling Factors

- Presence of publicly available Digital Elevation Model (DEM), SRTM 30m
- Presence of public satellite imagery, Landsat 30m as well as other higher resolution open datasets
- Presence of national satellite imagery of 1 meter resolution by Mohammad Bin Rashid Space Center

Constraints

- Low accuracy for publicly available DEM



Green areas on UAE mountains

Source: <https://www.ar-traveler.com/tourist-attractions-in-al-ain-abu-dhabi.html>

Conclusions and Recommendations

- Using the vector polygon feature gives higher accuracy results as the pixel coarse accuracy as well as square shape abstracts and approximates the green area print which usually have curve shapes which are not aligned with a pixel grid.
- Monitoring annual growth starting from the 1980s gives good insights to national governments about the growth trend.



Source: UAE Federal Competitiveness and Statistics Centre <https://1map-fcsa.hub.arcgis.com/>