

Maintenance of Transportation Networks in Iran and the Semnan Province

Background

Iran is a mountainous and arid country between the Persian Gulf and Caspian Sea [1]. It is one of the largest countries in Southern Asia, with a population of 86 million and a 673,806 mi² land area [1]. 76% of its population inhabits urban regions, and 10% of the population lives in the capital city Tehran [1]. With bustling urban centers and extensive distances between major cities, an effective and safe transportation network is vital to the country's continual economic expansion.

Maintaining the transportation system is essential to the overall prosperity of Iran and requires a constructive method of distributing financial support to provinces which need it most. An understanding of maintenance requirements is necessary in order to plan infrastructural development at the national and regional level.

Islamic Republic of Iran and Semnan province



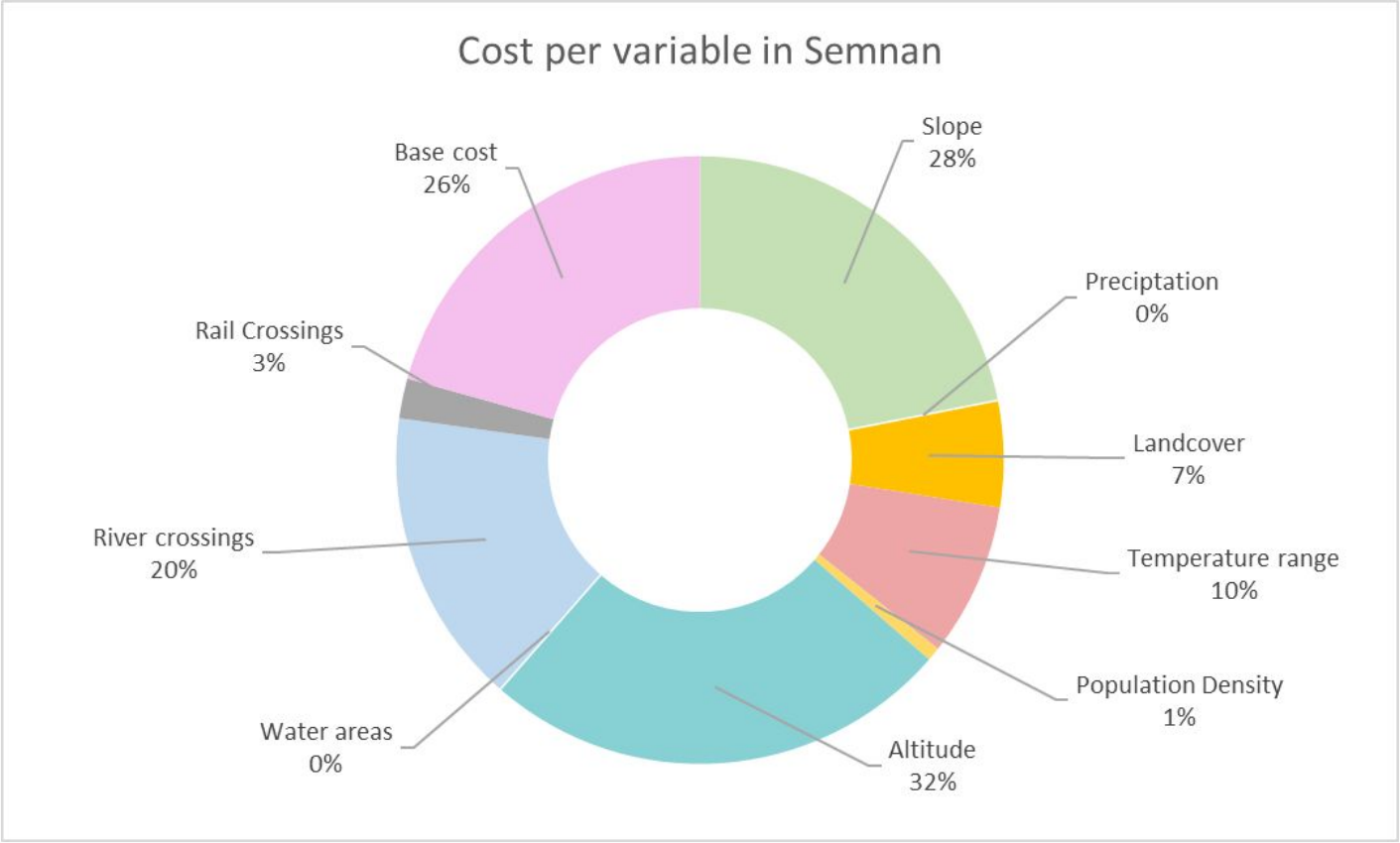
The road maintenance in Semnan

Semnan is a province in Northern Iran which focuses primarily on the production of grains, tobacco, cotton, and indigo, as well as coal and chromium mining [2]. It contains a road connecting the capital city Tehran to Razavi Khorasan, which is used extensively for travel between the two major urban centers and transporting goods. The province's high elevation and numerous river crossings make the road network expensive to maintain, thus proper funding is required to sustain Semnan's transportation needs.

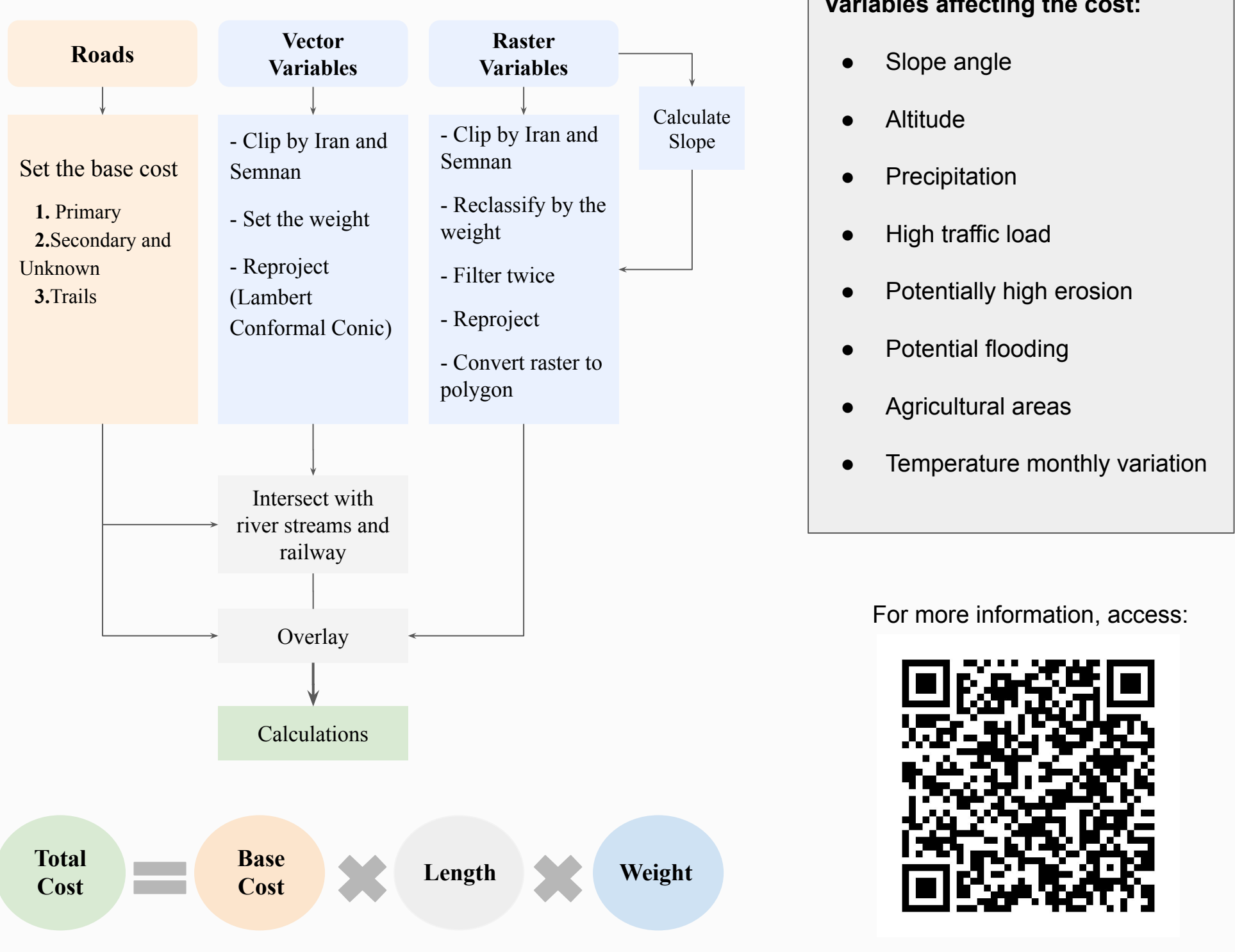
Total costs in Semnan
\$ 59 931 556
Average cost per km in Semnan
\$ 18 038.09

Main variables that affect the costs:

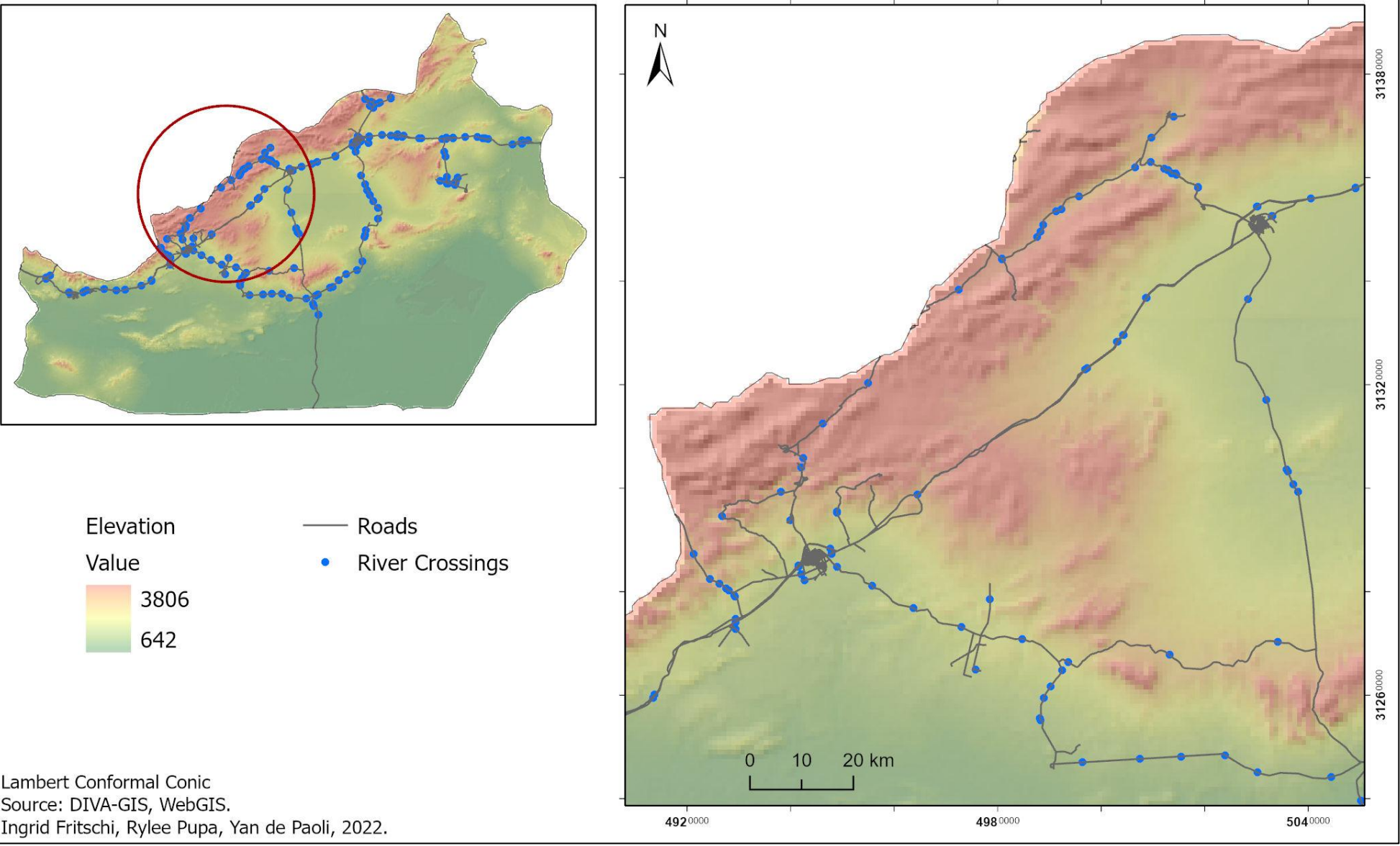
- Altitude
- Slope
- River crossings



The road maintenance



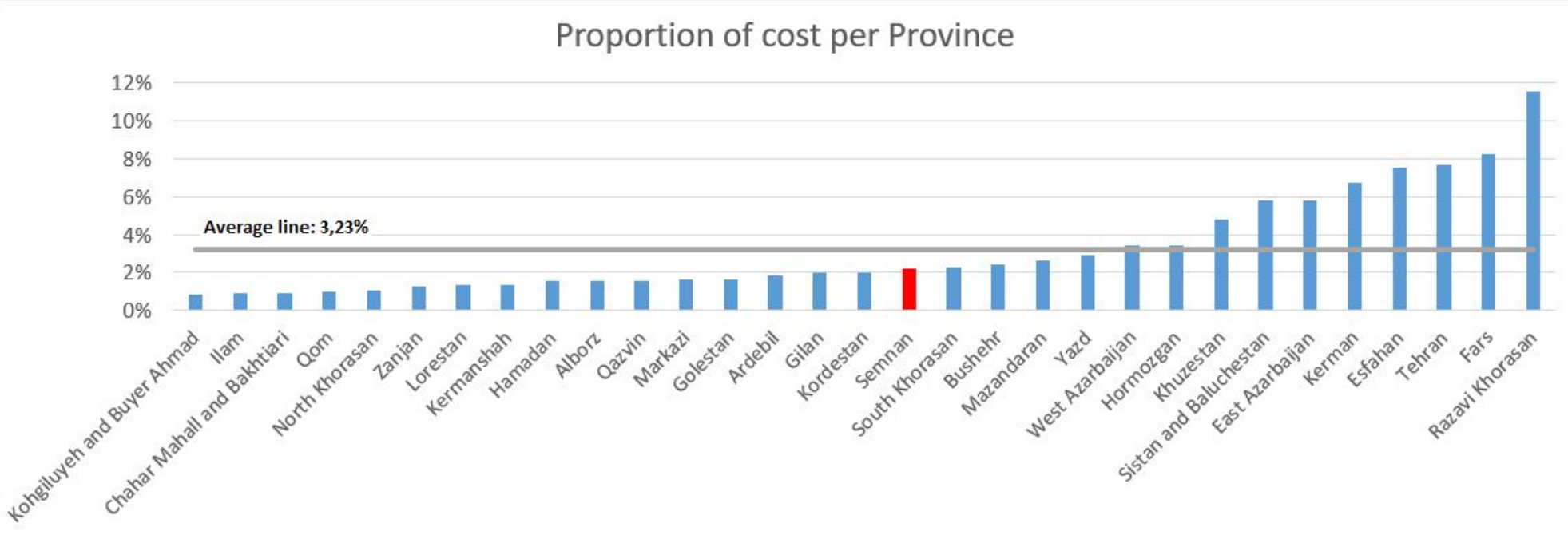
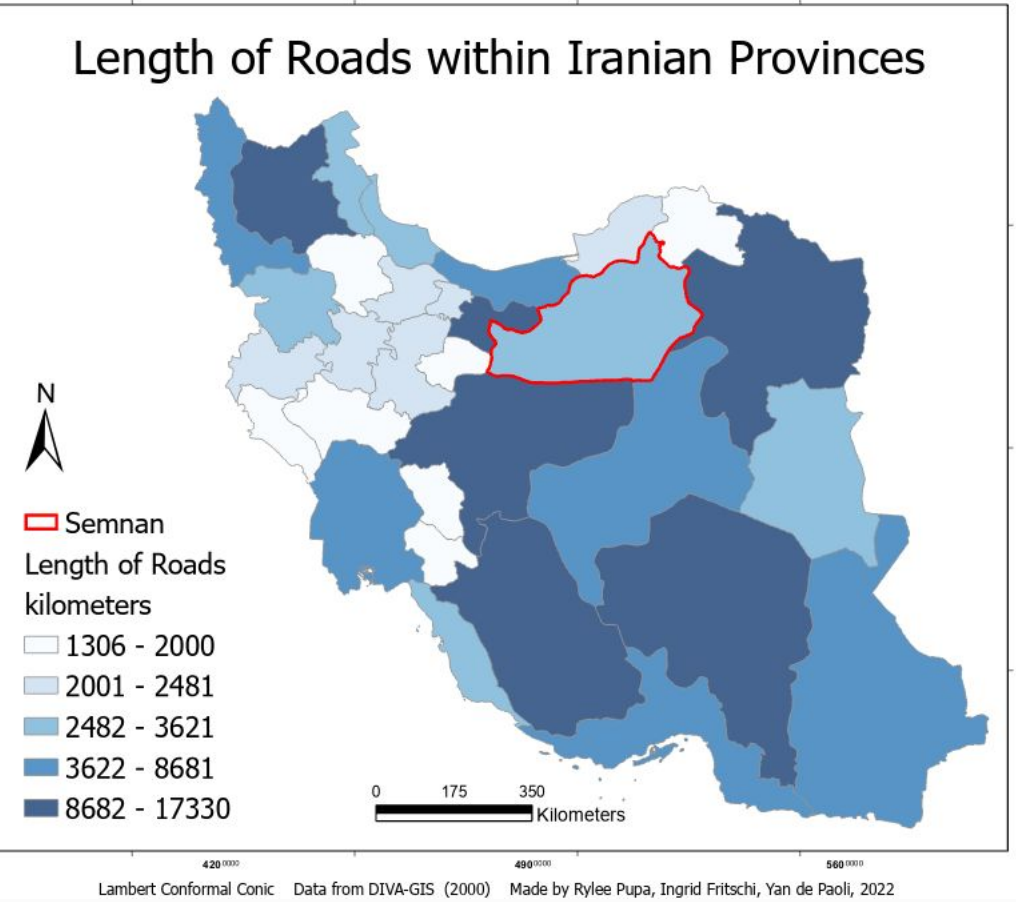
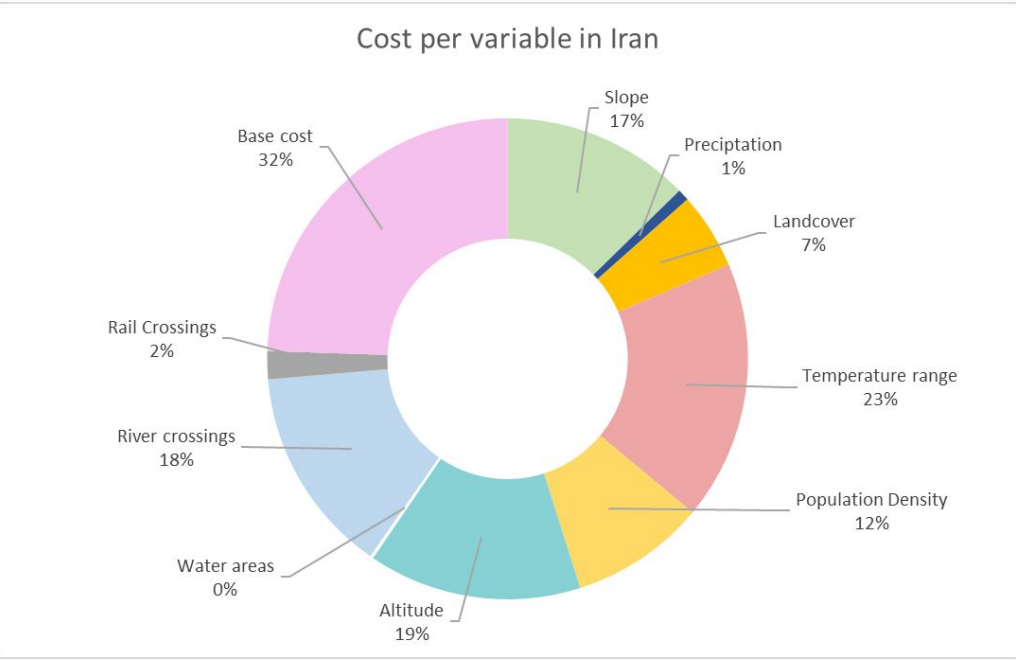
Main variables impacting road maintenance cost in Semnan



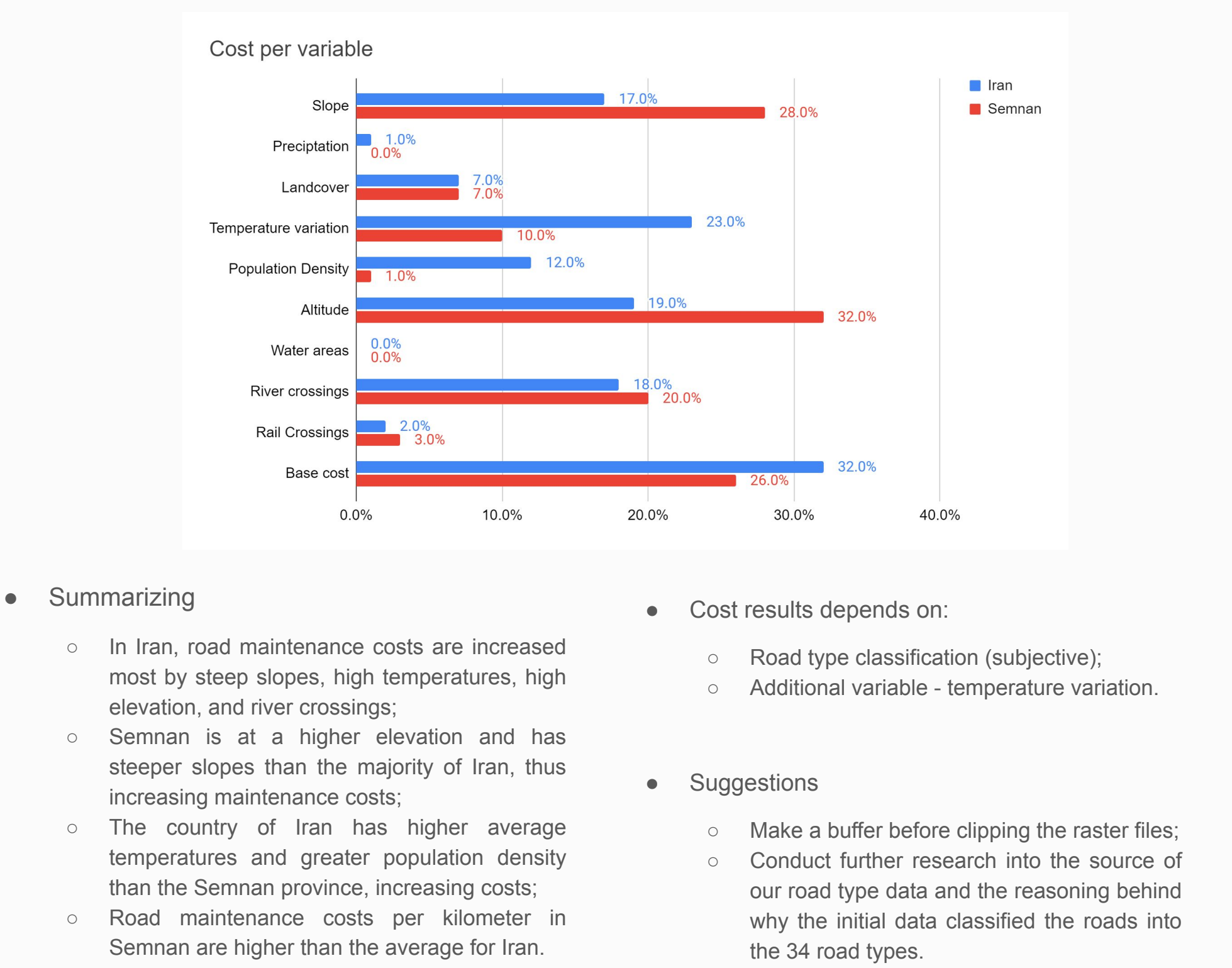
The road maintenance in Iran

Total costs Iran	\$ 2 426 588 271
Average cost per km in Iran	\$ 16 121.78

- Main variables that affects the costs:
 - Temperature variation
 - Altitude
 - River crossings
 - Slope
- Province with highest maintenance cost: Razavi Khorasan (about 12%);
- Province with lowest maintenance cost: Kohgiluyeh and Buyer Ahmad (about 1%);
- Semnan represents about 2% of the total cost, which is above the average line (3.23%).



Conclusion + suggestions



- Summarizing
 - In Iran, road maintenance costs are increased most by steep slopes, high temperatures, high elevation, and river crossings;
 - Semnan is at a higher elevation and has steeper slopes than the majority of Iran, thus increasing maintenance costs;
 - The country of Iran has higher average temperatures and greater population density than the Semnan province, increasing costs;
 - Road maintenance costs per kilometer in Semnan are higher than the average for Iran.
- Cost results depends on:
 - Road type classification (subjective);
 - Additional variable - temperature variation.
- Suggestions
 - Make a buffer before clipping the raster files;
 - Conduct further research into the source of our road type data and the reasoning behind why the initial data classified the roads into the 34 road types.

Sources

[1] *Iran: Country Data and statistics*. Worlddata.info. (n.d.). Retrieved October 14, 2022, from <https://www.worlddata.info/asia/iran/index.php>
[2] *Encyclopedia Britannica, inc.* (n.d.). *Semnan*. Encyclopedia Britannica. Retrieved October 14, 2022, from <https://www.britannica.com/place/Semnan-Iran>

Spatial Data obtained from DIVAGIS.org (2000); sedac.ciesin.columbia.edu (2020); worldclim.org (1970-2000); webgis.com/index.html; forobs.jrc.ec.europa.eu/products/glc2000.php.

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