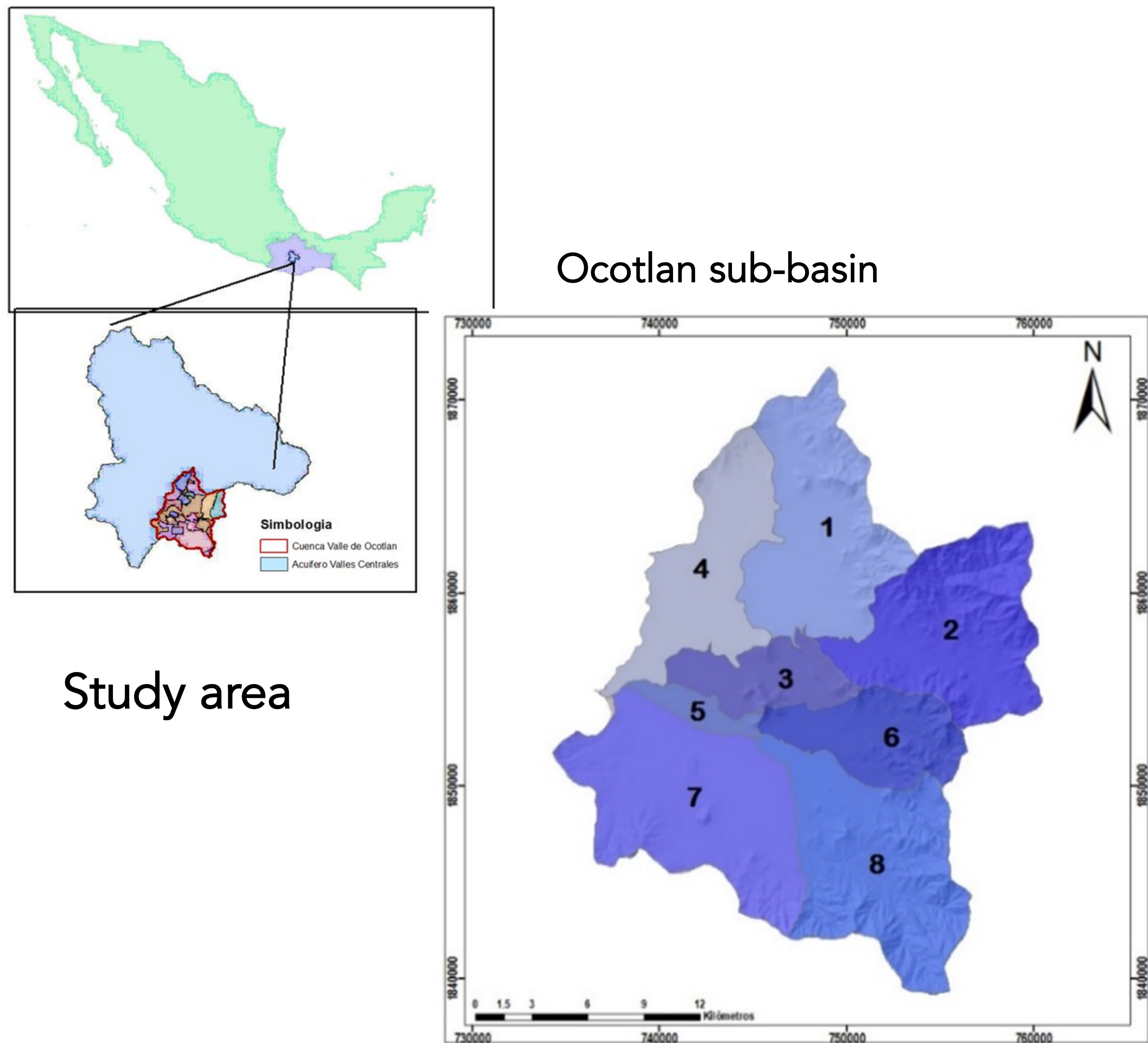


Modeling Groundwater vulnerability to Climate Change in agricultural areas of Oaxaca

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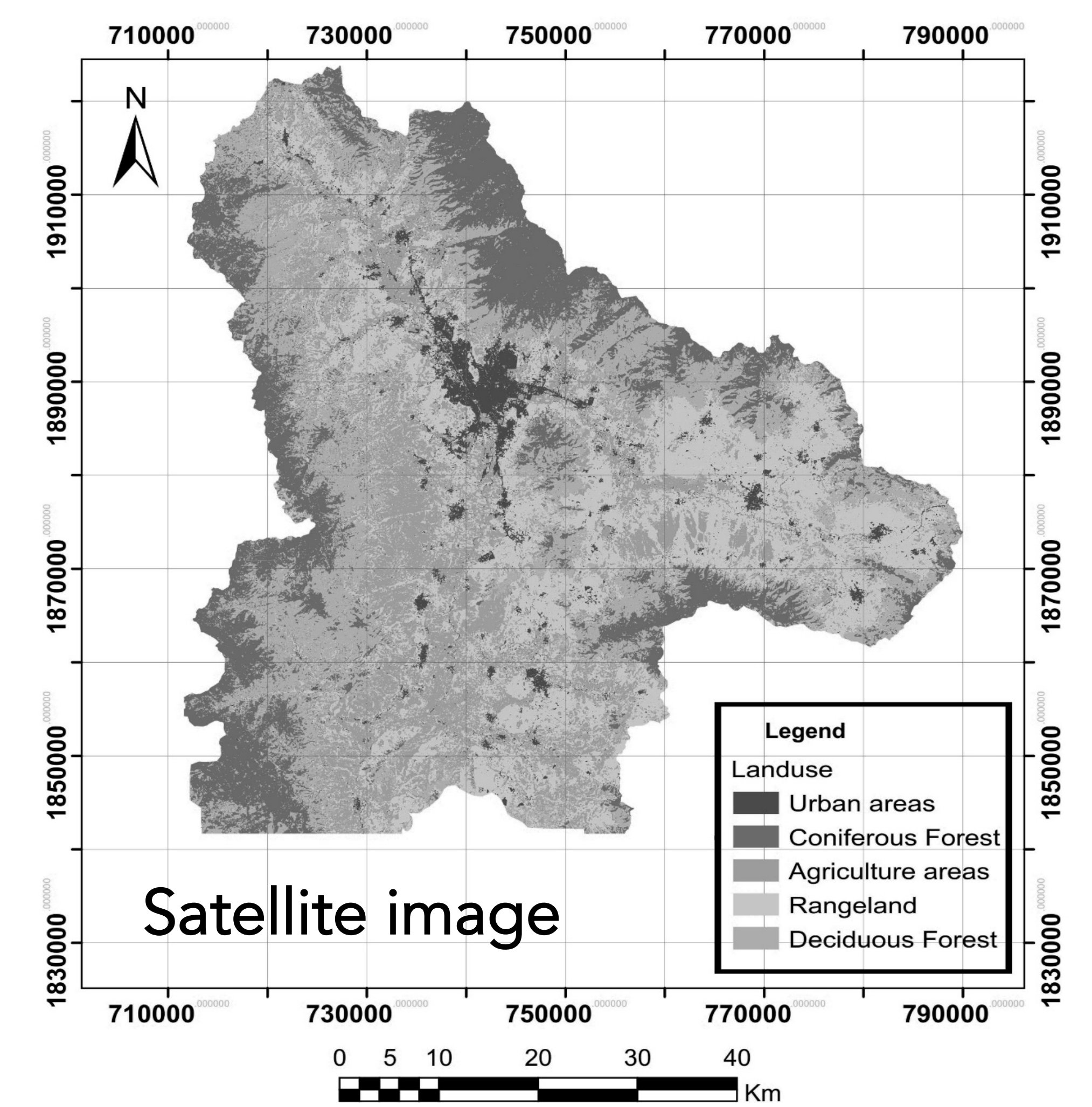


INTRODUCTION: A water vulnerability index to climate change was estimated with 7 variables in a region from the State of Oaxaca. An Analytic Hierarchy Process was used.

Po population, Sm social marginalization, LCU Land change use, Ru runoff to climate change, R water recharge to climate change, WP water pollution, AS Aquifer conditions (Normal, exploited, overexploited).

The Alto Atoyac study area is located in the Central Valley Region of the State of Oaxaca.

In The Central Valley Region 87.6% of the groundwater resource is used for agricultural purposes, while only 9.5% is used for public-urban services.



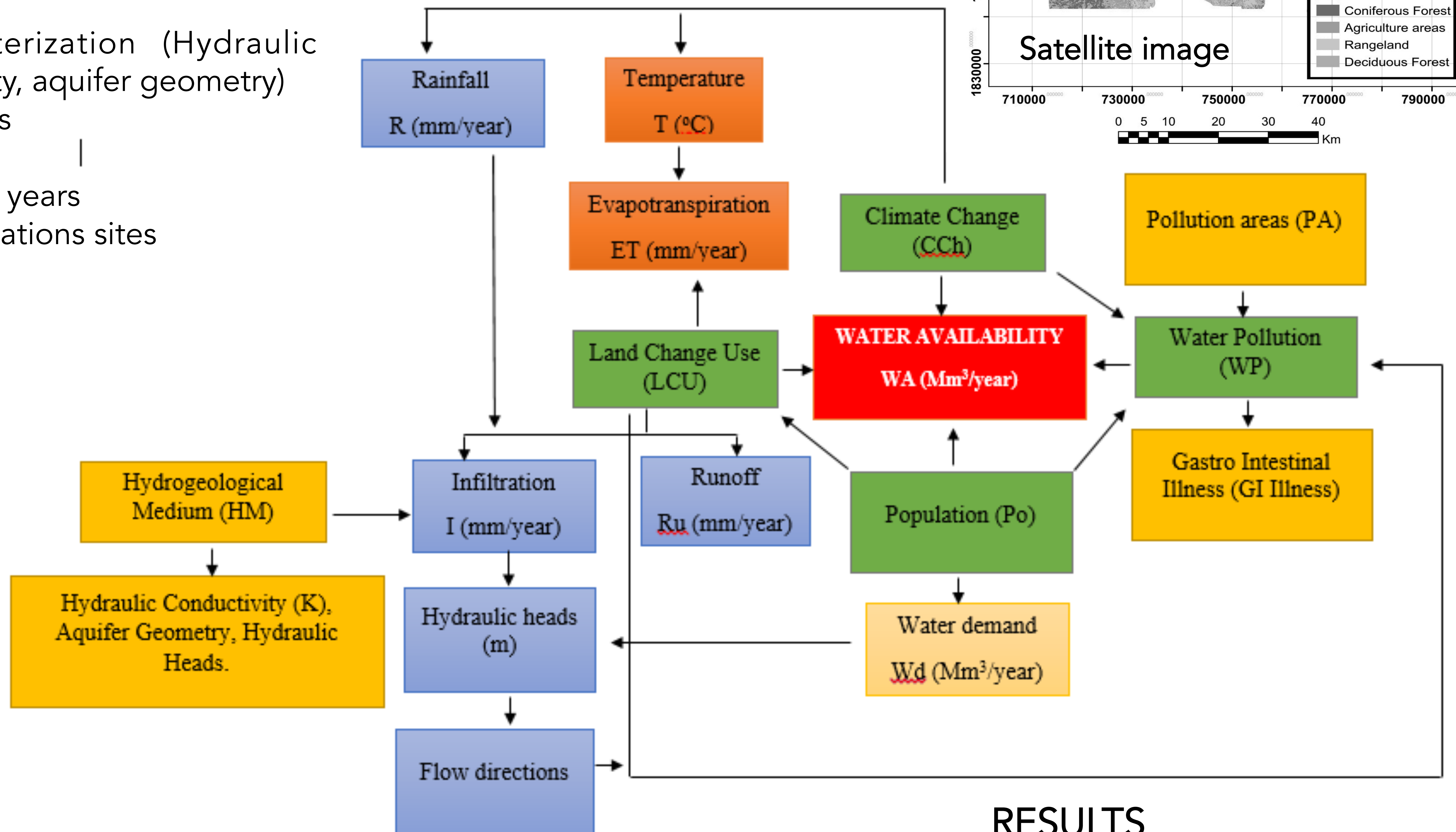
Available data

- Hydrogeological Characterization (Hydraulic heads, Hydraulic conductivity, aquifer geometry)
- Groundwater Flow directions
- Water quality test
- Land change use the last 34 years
- Georeferencing of contaminations sites
- Climate change scenarios
- Gastro intestinal illness data

Water availability

$WA=f(CCh, LCU, Po, WP)$:
 Water availability as a function of Climate Change, Land change use, Population, and Water pollution
 R: Rainfall
 ET: Evapotranspiration
 I: Infiltration
 Ru: Runoff
 Po: Population
 WP: Water pollution

METHODOLOGY



$$\text{Vulnerability} = (\alpha * E) + (\beta * S) - (\gamma * AC)$$

Vulnerability. Vulnerability is a function of exposure to climate (E), based on an extensive list of climatic stimuli such as change in temperature, precipitation, heat waves, floods and droughts; sensitivity (S) which is the degree to which it is a system is modified or affected by the disturbances, and to the adaptive capacity (AC) of a system to evolve and which is the capacity to adapt to environmental hazards or policy changes (Parry et al., 2007; Kim and Chung, 2013).

CONCLUSION

18 municipalities showed high groundwater vulnerability.

REFERENCES

Kim, Y. and E.S. Chung. 2013. Fuzzy VIKOR approach for assessing the vulnerability of the water supply to climate change and variability in South Korea. Applied Mathematical Modelling, 37(22), 9419-9430.
 Parry M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson. 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, UK, 982p.

RESULTS

