Review of: "New Method to Identify Potential Illegal Water Use Location by Using Remote Sensing and Neural Networks in Laguna de Aculeo, Chile"

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Potential competing interests: No potential competing interests to declare.

It seems the method is very useful for main objectives well identified. In my case, as an evaluator of the “water” domain, this review raises some issues related to: 1) Indicators; 2) Water Balance; 2) Language and Units.

1. In this paper, hydro-climatic and meteorological information is not clearly aligned along chapters 1, 2, and 3 (e.g., precipitation, evapotranspiration, water availability, and consumption). The climate and water use conditions could be better identified and comparable to other regions if the authors apply some indicators of worldwide use. I suggest adding Renewable Water Resources information (very important to water use and scarcity classification, as FAO – AQUASTAT, OECD publications mention) and computing/applying one or more scarcity/aridity/drought indicators, involving national/regional/local data, such as: Falkenmark Indicator, WEI+, Aridity Index (P/ETp), among others.
2. Somehow related also to climatic/meteorological data, a monthly Water Balance table would facilitate the knowledge of water flows, availability, and consumption along the year. The references are: annual P - 611 mm, annual ETp – 1200 mm, and Consumption – 572 to 1,000 L/s. So, when is the balance negative? As the paper mentions (pg. 8), the analysis of the water balance, some more comprehensive information would improve the identification of problems along the year as approached in figure 4. For instance, the correlation of soil-water balance with “areas with high vegetation coverage over time” (pg. 9).
3. With respect to “irrigation” language and regarding a more consistent and robust data analysis, some specific terms and units would facilitate the reading and interpretation of results. We find:

    a. “m^2” and “liters per day”: to water consumption/irrigation
    b. “m^3”: to lake water volume
    c. “liters per second”: to identify annual consumption… and the land area is missing
    d. “mm”: to precipitation and ETp units
    e. “km^2”: to lake area
    f. “m^2”: to land cover

An option could be the use of “mm/time” where proper to meteorology and irrigation events (a, c, d):

“10 x 10 m^2 grass area requires 500 liters per day” = 5 mm/day. Thus, it is easier to compare with ETc or P events (same for annual values).

Both lake area and land cover (also the land area missing - c): “km^2”

Comparing the available supply/lake water volume (b) to the water demand in the catchment (c): “m^3/time”

To comparisons, “daily liters per person” could also be: “m^3/year per person,” which is the unit of the “Falkenmark Indicator.”

Note 1: Some statements with “freshwater” or “renewable water resources” could clarify the problem.

Note 2: “Evaporation rate” of 1 200 mm, or “Potential Evapotranspiration” (ETp)? (same on page 8)

Note 3: Hydraulic conductivity (saturated?) units are usually “mm/hour” or “cm/day”; then, knowing the area, the related volume may be computed.

Note 4: Pg. 5: maybe describing some properties, since there are also soil properties not affected.

Note 5: Pg. 9: “ It is illegal to water lawns” or “it is illegal to irrigate lawns with freshwater”?

(May be to avoid repeating “water” so many times, when possible, use “irrigation.”)

Note 6: Can the reader/stakeholder get more information about validation procedures?