

# Supplementary Material: Establishment of the Baseline for the IWRM in the Ecuadorian Andean basins: Land use change, water recharge, meteorological forecast and hydrological modeling.

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**Table S1.** Description of each methodology subsection, data and models used.

Methodology subsection	Input data	Pre-processing stage	Post-processing
Land Use Change (LUC)	<ul style="list-style-type: none"> <li>- Landsat7 ETM (09-11-2009)</li> <li>- Landsat8 OLI_TIRS (09-20-2017)</li> <li>- Sentinel 2B Level 1C (07-31-2019)</li> <li>- DEM ALOS PALSAR RTC.</li> <li>- Land cover 2009 classified map.</li> <li>- Land cover 2017 classified map.</li> <li>- Land cover 2029 classified map.</li> </ul>	<ul style="list-style-type: none"> <li>- Conversion to TOA.</li> <li>- Atmospheric correction DOS.</li> <li>- Topographic correction CTS.</li> <li>- Supervised classification</li> <li>- Transition model MLP (defining explanatory variables and sub transition categories).</li> <li>- Kappa index and confusion matrix (reference data 2019 classified map)</li> <li>- Projection to 2029 (predefined explanatory variables and sub transition categories).</li> </ul>	<ul style="list-style-type: none"> <li>- Land cover classification 2009.</li> <li>- Land cover classification 2017.</li> <li>- Land cover classification 2019.</li> <li>- Land cover projection (MLP) 2019.</li> <li>- Land cover projection (MLP) 2029.</li> </ul>
Hydric Recharge Estimation	<ul style="list-style-type: none"> <li>- Multi-year average precipitation.</li> <li>- Soil sampling data</li> <li>- LULC maps scenarios (1) and (2).</li> <li>- DEM ALOS PALSAR RTC.</li> </ul>	<ul style="list-style-type: none"> <li>- Multi-year average ETP</li> <li>- Green-Ampt infiltration model (basic infiltration rate)</li> <li>- Coefficient assignment <math>k_p, k_v, k_{fc}</math>.</li> </ul>	<ul style="list-style-type: none"> <li>- Multi-year average hydric recharge for LULC scenario (1) and LULC scenario (2).</li> </ul>
Flash Flood Risk Assessment	<ul style="list-style-type: none"> <li>- Maximum precipitation in 24 hours precipitation records.</li> </ul>	<ul style="list-style-type: none"> <li>- Distribution functions.</li> <li>- Concentration time.</li> </ul>	<ul style="list-style-type: none"> <li>- Scenario (1) and scenario (2) inundation simulation.</li> </ul>

	<ul style="list-style-type: none"> <li>- LULC maps scenarios (1) and (2).</li> <li>- Soil sampling data.</li> <li>- DEM ALOS PALSAR RTC.</li> </ul>	<ul style="list-style-type: none"> <li>- Curve number (CN) for LULC maps scenarios (a) and (b).</li> <li>- Synthetic unit hydrographs.</li> <li>- Hydraulic modelling.</li> </ul>	
Meteorological Projections	<ul style="list-style-type: none"> <li>- Annual mean temperature values, T_Average.</li> <li>- Annual mean of maximum precipitation in 24 hours of each month, Pmax_Average.</li> </ul>	<ul style="list-style-type: none"> <li>- Projection to 2029 with ARIMA, Holt and Holt-Winters models.</li> </ul>	Analysis of temperature increase and extreme rainfall over a 10-year time horizon results.
Water Availability Estimation	<ul style="list-style-type: none"> <li>- LULC maps scenarios (1) and (2).</li> <li>- DEM ALOS PALSAR RTC.</li> <li>- 24 hours precipitation.</li> <li>- Maximum temperature.</li> <li>- Minimum temperature.</li> <li>- Relative humidity</li> <li>- Wind speed.</li> <li>- Soil sampling data.</li> </ul>	<ul style="list-style-type: none"> <li>- Semi-distributed hydrological modelling.</li> <li>- Solar radiation estimation.</li> <li>- Monthly climatic parameters calculation.</li> <li>- Soil map generation.</li> <li>- Coverages concatenation to SWAT database.</li> <li>- Slope map generation.</li> </ul>	<ul style="list-style-type: none"> <li>- Simulated flow values</li> <li>- FDC.</li> </ul>