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Development of performance indicators for Water-energy-food security and its application in Latin America and the Caribbean

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Understanding water-energy-food interrelatedness and interdependencies (WEF Nexus) over environmental resources can result in improved water, energy, and food security by integrating management and governance across sectors and scales, reducing tradeoffs, and building synergies, overall promoting sustainability and a transition to green economy. One of the most relevant research areas on the Nexus is the development of indexes to assess the performance of the three sectors and their interlinkages. These tools are essential to understanding the Nexus concept and to determine areas for improvement, especially in developing countries. To evaluate the WEF Nexus for a developing region, namely Latin America and the Caribbean (LAC), two approaches are proposed to evaluate water, energy and food security at intra-country level. First, a composite diagram was developed for LAC countries and subregions that considers three key indicators per sector: availability, access, and sustainability of the sector's resources. Second, an analysis was performed for selected countries using internal factors that represent the most important interrelationships that exist within the WEF Nexus. The results show that access to food in LAC is relatively low in comparison to other developing regions. Regarding renewable energy sources, with the exception of some countries, the region's share (including hydroelectricity) in electricity production is low. Water resources represent the most vulnerable sector for food and energy development of the countries (water for food, and water for energy), as well as the need to implement green infrastructure for sustainable water production (food for water).