

Quantitative Analysis of Three Sustainability Pillars for Water Tradeoff Projects in Amazon

Authors : Taha Anjamrooz, Sareh Rajabi, Hasan Mahmmud, Ghassan Abulebdeh

Abstract : Water availability, as well as water demand, are not uniformly distributed in time and space. Numerous extra-large water diversion projects are launched in Amazon to alleviate water scarcities. This research utilizes statistical analysis to examine the temporal and spatial features of 40 extra-large water diversion projects in Amazon. Using a network analysis method, the correlation between seven major basins is measured, while the impact analysis method is employed to explore the associated economic, environmental, and social impacts. The study unearths that the development of water diversion in Amazon has witnessed four stages, from a preliminary or initial period to a phase of rapid development. It is observed that the length of water diversion channels and the quantity of water transferred have amplified significantly in the past five decades. As of 2015, in Amazon, more than 75 billion m³ of water was transferred amidst 12,000 km long channels. These projects extend over half of the Amazon Area. The River Basin E is currently the most significant source of transferred water. Through inter-basin water diversions, Amazon gains the opportunity to enhance the Gross Domestic Product (GDP) by 5%. Nevertheless, the construction costs exceed 70 billion US dollars, which is higher than any other country. The average cost of transferred water per unit has amplified with time and scale but reduced from western to eastern Amazon. Additionally, annual total energy consumption for pumping exceeded 40 billion kilowatt-hours, while the associated greenhouse gas emissions are assessed to be 35 million tons. Noteworthy to comprehend that ecological problems initiated by water diversion influence the River Basin B and River Basin D. Due to water diversion, more than 350 thousand individuals have been relocated, away from their homes. In order to enhance water diversion sustainability, four categories of innovative measures are provided for decision-makers: development of water tradeoff projects strategies, improvement of integrated water resource management, the formation of water-saving inducements, and pricing approach, and application of ex-post assessment.

Keywords : sustainability, water trade-off projects, environment, Amazon

Conference Title : ICEWRE 2020 : International Conference on Environmental and Water Resources Engineering

Conference Location : Bali, Indonesia

Conference Dates : October 22-23, 2020