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Estimation of environmental flow for sustainable hydropower development

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Abstract

The purpose of environmental flows in a river is to secure the aquatic environment with an optimum amount of water for survival. A sustainable hydropower development project has to operate with minimum negative effects on other factors that man depends on and the environment is one of these factors. There have been conflicting minimum flow assessments from different methods and these are arguably the result of different environmental goals and levels of protection. But the main methods which have been developed are hydrologic, hydraulic, holistic and habitat simulation methods. Each method has different methodologies which have been developed by researchers worldwide. The hydrologic methods aim at minimum flow estimation using average daily, weekly or monthly historical data. They are the simplest and widely used methods. The hydraulic methods employ relationship between flow and cross sections of the river to find the minimum flow. The holistic methods are data intensive but warrant accurate results of minimum flows than the hydrologic and hydraulic methods. The holistic methods make use of a variety of data and their analysis involves different experts. The habitat methods are equally data intensive with experts required. Application of the methods depend on various factor such as availability of important data and experts for data analysis, accessibility of site, availability of funds and equipment, time frame and level of accuracy required.

Biography

Mulenga Musonda is currently an M.Tech second year student in Water Resources Management at the Indian Institute of Technology, Roorkee (India). He is a civil engineer who graduated in B.Tech from The University of Zambia in 2007. He has further successfully done a course in Comprehensive Urban Transport planning and Project at the Ministry of Land, Infrastructure, Transport and Tourism, Japan. The course was organized by the Japan International Cooperation Agency under the international Cooperation Program of the Government of Japan in which he obtained a certificate in 2008. He has since then worked for the Government of Zambia as a drainage engineer under the Ministry of Local Government and Housing, engineering department. He has been involved in various water, drainage structures and road projects in different parts of the country. He participates actively in engineering activities in the country and he is a member of the Engineering Institute of Zambia which is associated with different kinds of water resources projects and affairs of the engineers.