Upstream Effects on Aras Cascade Hydropower Plants System

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چکیده :

Aras River is an international river whose water resources are shared by four countries of Turkey, Armenia, Iran and Azerbaijan. A major middle part of Aras River is exactly the border between Iran, Azerbaijan and Armenia and on this part the countries share several hydropower plant projects including two storage projects (Aras and Khodafarin) and four run-of-river projects (Megri, Gharechilar, Marazad and Ordubad). On the other hand there are some development plans in upstream countries of Turkey and Armenia which are expected to affect the energy production performance of the hydropower cascade system of Aras River. The principal motivation of this study is to demonstrate some of these effects andtherefore the results are expected to be helpful for future action plans or possible hydro-political negotiations. To deal with this issue, the water resources demand-supply system of Aras River was modeled using WEAP (Water Evaluation and Planning) software. A script for hydropower simulation based on the sequential streamflow routing method was developed using scripting capabilities of WEAP. Results demonstrate that upstream projects construction will dramatically reduce energy production of the hydropower plants. We have supposed that the most influential effect of upstream development in Turkey and Armenia is 35% reduction in long-term average of Aras Dam inflow, the reality that revealed by apervious study. Therefore based on our results, 30% decrease in the annual average of hydropower energy production of Khodafarin, Megri and Gharechilar power plants and 50% and 15% reduction in annual average of hydropower energy production of respectively Aras and Marazad power plants are expected

کلید واژه : Hydropower plants cascade system, WEAP, Sequential Streamflow Routing, Aras River