

# Impact of River Regulation on Downstream Socio-Hydrologic Systems in Ethiopia

You are kindly invited to attend the public defence of the doctoral dissertation of

**Sofie Annys**

Friday December 11, 2020 at 4 P.M.

Livestream: [www.geografie.ugent.be/events](http://www.geografie.ugent.be/events)

Thesis submitted in fulfilment of the requirements for the degree of:  
Doctor of Sciences: Geography (UGent)  
Doctor of Applied Economics (UA)

## SUMMARY

In recent years, a renewed interest in large dams and large-scale irrigation schemes has developed, justified by the premise to make the agricultural and energy sectors climate-resilient. Despite this important climate effort, large dams and interbasin water transfers are controversial and have far-reaching impacts for river-dependent communities and the environments on which they depend. Since the year 2000, international standards on dam construction have been developed, but many dam projects currently still fail to meet environmental and social standards in practice as mitigation measures are not legally binding and a follow-up of impacts of large dams is not mandatory.

Drawing on GIS-analyses of remote sensing images, qualitative and quantitative empirical evidence from the field, this PhD dissertation has focused on the impacts of two large dams (Tekeze and Ribb) and an interbasin water transfer (Tana-Beles) on downstream socio-hydrologic systems, consisting



of the strongly interconnected and mutually evolving environmental, agricultural and social sub-systems. The research results have indicated that (i) downstream hydrogeomorphic systems have drastically altered after river regulation and are developing a new hydrogeomorphic equilibrium, (ii) small-scale farmer-led irrigation systems have been more efficient in increasing crop productivities than several large-scale irrigation projects, (iii) the newly induced hydrologic regimes have strongly altered downstream social interactions due to impeded river crossing, and (iv) ill-prepared land redistributions and resettlements have left thousands of households with a high risk of impoverishment. With its extensive hydropower potential and ambitious dam building program, Ethiopia has been the perfect case study for this research.

## SUPERVISORS

Prof. dr. Jan Nyssen (Ghent University, Dept. of Geography)

Prof. dr. ir. Steven Van Passel (University of Antwerp, Dept. of Engineering Management)

Prof. dr. ir. Joost Dessein (Ghent University, Dept. of Agricultural Economics)

## MEMBERS OF THE EXAMINATION COMMITTEE

Prof. dr. Veerle Van Eetvelde (Chair, Ghent University, Dept. of Geography)

Dr. ir. Stefaan Dondeyne (Ghent University, Dept. of Geography)

Prof. dr. Amaury Frankl (Ghent University, Dept. of Geography)

Prof. dr. Ann Verhetsel (University of Antwerp, Dept. of Transport and Regional Economics)

Prof. dr. Stijn Temmerman (University of Antwerp, Dept. of Biology)

Prof. dr. Enyew Adgo (Bahir Dar University, Dept. of Natural Resources Management)

Dr. Tesfaalem Ghebreyohannes (Mekelle University, Dept. of Geography and Environmental Studies)

Prof. dr. ir. Pieter Van der Zaag (IHE Delft Institute for Water Education and Delft University of Technology)