World Trade Model for freshwater fish and water type change scenarios

Topic: Addressing Resource Challenges in a Globalized Economy I
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As in the present, in future years, we will keep on seeing numerous dam and water management projects, involving several main rivers and countries or regions (e.g. in China, affecting the downstream availability in South-East Asia, in the regions of India-Pakistan; Turkey-Syria-Iraq-Iran, or Ethiopia-Sudan-Egypt). This issue and others linked to food security call for an integrated economic, ecological and social approach for dam projects analysis, which can be properly captured with the World Trade Model (WTM). This framework of comparative advantage studies economic production, and use and scarcity of natural resources, with an appropriate alignment of input-output tables of all (key climatic and hydrological, from GTAP) regions in the world, their factor uses (especially of natural resources, and in particular water) and endowments. In this article we distinguish three technologies of fishing production, subsistence freshwater fishing, marine fishing and aquaculture, and model with them 2 scenarios.
The first one consists in studying the impact that the disappearance of freshwater fish would imply in terms of production, trade, land or water use, with particular impacts in regions such as Southeast Asia and certain areas of East Africa and South America. The second scenario looks in the opposite direction, examining which impacts would be avoided if the maximum historical freshwater fish catch could be attained because of their higher availability.
Three water type classes based on the water quality are introduced and discussed in the model, with respect to the type of constraints and changes in costs they impose.