The 3rd International Forum on Water and Food
Tshwane, South Africa
November 14 – 17, 2011

CGIAR Challenge Program on WATER & FOOD
Andes • Ganges • Limpopo • Mekong • Nile • Volta

Co-hosted by: IWMI International Water Management Institute; FANRPAN Food, Agriculture and Natural Resources Policy Analysis Network

Assessing the impacts of existing and planned water storage development in the Ethiopian Highlands under current and projected future climate

MATTHEW MCCARTNEY[1], MICHAEL MENKER[2] AND SOLOMON SEYOUM[1]

[1]International Water Management Institute, Regional Office for Nile Basin and East Africa, Addis Ababa, Ethiopia
[2] Freie University of Berlin, Berlin, Germany
m.mccartney@cgiar.org

Session: Nile Basin

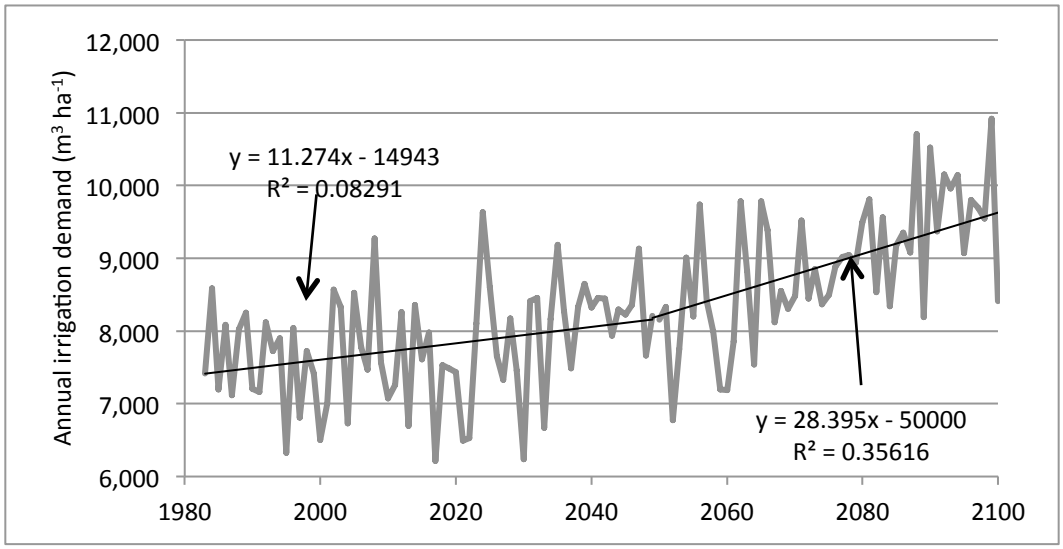
Key Message

By altering patterns of rainfall and runoff, future changes in climate will constrain agricultural production and economic growth in many developing countries. Methods to evaluate the possible impacts of climate change in water resources planning are a prerequisite for successful adaptation.

Summary

There are plans for significant expansion of hydropower and irrigation in the Ethiopian portion of the Blue Nile River basin. However, the possible consequences of climate change on the performance of schemes have not been evaluated. In this study, several models (i.e. CCLM, SWAT and WEAP) were combined to provide an assessment of the possible impact of one downscaled mid-range climate change scenario (A1B) on the performance of existing and planned irrigation and hydropower schemes, and downstream flows. Model simulations were run from 1983 to 2100. The results indicate that under this scenario, although there are variations within the basin, rainfall will be reduced and evaporation will increase, particularly in the second half of the century. This will in turn result in: i) increased irrigation

water demand; ii) reduced hydropower production; and iii) reduced downstream flows. Although significant uncertainty remains, this has important implications for the future planning, design and management of water resource schemes.



AVERAGE ANNUAL IRRIGATION DEMAND (M^3 HA^{-1}) FROM 1980 TO 2100 IN THE BLUE NILE BASIN UNDER AN A1B CLIMATE CHANGE SCENARIO