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## Agricultural Water Productivity Across Landscape Positions and Management Alternatives

TEKLU ERKOSSA JIJO<sup>1</sup>, AMARE HAILESLASSIE<sup>2</sup>, TILAHUN AMEDE<sup>3</sup>

<sup>1</sup>*International Water Management Institute (IWMI), Office for East Africa and Nile Basin , Ethiopia*

<sup>2</sup>*International Water Management Institute (IWMI),*

<sup>3</sup>*International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Agroecosystem Theme, Kenya*

### Abstract

We examine the variation in water productivity across landscape positions as influenced by slope and prevailing crop management practices for the major crops grown in the Blue Nile Basin. Two watersheds were selected in the basin and each was divided into three landscape positions; summit, backslope and footslope. For each position, crops that together cover at least 70% of that particular area were selected and monitored on five farmers' fields, in terms of variety selection and crop management practices. Soil and climate data for each landscape position were used to estimate crop water requirements of nine crops (maize (*Zea mays* L.), wheat (*Triticum aestivum* L), barley (*Hordeum vulgare*), potato (*Solanum tuberosum*), tef (*Eragrostis tef* Zucca), sorghum (*Sorghum bicolor*), finger millet (*Eleusine coracana*), niger seed (*Guizotia abyssinica*) and sesame (*Sesamun indicum*)). The effective rainfall during the growing period was estimated using FAO-CROPWAT model. The feed value of the crop residues was assessed under three livestock breeds and feeding scenarios. We found that water productivity was significantly affected by the landscape positions, crop type and management practices. Water productivity was the lowest in the backslope area, which is characterised by steep slopes and severe soil erosion. Irrespective of the landscape positions, improved crop varieties and livestock breeds and improved management practices substantially increased water productivity of the crop-livestock system. Widespread adoption of these improved options tailored for the landscape positions may significantly enhance income and livelihoods of the farming communities, provided their access to input and output markets is facilitated. This underpins the need for rigorous enforcement of the land use policy that favours the use of land according to its potentials and with suitable management practices.

**Keywords:** Backslope, blue Nile Basin, CROPWAT, Ethiopia, footslope, land use, summit