Modeling floodplain extent in the white volta basin: an application of the lisflood-fp model

B.K. Nyarko (1), B. Diekkrüger (2), C. Rodgers (3).,

(1) ZEFC, Center for Development Research, Walter-Flex Str 3, 53113, Bonn, Germany, bynarko@yahoo.co.uk (2) Hydrology Research Group, Department of Geography, University of Bonn, Meckenheimer Allee 166, Bonn, Germany, b.diekkrueger@uni-bonn.de, (3) GLOWA-Volta Project, Center for Development Research, Walter-Flex Str 3, 53113, Bonn, Germany, crodgers@uni-bonn.de

Farmers along the White Volta River in the Upper East Region of Ghana practice floodplain cultivation as a form of supplementary irrigation. This region is characterized by a mono-modal rainy season, although uncertain precipitation patterns make rainfed agriculture risky. As rainfed cultivation often fails to provide adequate food security for the region's residents, farmers are exploring alternative methods of cultivation, including the cropping of areas that are often seasonally inundated. The Government of Ghana is actively encouraging floodplain cultivation, which can be practiced in the dry season using pumped river water as a source of irrigation. The increasing use of floodplains for dry season cultivation has placed pressures on land allocation, however, and has decreased the average distance from the margin of cultivated land to the main river from 30.7 to 5.3 meters. Tillage in close proximity to the river channel has resulted in high silt delivery levels. In order to promote sustainable management of river resources, a floodplain extent map was created to enable the enforcement of a buffer zone along the river. The extent map was delineated using the LISFLOOD-FP model, based on the Saint-Venant open channel flow and Manning equations coupled with a 2D raster model of the floodplain, which was validated from direct field observations. The derived floodplain extents correspond to flood inundation that is subject to variation in time and with distance downstream.