



Tropentag, October 6-8, 2009, Hamburg

“Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources”

Characterisation of Small Wetlands in East Africa

COLLINS HANDA¹, NAOMIE SAKANE², BEATE BOEHME³, HELLEN KAMIRI¹, EMILIANA MWITA⁴,
NEEMA MOGHA²

¹*University of Bonn, Institute of Crop Science and Resource Conservation, Germany*

²*Wageningen University, Plant Production Systems Group, Germany*

³*University of Siegen, Research Institute for Water and Environment, Germany*

⁴*University of Bonn, Geography Department, Germany*

Abstract

Small wetlands in East Africa comprise valley heads, inland valley swamps, mountain peat bogs and flood plains. They are highly diverse in terms of their size, hydrologic regimes, vegetation, soils, and geomorphologic settings. They provide diverse ecosystem services and fulfil a wide range of ecological and social functions. There is a need to target further research interventions and to provide advice regarding wetland's conservation or agricultural use. Therefore, a typology of small wetlands (5–500 ha) in Kenya and Tanzania (East Africa) was carried out between February 2008 and June 2008 to classify and group wetlands based on common denominators. Study sites were selected based on geological characteristics, rainfall gradient, altitude, demography and wetland distribution and diversity. A total of 51 wetlands (157 land use subunits) in the Usambara mountains and the Pangani plain in Tanzania and in the Mount Kenya foodslopes and the Ewaso Naroc Swamp in Kenya were surveyed. A data reduction analysis performed on 27 variables using principle component analysis (PCA) indicated that 17 variables, explained most similarities within the wetland subunits. These variables included attributes related to biophysical features and land use (seasonality of flooding, soil C and P contents and texture, vegetation type, drainage patterns, land use of adjacent uplands, the type, duration and intensity of use) and the socio-economic settings of the wetlands (accessibility, population density, market access, and livelihood level). With these variables eight distinct wetland cluster groups were identified. A Discriminant Analysis (DA) showed that 88% of the variation among the cluster groups were explained by wetland type (inland valley vs. floodplain) soil P content (<10 vs. >10 ppm Olsen-P), soil texture (clay vs. sandy clay) and the hydric regime (permanent vs. seasonal flooding). Based on these results, four wetlands, covering the six dominant out of the eight wetland cluster groups, were selected for further in-depth studies regarding their vulnerability and agricultural use potential.

Keywords: Discriminant analysis, flood plains, inland valley, principle component analysis