In most parts of Uganda, enhanced seasonal rainfall occurs in two rainy seasons; March through May (MAM), known as the Long Rains season and September through December (SOND), known as the Short Rains. This bimodality arises from the meridional shift of the Inter-Tropical Convergence Zone (ITCZ), moving from the southern to the northern hemisphere during the Long Rains, and back to the southern hemisphere during the Short Rains. Accurate and reliable prediction of different seasonal rainfall characteristics such as the onset of the rainy season and the start of the sowing time is of crucial importance for agriculture and sustainable food production. This research studied the onset for the long rainy season in Uganda. Generally, for the Long Rains season, the onset and cessation dates are independent of Number of Rain Days and the mean daily Rainfall Intensity during the rainy season. Hence the Long Rains seasonal rainfall total depends on a combination of virtually unrelated factors, which may account for the difficulty in its prediction. Using station observations, Sub-seasonal to Seasonal (S2S) dataset and the Weather Research and Forecasting (WRF) model output, seasonal rainfall onset period was determined over Uganda using the fuzzy-logic approach. Using the approach outlined in "Predicting the regional onset of the rainy season in West Africa" on the first date of the year, the three constraints are valid simultaneously. Each definition constraint is attached to a fuzzy membership function using triangular (subscript T) fuzzy numbers. In the final analysis, the WRF model has a better prediction skill of MAM seasonal rain timing when compared to the two S2S models of European Centre for Medium-Range Weather Forecasts (ECMWF) and the Korea Meteorological Administration (KMA). However, ECMWF predicted late onset with a higher skill than WRF and KMA models. In general, the seasonal rain onset prediction has been a continuing challenge in Uganda, the Greater Horn of Africa (GHA), and the global tropics at large this research guides the improvement of the onset prediction skill in the region.

Key words: Onset, fuzzy logic, Seasonal rainfall, Prediction skill