Climatic Effects on the Yield of Upland Rice Grown Along an Altitude Gradient in Madagascar

SUCHIT SHRESTHA [1], FOLKARD ASCH[1], ALAIN RAMANANTSOANIRINA[2], JULIE DUSSERRE[3]

[1] *University of Hohenheim, Department of Plant Production and Agroecology in the Tropics and Subtropics, Stuttgart, Germany*
[2] *FoFiFa, Madagascar*
[3] *CIRAD, France*

Development of upland rice can supplement to lowland rice as the pressure is increasing on irrigated land. In Madagascar, rice is cultivated on 1.3 M ha of which 29% are upland rice, growing from the coastal area up to the higher altitude. High altitude rice cultivation is constraint by a short vegetation period due to low temperatures and thus by the time the crop needs to complete its cycle. Climate change is assumed to result in a rise in mean temperatures of 2–5 degrees depending on the simulation scenario. Thus, rice cropping in higher altitudes may become more favorable as long as precipitation is not a limiting factor. The RISOCAS project of the University of Hohenheim for developing rice crop adaptation strategies for climate change in vulnerable environments has selected three different altitude gradient locations (Andranomanelatra 1625 m, Ivory 965m and Ankepaka 25m asl) in Madagascar for the upland rice field experiments. Mini Rice Gardens were designed for 10 contrasting rice genotypes with 5 monthly planting dates on three locations resulting in 15 different photo-thermal environments. At all sites, genotypic and planting date responses were studied by closely observing the time and temperature requirements to panicle initiation, booting, heading, flowering, and physiological maturity. In addition grain yield and yield components and spikelet sterility were observed. Temperature effects on sterility are discussed in order to judge the agronomic fit of a potential upland rice ideotype for higher altitude cropping in a changing climate.

Keywords: Climate change adaptation, temperature, yield, sterility, RISOCAS

Contact: suchitps@uni-hohenheim.de