

RESPONSE OF WOODY PLANT SPECIES DIVERSITY AND TREE GROWTH IN ENCLOSURE TO SPATE IRRIGATION FROM GULLIES

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Severe deforestation has taken place over long years and continued until the last few decades in Northern Ethiopia. To reverse this phenomenon enclosures (areas set aside from human and animal interference) have been widely implemented in the Tigray region of Northern Ethiopia with many positive results in environmental rehabilitation (e.g. soil erosion reduction, soil fertility increment, biomass improvement) and socio-economic improvement. Nevertheless, the growth of trees and biodiversity increment in the enclosure are slow, which can be explained by the longer dry season (8 - 9 months) and recurrent drought in the region. Taking example from spate irrigation that is practiced onto croplands in nearby regions, storm runoff was diverted from gullies onto two enclosures (Hechi in 2002 to 2005 and Adikolakul in 2012 to 2016). This type of spate irrigation had the objectives, to reduce flooding risk; to facilitate downstream gully rehabilitation; and to enhance vegetation growth in the enclosure.

Hence, this study aimed to analyse the effect of the irrigation on the growth of woody vegetation and biodiversity improvement in the enclosures as compared to the non-irrigated adjacent enclosure areas. To this end, different forest and tree parameters (woody plant diversity, biomass, height, diameter, tree ring) data were collected at Adikolakul from sample plots systematically laid down along transects in the enclosure, while only tree ring data was collected at Hechi enclosure to see the long term effect of irrigation on tree growth through the analysis of tree ring increments. Preliminary results show larger average tree basal area (0.024 ft²) in irrigated area than the non-irrigated area (0.015 ft²) which indicate the positive effect of spate irrigation with storm runoff on tree growth. A vigorous tree growth as well as flowering in the plots with spate irrigation were also observed during field visit even in the dry season. Results of the complete quantitative analyses will be presented in the conference.