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Herbaceous and woody vegetation composition dry matter production and range condition in lowlands of Bale ,Southeast Ethiopia

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Abstract A study with the objective of range inventory and condition assessment was undertaken in Rayitu district of Bale zone , in year of 2006 .Accordingly ,the district was stratified by altitude (765 to 1070 m and >1070 to1350 m) and grazing types (communal ,enclosures and benchmark grazing sites) .Data on grass species composition ,basal cover ,litter cover ,number of grass seedlings ,age distribution of grass ,soil erosion ,soil compaction and woody parameters such as density ,canopy cover and hedging were gathered .A total of 44 ,2 ,2 ,8 and 45 species of grasses ,legumes ,sedges ,other herbaceous plant and woody species were identified in the district ,respectively .Aristida adscension ,Sporobolus panicoides ,Sporobolus pyramidalis ,and Tragus berteronianus were the frequent species in the communal grazing lands ,whereas Aristida vestita ,Cenchrus ciliaris , Sporobolus panicoides ,Sporobolus pyramidalis and Tetrapogon cencriformis were the frequent and/or most frequent species in the enclosure areas .In the benchmark grazing sites ,Bothriochloa radicans ,Cenchrus ciliaris ,Cynodon dactylon ,Eragrostis tenuifolia ,Panicum maximum and Sporobolus pyramidalis were the frequent and/or most frequent species .Furthermore ,Acacia tortilis ,Acacia bussie ,Combretum collinum and Commiphora erythraea were the common and/or dominant woody species in the communal grazing area ,whereas Acacia bussei ,Acacia mellifera ,Acacia oerfota ,Acacia senegal ,Acacia tortilis and Commiphora erythraea in the enclosures .Acacia bussei ,Acacia seyal ,Acacia tortilis ,Combretum collinum and Griwa penicillata were the common and/or dominant species in the benchmark sites .In the study district ,the percentage bare ground was about 18% (21.76% in communal and 14.13% in benchmark) .The mean woody density in communal ,enclosure and benchmark sites of the study district were 2 ,654 2±109.7 ,2 ,667 8±125.8 and 2 ,041.7±98.1 plants per hectare ,respectively .Thus ,the wood species density indicated that communal and enclosure grazing sites are bush encroached .The study also showed that total dry matter biomass (DM) ,DM of grass ,and DM of highly desirable ,DM of intermediate and least desirable grass species were significantly ($P \leq 0.05$) higher in benchmark followed by the enclosure ,which is significantly ($P \leq 0.05$) higher than in the communal .Mean total range condition score in the communal ,enclosure and benchmark grazing sites of the study district were 25.1±0.24 ,39±1.35 and 51.92±1.2 ,respectively .Thus communal ,enclosure and benchmark grazing sites were classified as poor ,fair and good condition ,respectively .There was a strong positive correlation ($R^2 = 0.686$) between range condition rating and total grass species biomass .Vegetation studies confirmed that the condition of the communal grazing land has deteriorated indicating the need for further improvement .The enclosure sites were in transitional state from poor to fair condition ,which also needs further improvement intervention while the benchmark sites need maintenance of their present condition .