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Mapping decadal land cover changes in the woodlands of north eastern Namibia using the Landsat satellite archive (1975-2014)

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Woodland savannahs provide essential ecosystem functions and services to communities. On the African continent, they are widely utilized and converted to intensive land uses. This study investigates the land cover changes over 108,038 km2 in NE Namibia using multi-sensor Landsat imagery, at decadal intervals from 1975 to 2014, with a post-classification change detection method and supervised Regression Tree classifiers. We discuss likely impacts of land tenure and reforms over the past four decades on changes in land use and land cover. These included losses, gains and exchanges between predominant land cover classes. Exchanges comprised logical conversions between woodland and agricultural classes, implying woodland clearing for arable farming, cropland abandonment and vegetation succession. The dominant change was a reduction in the area of the woodland class due to the expansion of the agricultural class, specifically, small-scale cereal and pastoral production. Woodland area decreased from 90% of the study area in 1975 to 83% in 2014, while cleared land increased from 9% to 14%. We found that the main land cover changes are conversion from woodland to agricultural and urban land uses, driven by urban expansion and woodland clearing for subsistence-based agriculture and pastoralism.