Study site description

The study site covers an area of 1160 km$^2$ in the Gorongosa and Nhambita districts of Sofala province, central Mozambique, delimited by the extent of radar data imagery (Fig. 1). The largest town in the study area is Gorongosa town, situated to the north of the study area, but several smaller villages and settlements exist, including Nhambita and Mbulawa. Gorongosa is connected to Inchope and the Beira corridor in the south, a major economic area, by a paved road (designated the EN1). The paved road is the only main road in the study site, but several smaller dirt roads and tracks exist throughout the area. The study site includes part of the Gorongosa National Park and the park buffer zone, which extends from the park boundary up to the east side of the main road. Several other protected areas known as ‘Avoided Deforestation areas’ occur, which are part of the Sofala community carbon project, administered by a carbon trading company Envirotech Ltd (www.envirotrade.co.uk). Several large rivers cross the study site; the Vunduzi river runs from the northeast down to join the Pungue river running west to east. The steepest slopes (>10°) mainly occur alongside these large rivers, and the highest elevation (490 m a.s.l.) occurs to the north and the west of the study site (as determined from SRTM data). The vegetation in the area is predominantly classified as miombo woodland with a mean above-ground biomass (AGB) of ~ 21 tC ha$^{-1}$, but with a graduation from dense woodland on the well drained slopes to the northwest, to more open savanna on the poorly drained valley floor to the southeast. The area receives ~ 850 mm mean annual precipitation with strong seasonality in precipitation, with most of the rain falling in the wet season between November and March.
Fig.1: Gorongosa and Nhambita districts in the Sofala province, central Mozambique. The study area is delimited by the radar image extent, covering 1160km². Gorongosa is the nearest large town to the north of the image, and the main road (the EN1) links Gorongosa to Inchope and the Beira corridor to the south. Several smaller communities exist, including Mbulawa and Nhambita communities. Vector data courtesy of ARA CENTRO.

With the end of the Mozambican civil war in 1992, displaced local populations started to return to the area. The resettlement of people increased population numbers, and the population of Gorongosa town increased by 50% from 1997 to 2007, reaching 117,129 inhabitants in 2007. During 1999 to 2002 both the main road and the bridge over the Pungue river were re-built, re-connecting Gorongosa and Nhambita districts to the Beira corridor. The resettlement of people and improved infrastructure has meant the area north of the Pungue is undergoing rapid land-use change, whereas the area south of the Pungue has already largely been deforested, due to being under pressure from resource extraction and land use change for longer. The main proximal causes of forest loss are thought to be clearance for small-scale agriculture, and charcoal production. Fire is used for clearing land and for management, and wild fires are a frequent occurrence. Charcoal is sold along the main road for further transport to Inchope and on to other large urban centres, such as Chimoio and Beira.