

# Supplementary information

## Calculation of deforestation rate

To calculate  $r$ , mean annual rate of change of forest cover, we used the following formula after Puyavaud (2003)

$$r = \frac{1}{t_2 - t_1} \times \ln \frac{A_2}{A_1}$$

where  $A_1$  and  $A_2$  are the forest cover at time  $t_1$  and  $t_2$ , respectively.

## Landsat images used in the study

**SI Table 1.** Details of the Landsat images used in this study

Sensor	Date	ID
Landsat 5 TM	1990 June 02	LT51670781990153JSA00
Landsat 7 ETM+	2001 May 08	LE71670782001127SGS00
Landsat 5 TM	2007 April 30	LT51670782007120JSA00
Landsat 8 OLI	2013 May 16	LC81670782013136LGN01
Landsat 8 OLI	2016 May 24	LC81670782016145LGN00

## Accuracy assessment

**SI Table 2.** Confusion matrix of direct classification using a support vector machine algorithm (NF: persistent non forest, FL1990–2001: forest loss 1990–2001, FL2001–2007: forest loss 2001–2007, FL2007–2013: forest loss 2007–2013, FL2013–2016: forest loss 2013–2016, PF: persistent forest)

		Validate dataset					Row total	User's accuracy
		NF	FL1990–2001	FL2001–2007	FL2007–2013	FL2013–2016		
Mapped classification	NF	98	4	0	0	0	102	96.1%
	FL1990–2001	1	95	0	0	0	96	99.0%
	FL2001–2007	1	1	97	1	0	100	97.0%
	FL2007–2013	0	0	3	99	0	102	97.1%
	FL2013–2016	0	0	0	0	100	100	100.0%
	PF	0	0	0	0	0	100	100.0%
Column total		100	100	100	100	100	600	-
Producer's accuracy		98.0%	95.0%	97.0%	99.0%	100.0%	100.0%	-

Overall accuracy: 98.2%    Kappa coefficient: 0.98

**SI Table 3.** Confusion matrix of independent accuracy assessment comparing Google Earth imagery with the extent of forest estimated by a support vector machine algorithm in 2013

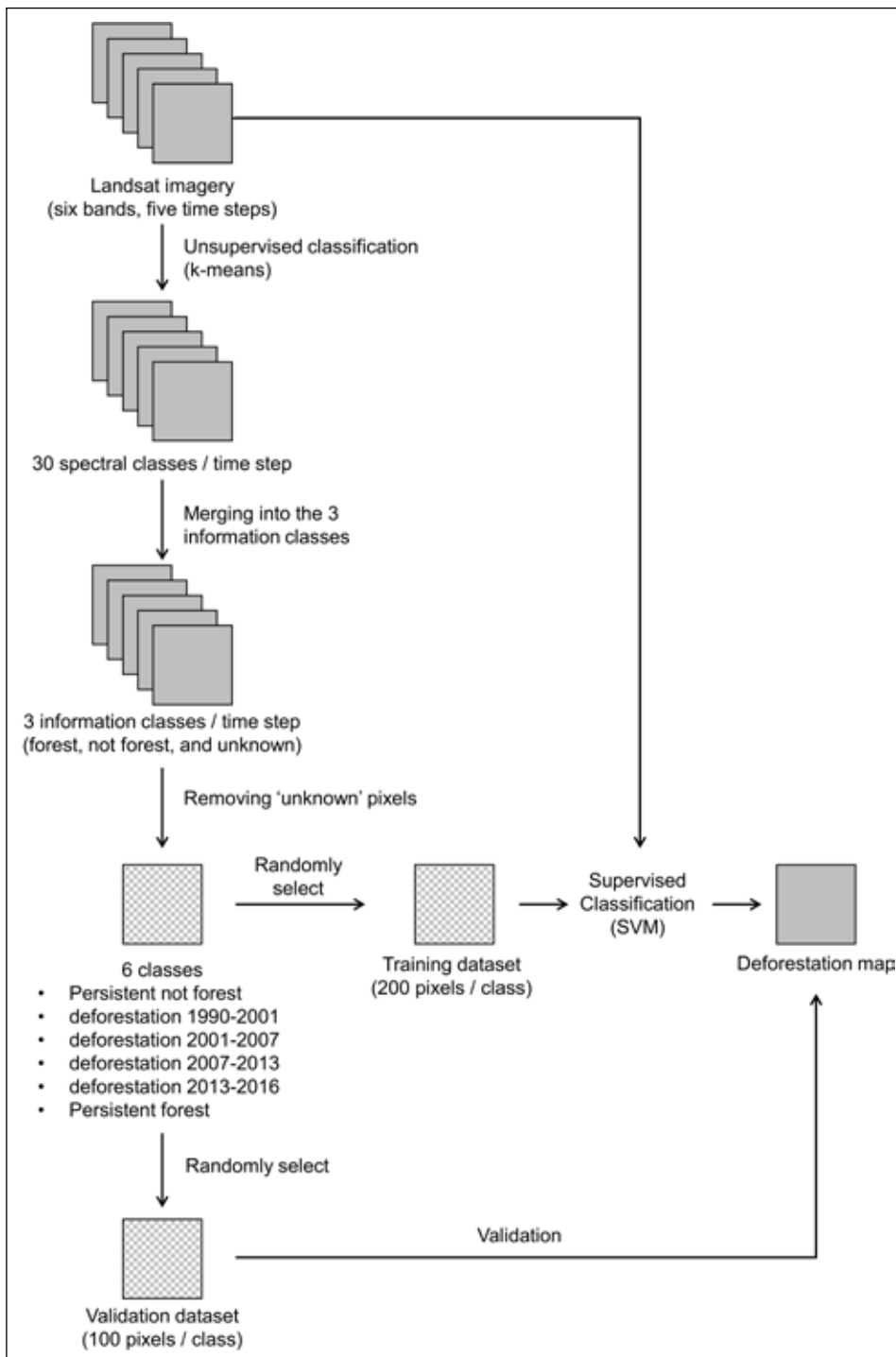
		Validate dataset		Totals	User's accuracy
		Non forest	Forest		
Mapped classification	Non forest	43	7	50	86.0%
	Forest	7	43	50	86.0%
Column total		50	50	100	
Producer's accuracy		86.0%	86.0%		

Overall accuracy: 86.0%    Kappa coefficient: 0.72

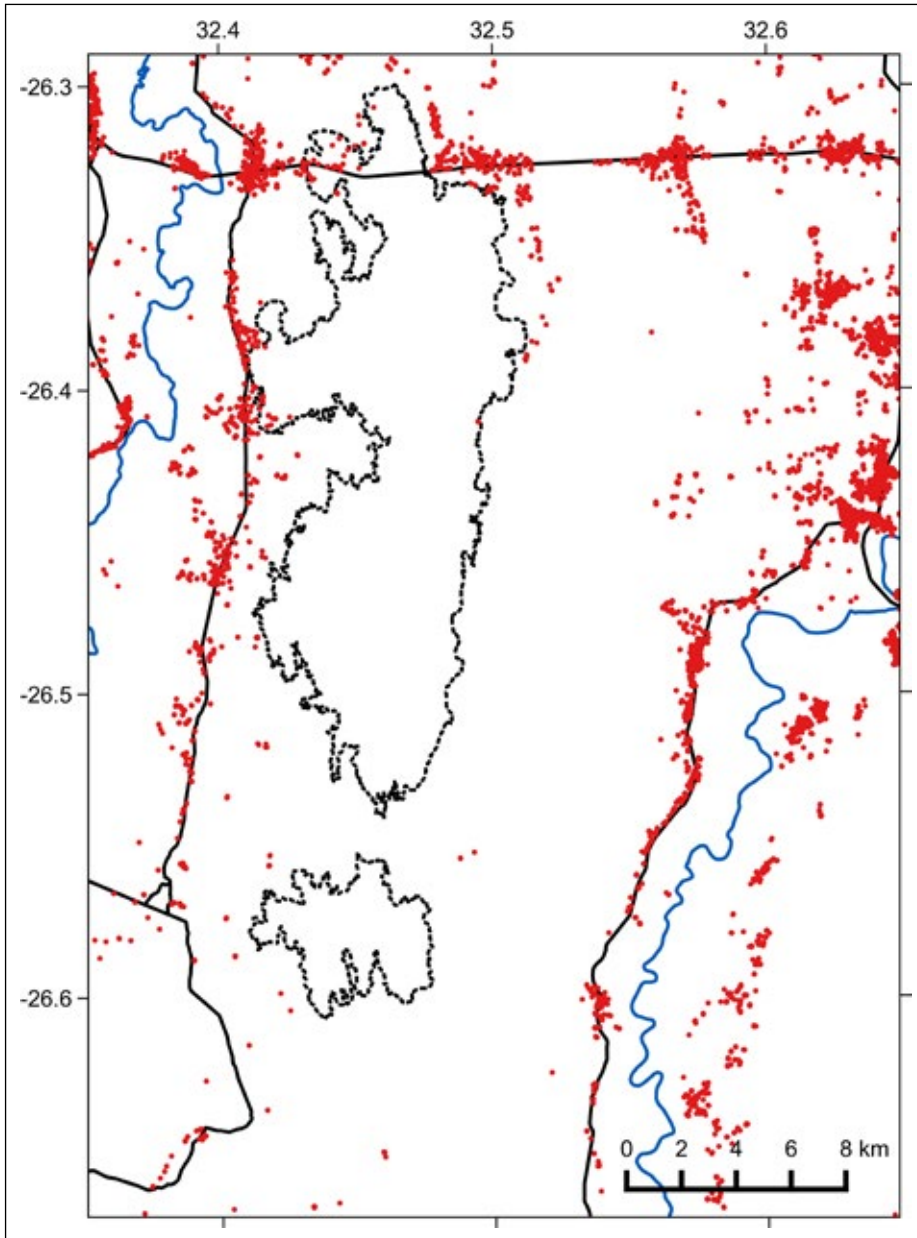
**SI Table 4.** Confusion matrix of independent accuracy assessment comparing Google Earth imagery and Sentinel-2 with the extent of forest estimated by a support vector machine algorithm in 2016

		Validate dataset		Totals	User's accuracy
		Non forest	Forest		
Mapped classification	Non forest	47	3	50	94.0%
	Forest	6	44	50	88.0%
Column total		53	47	100	
Producer's accuracy		88.7%	93.6%		

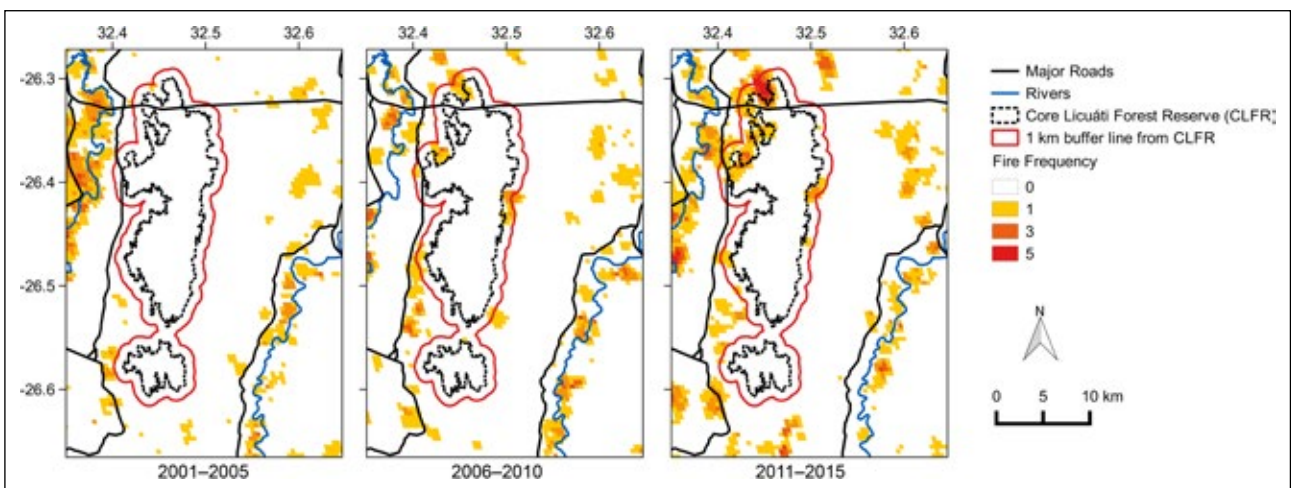
Overall accuracy: 91.0%    Kappa coefficient: 0.82



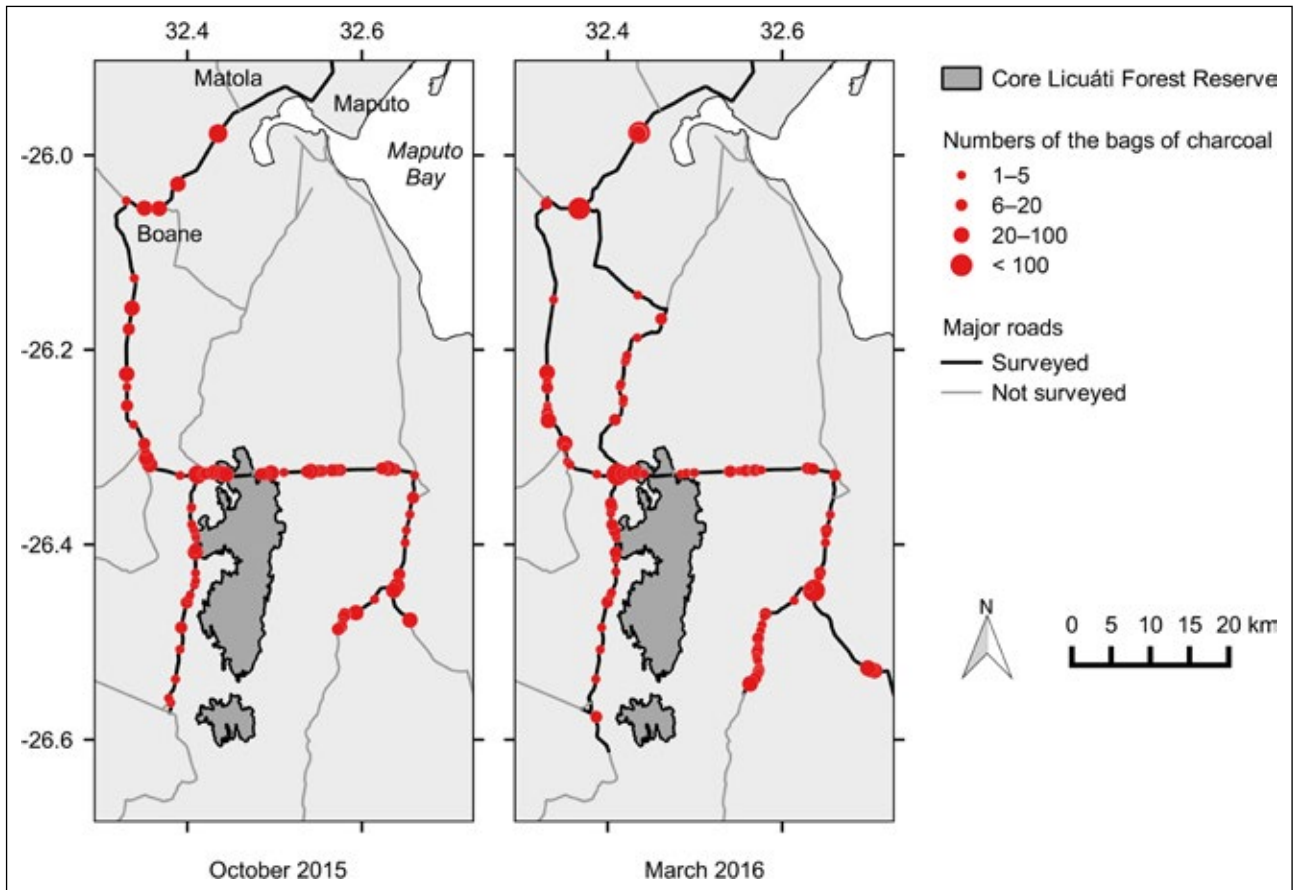
**SI Figure 1.** Flowchart of deforestation analysis used in this study. Each grey square represents one image at one time step, while each dotted square represents selected pixels in a raster file.



**SI Figure 2.** The location of human settlements in the wider study area in southern Mozambique. Dotted lines indicate the Core Licuáti Forest Reserve, while red dots indicate the distribution of houses identified by high resolution Google Earth imagery taken over the period August to September 2015.



**SI Figure 3.** Fire history map of the study area in southern Mozambique estimated by MODIS burned area product (MCD45A1) in three time steps between 2001 and 2015. The Core Licuáti Forest Reserve is outlined in black as is a 1 km buffer area (red line) around the CLFR.



**SI Figure 4.** Distribution of charcoal bags sold along the road side in southern Mozambique in October 2015 (left) and March 2016 (right).