

Appendix 1. Temporal changes (Table A1.1) and geographical distribution of the socioeconomic and biophysical factors (Fig. A1.1-A1.10) of all municipalities of São Paulo State between 1960 and 2006.

We applied a Kruskal-Wallis test for assessing the potential differences between years (1960, 1970, 1980, 1996 and 2006) of each explanatory variable. The Kruskal-Wallis test was chosen because the data were not normally distributed neither presented homogeneity of variances. All analyses were conducted using R statistical software (R Development Core Team 2016).

Table A1.1 Median of each explanatory variable for the years 1960, 1970, 1980, 1996 and 2006, and the Kruskal-Wallis results comparing those years. The distinct superscript letters indicate for which years the difference between the medians is statistically significant.

Explanatory variables	Median					Kruskal-Wallis test		
	1960	1970	1980	1996	2006	df	χ^2	<i>P</i> -value
Annual crops (%)	13.45 ^a	15.77 ^{a,b}	14.29 ^a	14.13 ^a	19.13 ^b	4	14.65	0.0054*
Perennial crops (%)	7.56 ^a	4.77 ^b	6.67 ^a	4.01 ^b	6.98 ^a	4	67.63	<0.0001*
Forest cover (%)	8.24 ^a	5.61 ^b	4.36 ^c	5.01 ^b	8.29 ^a	4	213.16	<0.0001*
Pasture (%)	50 ^a	56.55 ^b	51.60 ^{a,c}	53.64 ^{b,c}	44.76 ^d	4	45.87	<0.0001*
Exotic tree plantation (%)	1.35 ^a	1.03 ^{a,b}	1.01 ^a	0.68 ^b	0.27 ^c	4	138.25	<0.0001*
Uncultivated land (%)	3.43 ^a	3.54 ^a	0.71 ^b	0.46 ^c	0.022 ^d	4	1374.5	<0.0001*
Tractors per area (n° tractor / ha)	0.0012 ^a	0.0027 ^b	0.0064 ^c	0.0092 ^d	0.0087 ^d	4	1179.7	<0.0001*
Density of farm workers (n° of worker / ha)	0.090 ^a	0.072 ^b	0.073 ^b	0.051 ^c	0.055 ^c	4	158.91	<0.0001*
Farms that uses fertilizer (% of farms)	35.49 ^a	49.68 ^b	81.90 ^c	72.48 ^d	-	3	632.67	<0.0001*

“*” indicates the statistical significance at the level $\alpha = 0.05$

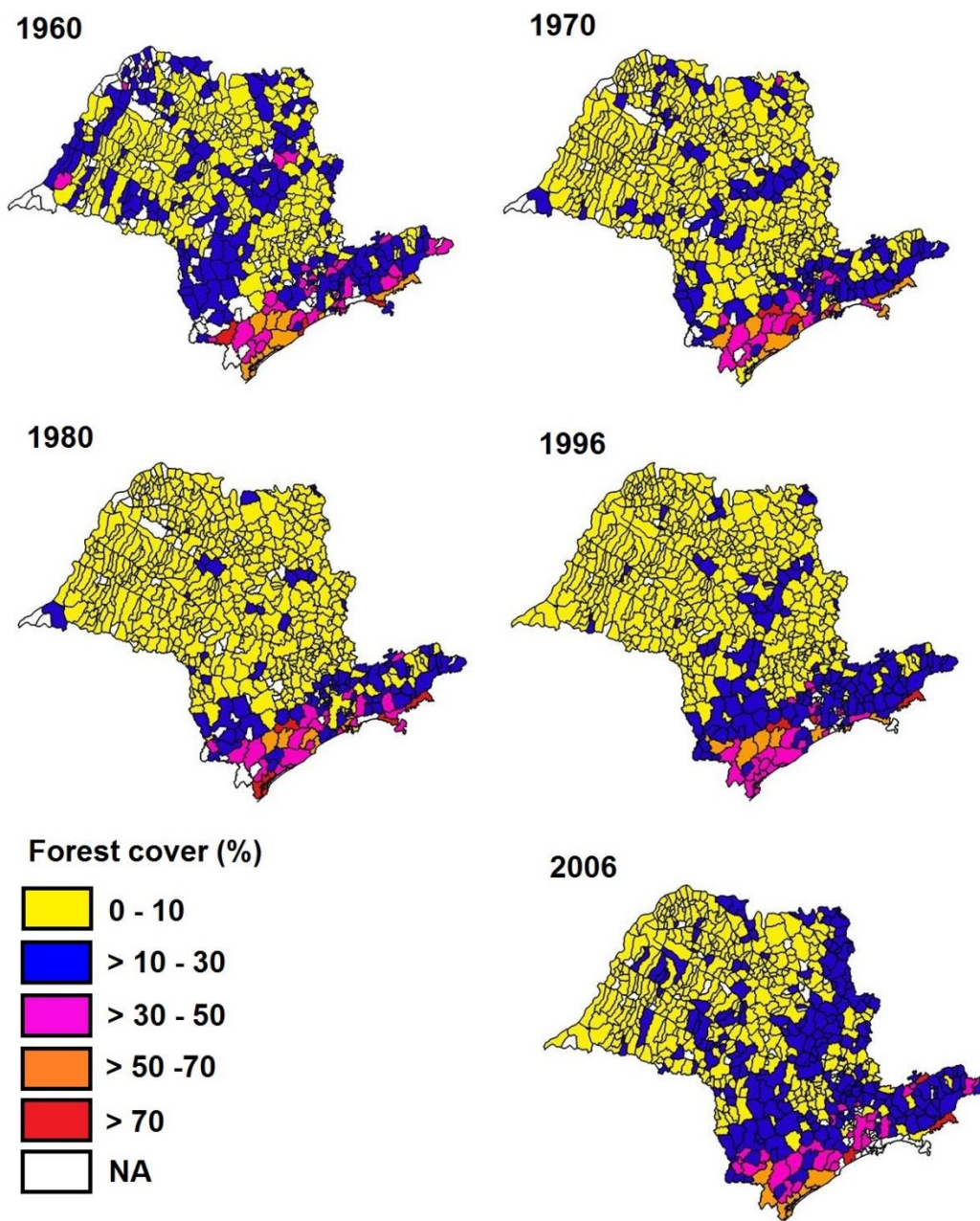


FIGURE A1.1 Percentage of forest cover at the municipality-scale for São Paulo state calculated for the years 1960, 1970, 1980, 1996 and 2006. Municipality boundaries are shown in black. (NA) Missing values.

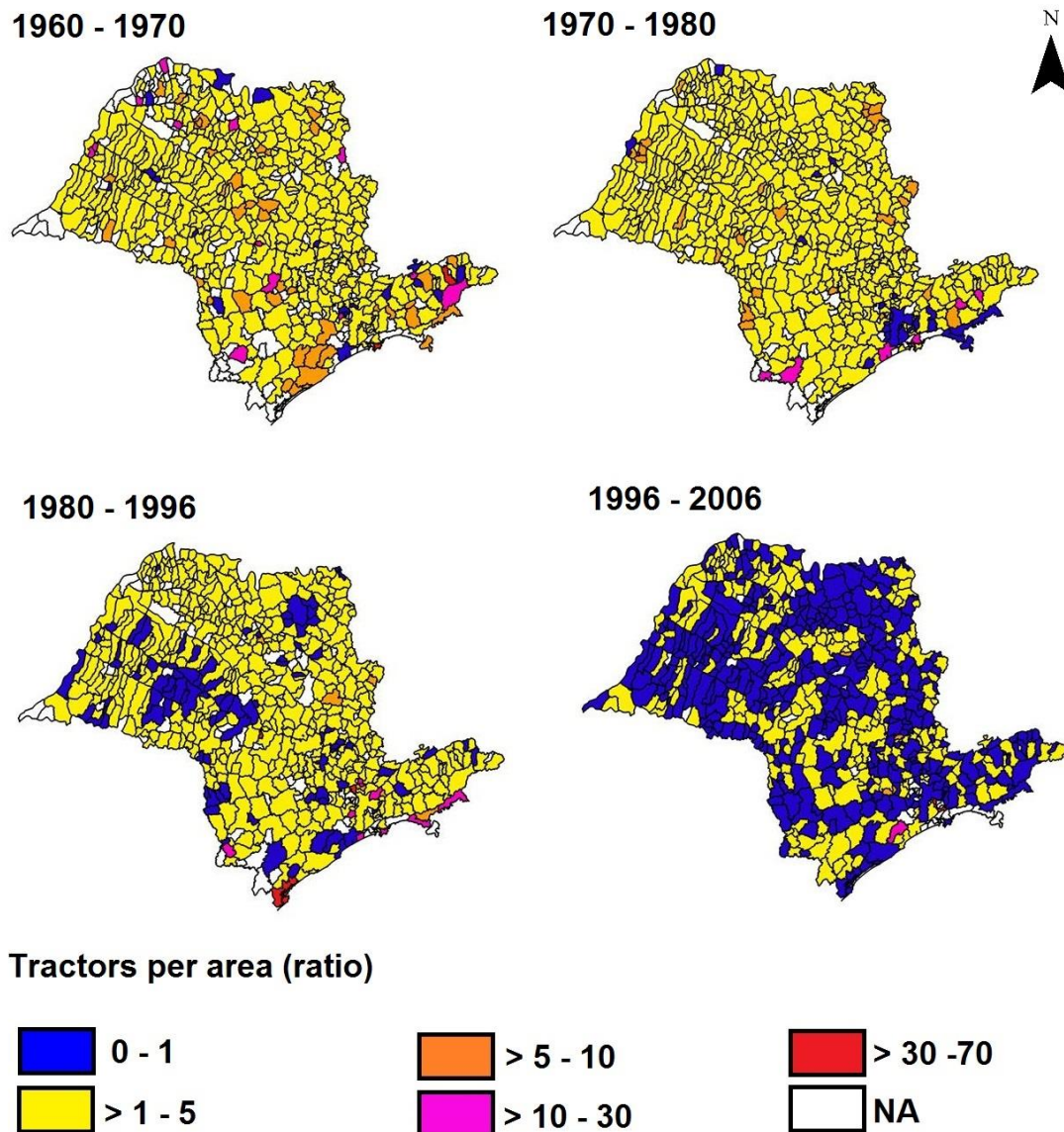


FIGURE A1.2 Tractors per area ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. The ratio of tractors per area was calculated by dividing the values of tractors per area of one census by the values of tractors per area of the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that tractors per area increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.

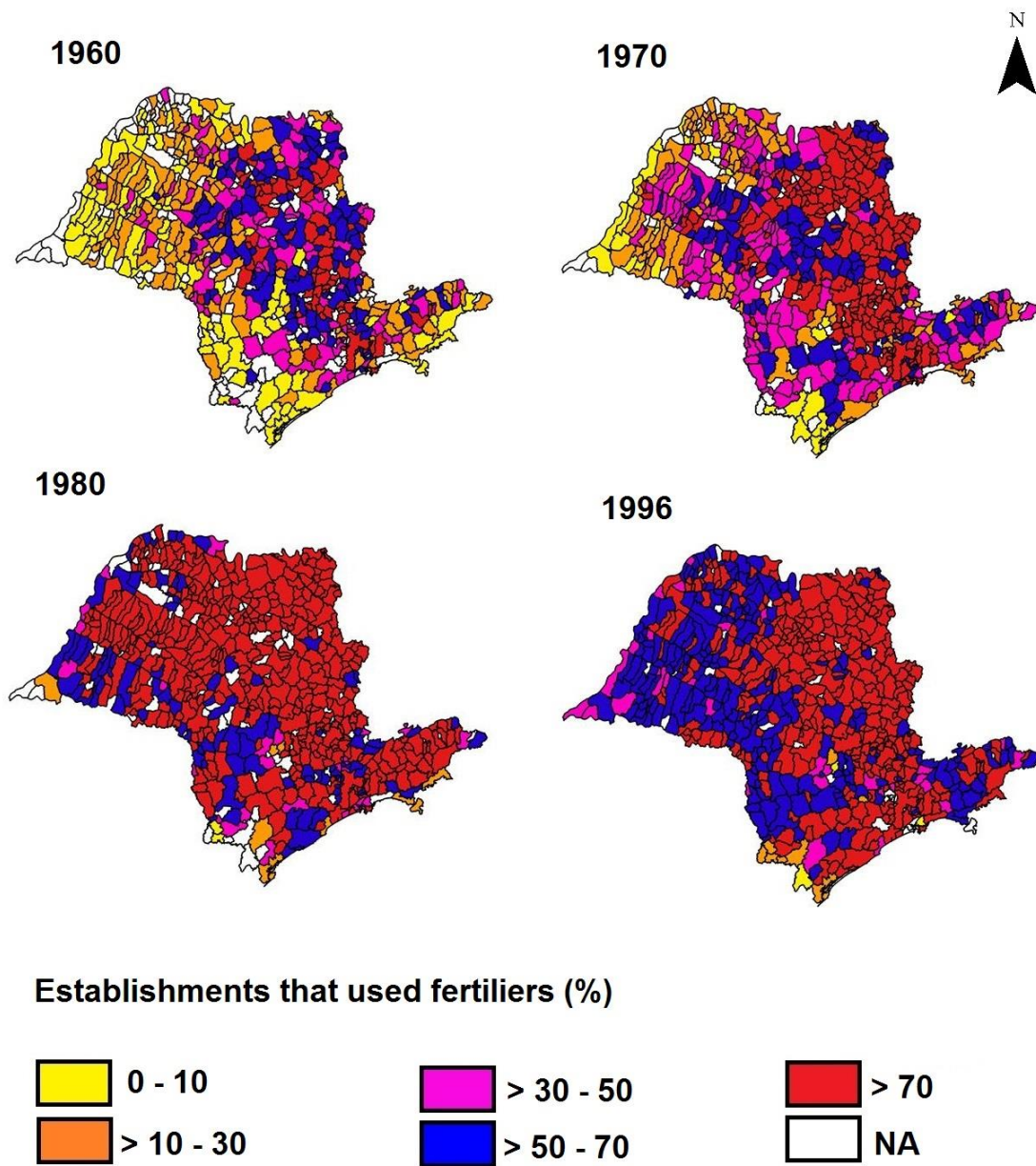


FIGURE A1.3 Percentage of establishments that used fertilizer at the municipality-scale for São Paulo state calculated for the years 1960, 1970, 1980 and 1996. Municipality boundaries are shown in black. (NA) Missing values.

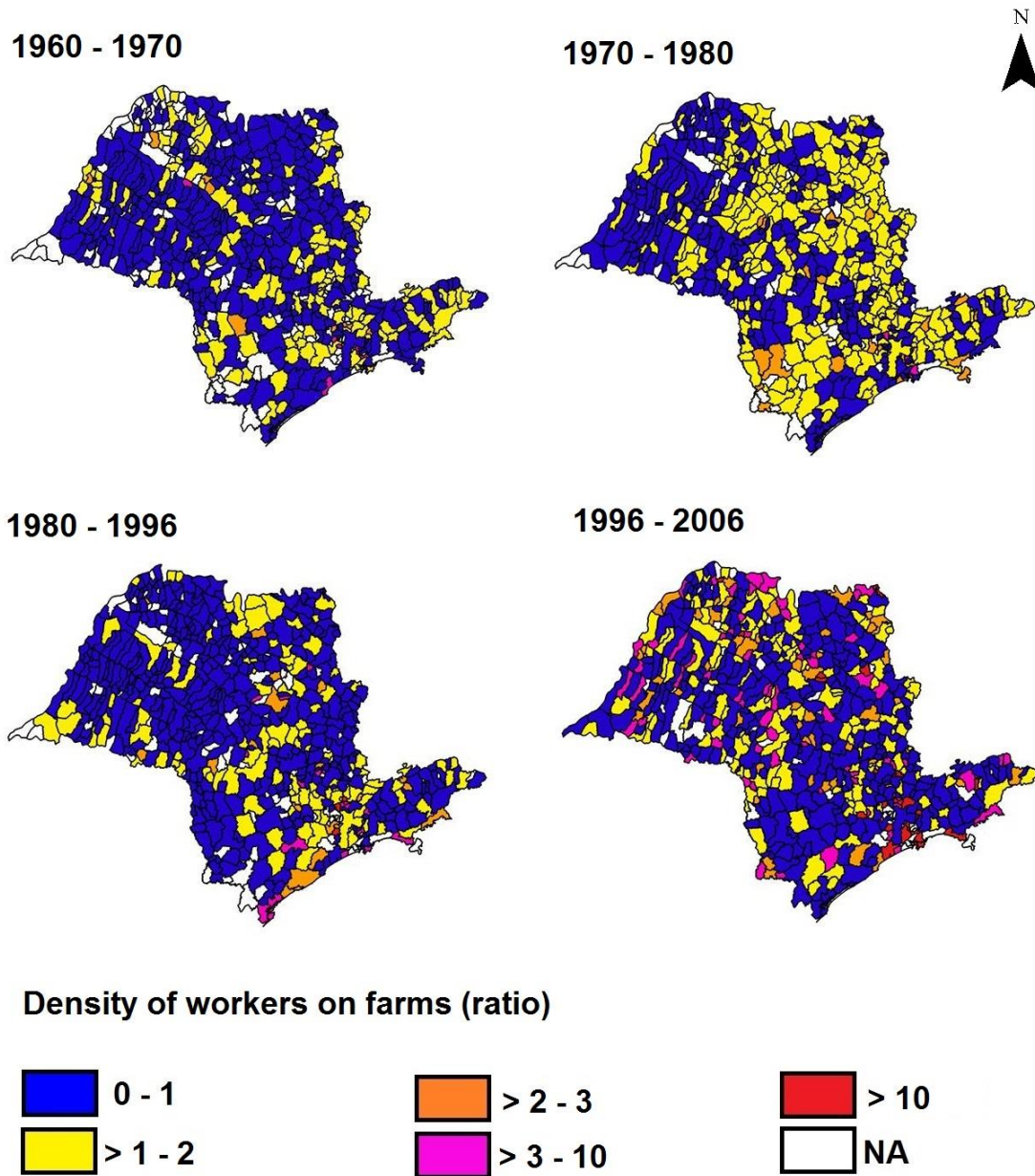
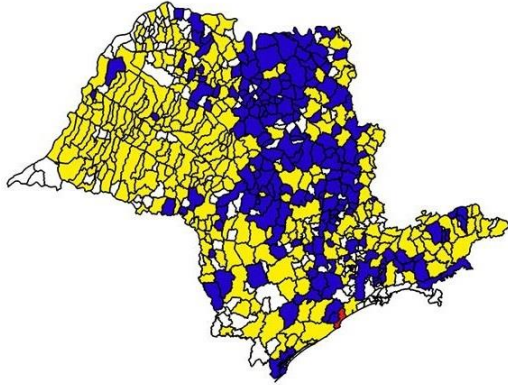
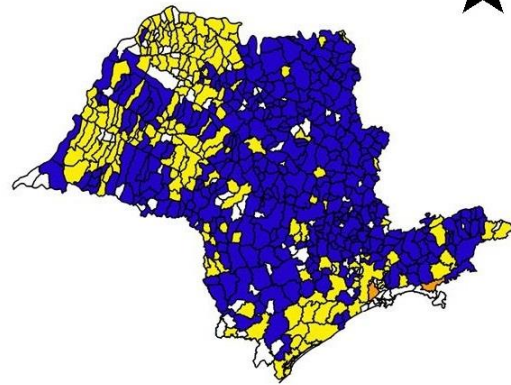


FIGURE A1.4 Density of workers on farms ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Density of workers on farms ratio was calculated by dividing the density of workers in one census by the density of workers in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that density of workers increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.

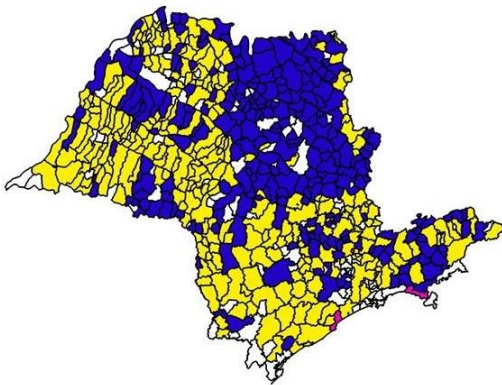
1960 - 1970



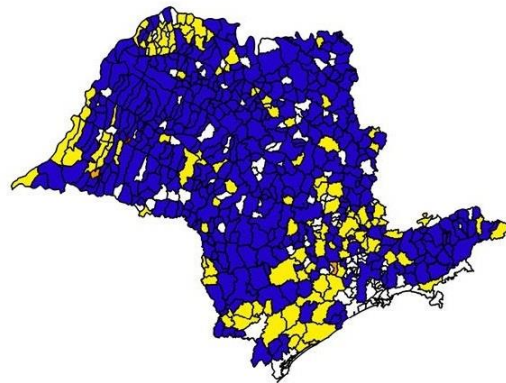
1970 - 1980



1980 - 1996



1996 - 2006



Pasture (ratio)

0 - 1

> 1 - 5

> 5 - 10

> 10 - 20

> 20

NA

FIGURE A1.5 Pasture ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Pasture ratio was calculated by dividing the pasture percentage in one census by pasture percentage in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that pasture increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.

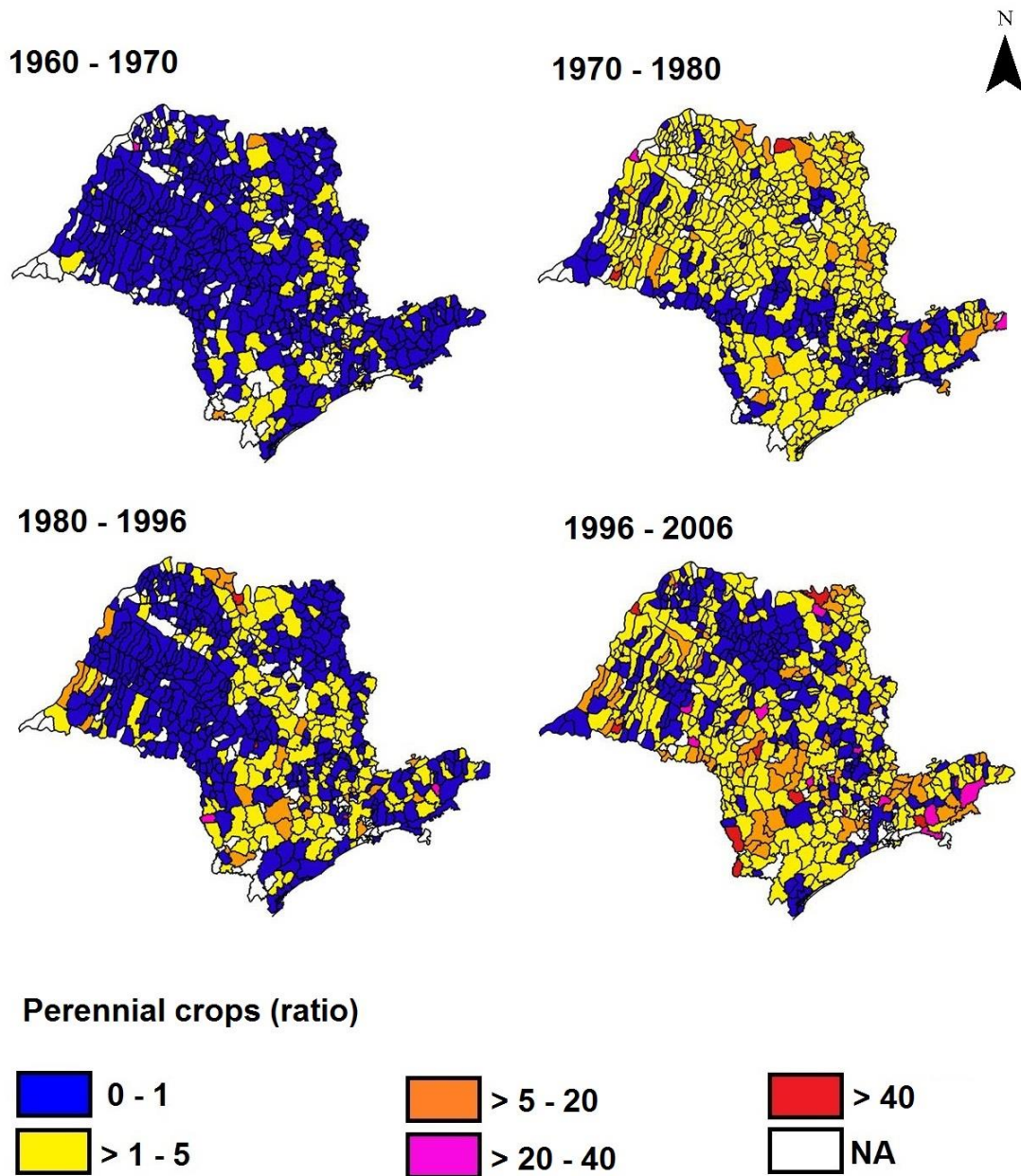


FIGURE A1.6 Perennial crop ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Perennial crop ratio was calculated by dividing the perennial crop percentage in one census by perennial crop percentage in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that perennial crops increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.

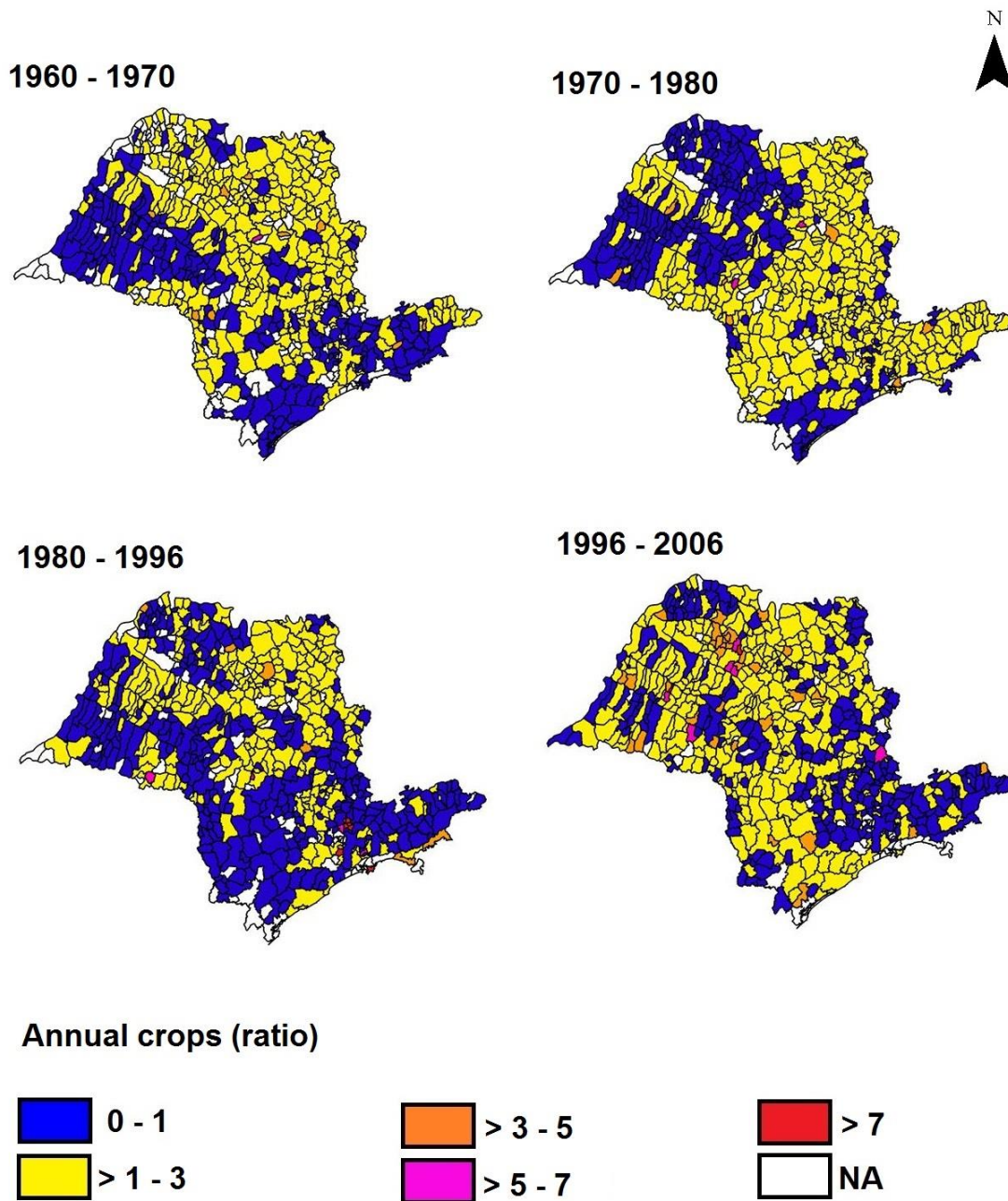


FIGURE A1.7 Annual crop ratio at the municipality-scale for Sao Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Annual crop ratio was calculated by dividing the annual crop percentage in one census by annual crop percentage in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that annual crops increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.

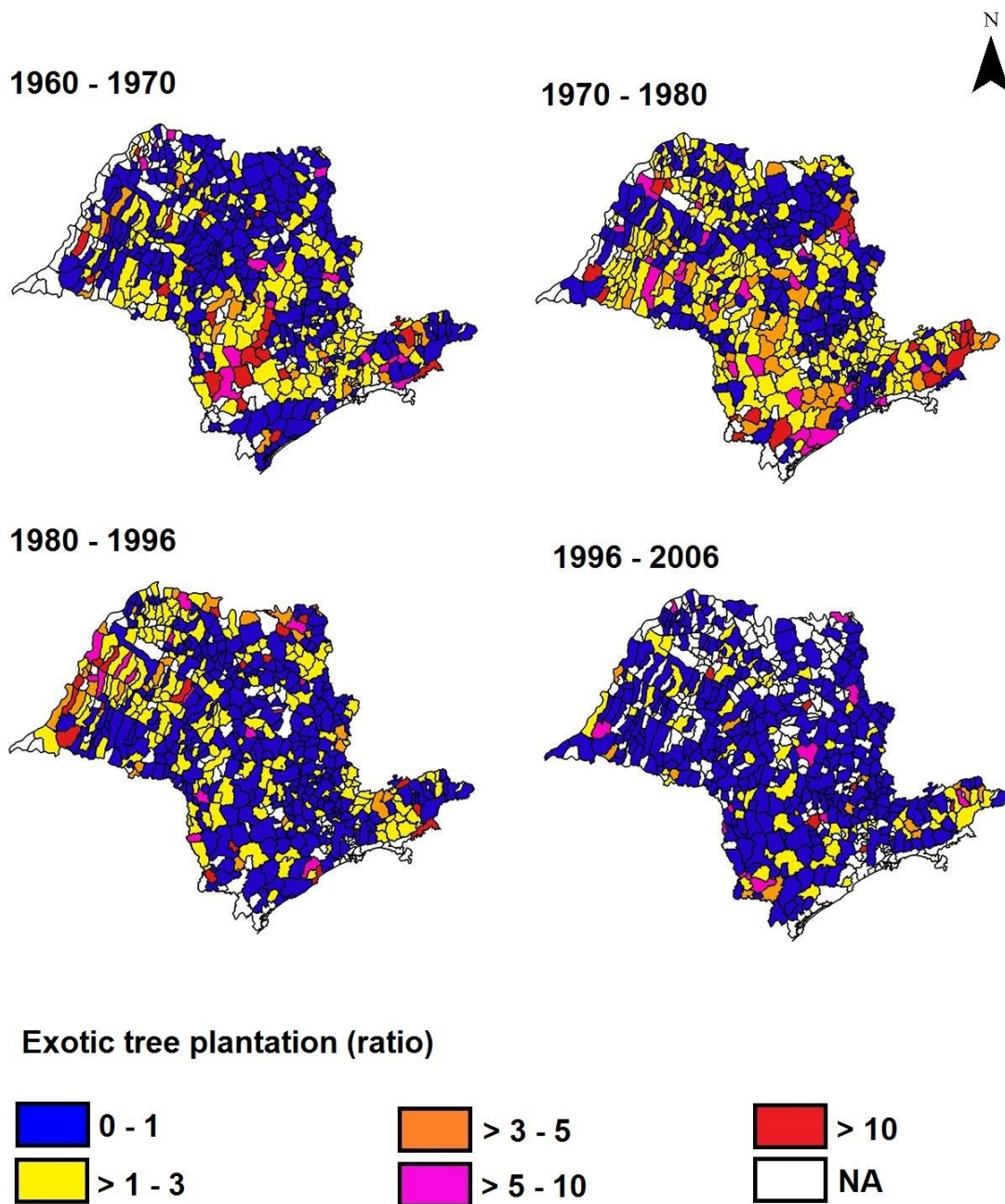


FIGURE A1.8 Exotic tree plantation ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Exotic tree plantation ratio was calculated by dividing the percentage of exotic tree plantation in one census by the percentage of exotic tree plantation in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that exotic tree plantation increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values

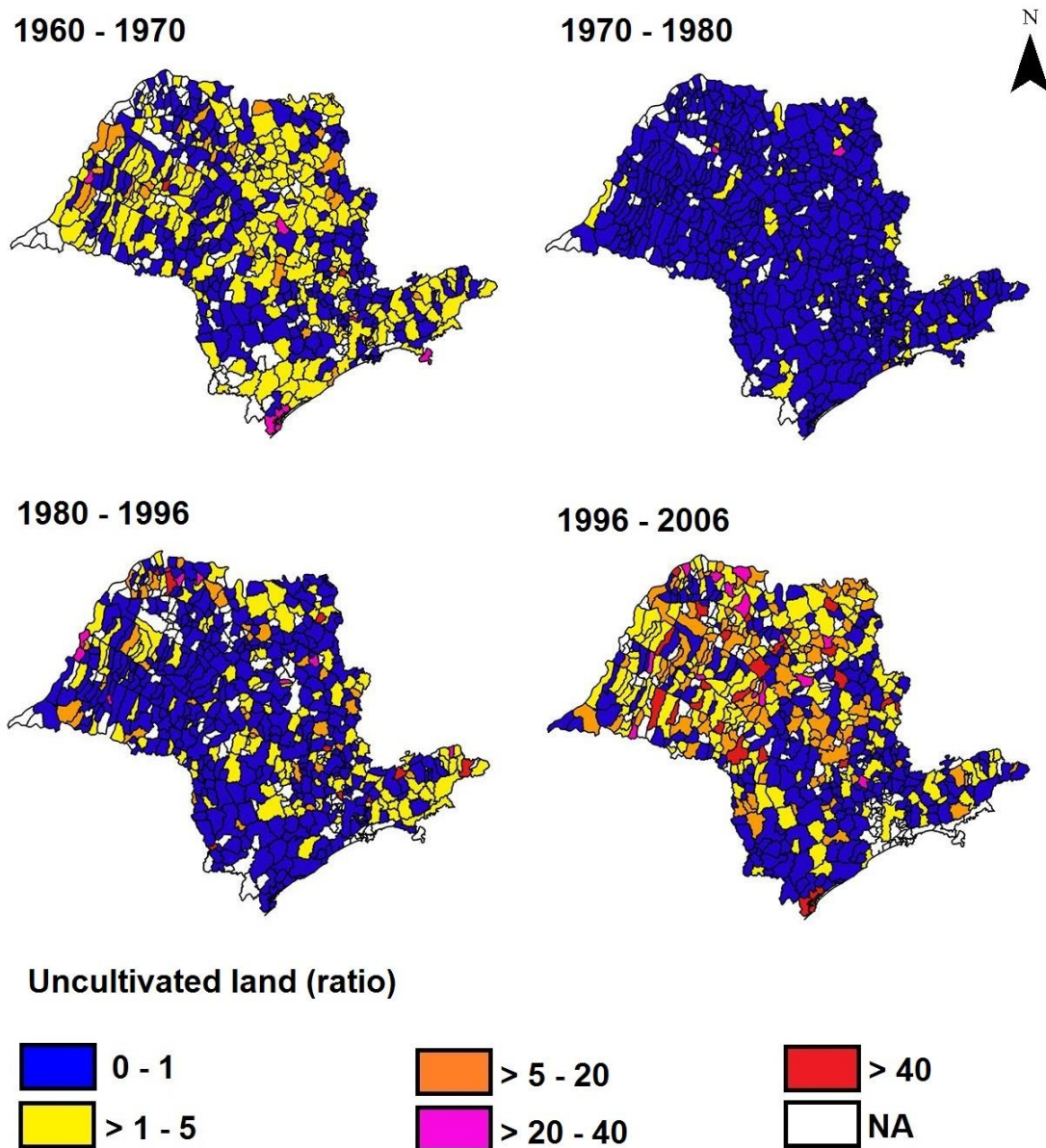
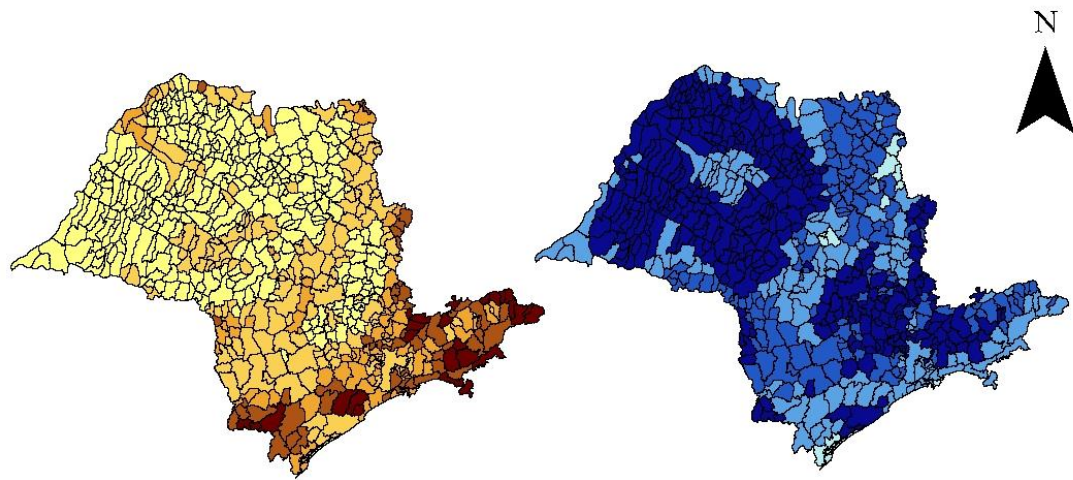
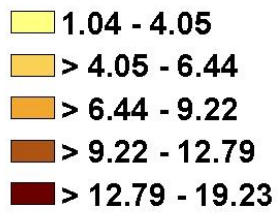


FIGURE A1.9 Uncultivated land ratio at the municipality-scale for São Paulo state calculated for the intervals 1960-1970, 1970-1980, 1980-1996 and 1996-2006. Uncultivated land ratio was calculated by dividing the uncultivated land percentage in one census by uncultivated land percentage in the previous census (e.g. values in 1970 / values in 1960). Ratio values greater than 1 (one) indicate that uncultivated land increased over the census interval and values lower than 1 (one) indicate that it decreased. Municipality boundaries are shown in black. (NA) Missing values.



Mean slope degree (%)



Soil water retention capacity (mm)

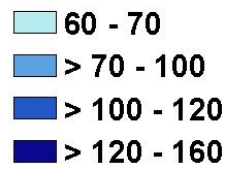


FIGURE A1.10 Soil water retention capacity and mean slope degree at the municipality-scale for the state of São Paulo. Municipality boundaries are shown in black.