

## Appendices

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### **Appendix 1. Standard errors and confidence intervals of the elements of the area transition matrices at regional and pan-tropical levels**

*Notes:*

- *A confidence interval might contain values outside the range of possible values (negative values). Nevertheless, complete formal intervals are presented to correspond to the standard error.*
- *The symbol  $\epsilon$  indicates values below the displayed decimal point.*
- *The matrices are based on the common visible area between all the images of the three date time-series. Stable water was excluded from the matrices.*

**Table 21. Standard errors and 95 percent confidence intervals of the area transition matrices - Pan-tropical level (million ha)**

**Standard errors - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
Land cover classes in 1980		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Closed canopy forest	60.2	1.1	1.6	3.0	0.5	3.3	7.0	1.4	1.2	
Open canopy forest	0.1	37.7	0.2	2.4	0.6	0.7	1.3	0.5	0.1	
Long fallow	0.3	ε	11.8	0.1	0.2	2.0	0.5	ε	ε	
Fragmented forest	0.3	0.2	0.1	31.1	0.2	2.2	4.3	0.2	0.2	
Shrubs	0.1	ε	0.1	ε	28.0	0.2	7.8	0.5	0.1	
Short fallow	0.3	0.1	0.3	0.3	0.2	17.7	1.8	0.1	0.1	
Other land cover	0.2	0.2	0.1	0.5	0.6	0.7	57.3	0.9	0.3	
Water	0.1	ε	ε	ε	ε	0.1	0.4	0.9	ε	
Plantations	ε	ε	ε	ε	ε	0.1	0.4	ε	6.6	

**Standard errors - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
Land cover classes in 1990		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other land cover	Water	Plantations
Closed canopy forest	63.4	0.3	1.2	3.1	0.6	1.9	10.1	0.7	0.8	
Open canopy forest	0.1	36.4	0.2	2.7	0.3	0.7	1.2	ε	ε	
Long fallow	0.5	0.1	11.9	0.1	ε	1.2	1.3	ε	0.1	
Fragmented forest	0.1	0.2	0.1	31.4	0.2	1.1	2.5	0.1	0.1	
Shrubs	ε	0.1	ε	ε	26.6	0.3	2.8	1.7	ε	
Short fallow	0.5	0.1	0.3	0.9	0.1	19.6	3.4	0.1	0.2	
Other land cover	0.2	0.1	0.2	0.9	1.1	3.3	60.7	0.5	0.7	
Water	0.1	ε	ε	ε	0.6	ε	0.5	3.0	ε	
Plantations	ε	ε	ε	ε	ε	ε	0.5	ε	7.7	

**95 % confidence intervals - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
Land cover classes in 1980		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Closed canopy forest	[62.4;1318.5]	[4.2;8.4]	[6.3;12.8]	[5.5;17.1]	[0.8;2.6]	[8.5;21.6]	[21.7;49.2]	[-0.7;4.9]	[0.3;5.1]	
Open canopy forest	[0.4;0.9]	[222.0;369.7]	[0.1;1.0]	[1.2;10.7]	[0.1;2.6]	[0.9;3.7]	[7.4;12.5]	[-0.4;1.5]	[0.1;0.3]	
Long fallow	[0.5;1.6]	[0.0;0.1]	[39.1;85.4]	[0.0;0.5]	[-0.1;0.6]	[2.8;10.7]	[1.2;3.3]	[0.0;0.1]	[0.0;0.0]	
Fragmented forest	[0.1;1.3]	[0.5;1.1]	[0.0;0.5]	[136.6;258.4]	[0.3;1.3]	[-0.3;8.2]	[6.5;23.2]	[-0.1;0.8]	[-0.1;0.5]	
Shrubs	[0.0;0.3]	[0.0;0.1]	[0.0;0.4]	[0.1;0.2]	[95.1;204.8]	[-0.1;0.7]	[4.0;34.5]	[-0.3;1.5]	[0.0;0.5]	
Short fallow	[0.4;1.7]	[0.2;0.6]	[0.6;1.9]	[0.0;1.3]	[0.0;0.6]	[74.5;143.9]	[3.6;10.8]	[0.0;0.3]	[-0.1;0.4]	
Other land cover	[0.4;1.2]	[0.6;1.4]	[0.1;0.5]	[0.5;2.6]	[0.5;2.6]	[-0.1;2.6]	[741.2;965.9]	[-0.4;3.2]	[0.3;1.5]	
Water	[0.0;0.3]	[0.0;0.1]	[0.0;0.0]	[0.0;0.2]	[0.0;0.0]	[0.0;0.2]	[0.3;1.7]	[0.7;4.3]	[0.0;0.0]	
Plantations	[0.0;0.2]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.3]	[0.2;1.7]	[0.0;0.0]	[1.9;27.7]	

**95 % confidence intervals - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
Land cover classes in 1990		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other land cover	Water	Plantations
Closed canopy forest	[0.07;2;1255.9]	[0.5;1.8]	[3.4;8.0]	[3.4;15.4]	[0.2;2.4]	[6.2;13.5]	[23.3;62.9]	[-0.2;2.5]	[0.4;3.4]	
Open canopy forest	[0.0;0.4]	[216.0;358.7]	[0.2;0.9]	[1.5;12.2]	[0.1;1.2]	[0.9;3.4]	[4.4;8.9]	[0.0;0.1]	[0.0;0.1]	
Long fallow	[0.1;2.0]	[0.0;0.3]	[40.0;86.5]	[0.1;0.4]	[0.0;0.1]	[2.4;7.2]	[2.1;7.3]	[0.0;0.1]	[0.0;0.5]	
Fragmented forest	[0.2;0.8]	[0.1;0.8]	[0.0;0.5]	[140.5;263.7]	[0.1;0.8]	[0.0;4.4]	[6.3;16.0]	[0.0;0.3]	[-0.1;0.5]	
Shrubs	[0.0;0.2]	[0.0;0.2]	[0.0;0.1]	[0.0;0.1]	[91.4;195.5]	[0.1;1.1]	[4.4;15.1]	[-1.6;5.2]	[0.0;0.2]	
Short fallow	[0.0;2.0]	[0.1;0.5]	[0.6;1.9]	[-0.3;3.3]	[0.0;0.4]	[84.2;161.2]	[4.8;18.3]	[0.0;0.3]	[0.1;0.7]	
Other land cover	[0.2;1.1]	[0.2;0.7]	[0.2;0.8]	[0.4;4.1]	[1.6;5.8]	[-1.6;11.4]	[809.5;1047.3]	[0.3;2.3]	[1.0;3.6]	
Water	[-0.1;0.4]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[-0.4;2.0]	[0.0;0.1]	[0.2;2.2]	[-0.4;11.5]	[0.0;0.0]	
Plantations	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[0.0;0.0]	[0.0;0.1]	[0.2;2.0]	[0.0;0.0]	[2.9;33.2]	

**Table 22. Standard errors and 95 percent confidence intervals of the area transition matrices - Africa (million ha)**

**Standard errors - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		40.6	0.7	0.4	2.4	ε	3.0	0.7	ε	0.1
Open canopy forest		0.1	29.9	0.2	2.4	ε	0.6	1.0	ε	ε
Long fallow		ε	ε	6.9	0.1	ε	0.4	0.1		
Fragmented forest		0.3	0.2	0.1	28.9	0.1	1.9	2.0	ε	ε
Shrubs		ε	ε	ε	ε	15.6	0.2	0.6		ε
Short fallow		0.2	0.1	0.1	0.3	ε	11.3	0.4	ε	0.1
Other land cover		0.2	0.2	ε	0.5	0.1	0.1	45.1	0.1	0.2
Water		ε	ε		ε	ε	0.1	0.1	0.1	
Plantations		ε					ε	ε		0.4

**Standard errors - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other land cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		38.7	0.3	0.3	2.6	ε	1.7	0.7	ε	ε
Open canopy forest		ε	28.5	0.1	2.7	0.1	0.6	0.7	ε	ε
Long fallow		ε	0.1	7.0	0.1	ε	0.2	0.1		
Fragmented forest		0.1	0.1	ε	29.2	ε	1.1	1.9	ε	ε
Shrubs		ε	ε	ε	ε	15.3	0.2	0.6		ε
Short fallow		0.5	0.1	0.2	0.8	0.1	13.7	1.6	ε	
Other land cover		ε	0.1	ε	0.1	0.1	0.2	45.8	0.1	0.1
Water							ε	0.1	0.1	
Plantations		ε			ε		ε	0.1		0.6

**95 % confidence intervals - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		[194.3;353.4]	[1.4;4.0]	[0.2;1.6]	[0.0;9.3]	[0.0;0.2]	[1.4;13.0]	[1.2;3.9]	[0.0;0.1]	[0.0;0.3]
Open canopy forest		[0.1;0.4]	[134.1;251.2]	[-0.1;0.7]	[0.5;10.0]	[0.0;0.1]	[0.4;2.8]	[2.8;6.6]	[0.0;0.0]	[0.0;0.1]
Long fallow		[0.0;0.2]	[0.0;0.1]	[2.3;29.3]	[-0.1;0.4]	[0.0;0.1]	[0.0;1.6]	[0.1;0.5]	[0.0;0.0]	[0.0;0.0]
Fragmented forest		[-0.1;1.0]	[0.3;1.0]	[-0.1;0.2]	[79.7;193.2]	[0.0;0.3]	[-1.5;5.9]	[1.8;9.8]	[0.0;0.0]	[0.0;0.0]
Shrubs		[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[13.7;74.8]	[-0.2;0.6]	[0.0;2.4]	[0.0;0.0]	[0.0;0.1]
Short fallow		[0.1;0.9]	[0.1;0.4]	[0.0;0.3]	[-0.1;1.1]	[0.0;0.1]	[36.1;80.3]	[0.9;2.3]	[0.0;0.1]	[0.0;0.2]
Other land cover		[0.0;0.6]	[0.4;1.1]	[0.0;0.1]	[0.1;2.2]	[0.0;0.5]	[0.1;0.6]	[363.8;540.6]	[0.1;0.3]	[-0.1;0.6]
Water		[0.0;0.1]	[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[-0.1;0.2]	[0.1;0.6]	[0.0;0.3]	[0.0;0.0]
Plantations		[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[0.0;0.0]	[0.0;1.6]

**95 % confidence intervals - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other land cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		[185.6;337.2]	[0.0;1.2]	[0.1;1.4]	[0.6;10.7]	[0.0;0.1]	[1.7;8.3]	[0.6;3.4]	[0.0;0.1]	[0.0;0.2]
Open canopy forest		[0.0;0.1]	[130.1;242.0]	[0.0;0.5]	[0.6;11.1]	[-0.1;0.4]	[0.5;3.0]	[1.4;4.4]	[0.0;0.0]	[0.0;0.0]
Long fallow		[0.0;0.1]	[-0.1;0.2]	[2.6;29.9]	[0.0;0.3]	[0.0;0.0]	[0.1;0.9]	[0.0;0.4]	[0.0;0.0]	[0.0;0.0]
Fragmented forest		[0.0;0.4]	[0.0;0.4]	[0.0;0.1]	[82.6;197.0]	[0.0;0.1]	[-0.4;4.0]	[2.3;9.7]	[0.0;0.0]	[0.0;0.0]
Shrubs		[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[12.8;73.0]	[-0.1;0.7]	[0.3;2.8]	[0.0;0.0]	[0.0;0.1]
Short fallow		[-0.2;1.7]	[0.1;0.4]	[0.0;0.6]	[-0.7;2.6]	[-0.1;0.4]	[38.4;92.2]	[-0.3;6.1]	[0.0;0.2]	[0.0;0.0]
Other land cover		[0.0;0.2]	[0.1;0.4]	[0.0;0.1]	[0.1;0.7]	[0.0;0.3]	[0.1;0.7]	[377.2;556.8]	[0.1;0.5]	[0.0;0.2]
Water		[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.4]	[0.0;0.3]	[0.0;0.0]
Plantations		[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[-0.1;0.4]	[0.0;0.0]	[0.0;2.3]

**Table 23. Standard errors and 95 percent confidence intervals of the area transition matrices - Asia (million ha)**

**Standard errors - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980		17.2	0.6	1.2	0.4	0.1	1.2	2.8	0.2	1.2
Closed canopy forest		0.1	7.0	0.1	0.1	0.1	ε	0.3	ε	ε
Open canopy forest		0.3	ε	9.5	ε	0.2	2.0	0.5	ε	ε
Long fallow		ε	ε	0.1	3.2	0.2	0.1	0.6	ε	ε
Fragmented forest		0.1	ε	ε	ε	2.2	ε	0.4	ε	ε
Shrubs		0.2	ε	0.3	0.1	0.2	12.6	1.2	ε	0.1
Short fallow		0.1	0.1	0.1	ε	0.1	ε	21.8	0.1	0.2
Other land cover		ε	ε	ε	ε	ε	ε	ε	0.3	ε
Water		ε	ε	ε	ε	ε	0.1	0.4	ε	6.6
Plantations										

**Standard errors - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990		17.5	0.1	1.0	0.3	0.1	0.6	3.4	0.6	0.8
Closed canopy forest		0.1	6.9	0.1	0.1	0.1	0.1	0.6	ε	ε
Open canopy forest		0.2	ε	9.5	ε	ε	1.2	0.9	ε	0.1
Long fallow		ε	ε	0.1	3.1	0.2	0.1	0.5	ε	ε
Fragmented forest		ε	ε	ε	ε	2.3	0.1	0.4	ε	ε
Shrubs		ε	ε	0.3	ε	ε	12.7	2.9	0.1	0.2
Short fallow		0.1	0.1	0.1	0.3	0.1	0.1	21.1	0.1	0.6
Other land cover		ε	ε	ε	ε	ε	ε	ε	0.5	ε
Water		ε	ε	ε	ε	ε	ε	0.4	ε	7.7
Plantations										

**95 % confidence intervals - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980		[177.1;244.6]	[0.6;2.9]	[3.0;7.7]	[0.4;2.1]	[0.1;0.4]	[2.1;6.7]	[2.0;12.8]	[0.0;0.7]	[0.1;4.9]
Closed canopy forest		[0.1;0.5]	[10.8;38.3]	[0.0;0.3]	[0.0;0.4]	[0.1;0.5]	[0.0;0.2]	[0.4;1.6]	[0.0;0.2]	[0.0;0.1]
Open canopy forest		[0.3;1.4]	[0.0;0.0]	[23.7;61.0]	[0.0;0.1]	[-0.1;0.6]	[1.6;9.4]	[0.8;2.9]	[0.0;0.1]	[0.0;0.0]
Long fallow		[0.1;0.1]	[0.0;0.2]	[0.0;0.3]	[10.9;23.3]	[0.0;0.8]	[0.0;0.4]	[0.9;3.2]	[0.0;0.1]	[0.0;0.2]
Fragmented forest		[0.0;0.2]	[0.0;0.1]	[0.0;0.2]	[0.0;0.1]	[3.7;12.3]	[0.0;0.1]	[0.4;1.9]	[0.0;0.1]	[0.0;0.2]
Shrubs		[0.0;1.0]	[0.0;0.1]	[0.4;1.6]	[0.0;0.3]	[-0.1;0.5]	[13.7;63.1]	[1.4;6.2]	[0.0;0.1]	[-0.1;0.3]
Short fallow		[0.1;0.3]	[0.1;0.4]	[0.1;0.4]	[0.1;0.3]	[0.1;0.6]	[0.0;0.2]	[165.3;250.9]	[0.1;0.4]	[0.0;0.7]
Other land cover		[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.2]	[-0.1;1.1]	[0.0;0.0]
Water		[0.0;0.2]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.3]	[0.1;1.5]	[0.0;0.0]	[-0.1;25.6]
Plantations										

**95 % confidence intervals - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990		[158.7;227.4]	[0.2;0.6]	[1.7;5.5]	[0.1;1.4]	[0.0;0.3]	[2.0;4.3]	[2.6;16.1]	[-0.5;2.0]	[0.3;3.3]
Closed canopy forest		[0.0;0.3]	[11.2;38.2]	[0.0;0.4]	[0.0;0.4]	[0.0;0.3]	[0.0;0.5]	[-0.1;2.2]	[0.0;0.1]	[0.0;0.0]
Open canopy forest		[0.1;0.9]	[0.0;0.0]	[23.1;60.3]	[0.0;0.1]	[0.0;0.0]	[1.6;6.3]	[1.1;4.5]	[0.0;0.1]	[0.0;0.5]
Long fallow		[0.0;0.2]	[0.0;0.1]	[-0.1;0.4]	[10.7;23.0]	[-0.1;0.5]	[0.0;0.5]	[0.2;2.3]	[-0.1;0.1]	[0.0;0.1]
Fragmented forest		[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[4.2;13.0]	[0.0;0.5]	[0.1;1.5]	[0.0;0.1]	[0.0;0.0]
Shrubs		[0.0;0.2]	[0.0;0.0]	[0.1;1.3]	[0.0;0.1]	[0.0;0.0]	[16.3;66.3]	[0.7;11.9]	[0.0;0.2]	[0.1;0.7]
Short fallow		[0.0;0.4]	[0.0;0.4]	[0.0;0.3]	[-0.2;0.9]	[0.0;0.3]	[0.1;0.6]	[181.2;264.1]	[0.1;0.6]	[0.7;3.2]
Other land cover		[0.0;0.1]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.1;0.2]	[0.2;2.3]	[0.0;0.0]
Water		[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[-0.1;1.5]	[0.0;0.0]	[0.3;30.3]
Plantations										

**Table 24. Standard errors and 95 percent confidence intervals of the area transition matrices - Latin America (million ha)**

**Standard errors - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		41.1	0.6	1.1	1.7	0.4	0.9	6.4	1.4	ε
Open canopy forest	ε		21.9	ε	0.2	0.6	0.4	0.8	0.5	ε
Long fallow	0.1	ε		1.3	ε	ε	0.2	0.1	ε	
Fragmented forest	0.1	ε	ε		10.8	0.1	1.0	3.7	0.2	0.2
Shrubs	ε	ε	0.1	ε		23.1	0.1	7.8	0.5	0.1
Short fallow	0.1	ε	0.1	0.1	ε		5.3	1.3	0.1	
Other land cover	0.1	ε	ε	0.2	0.5	0.7		27.9	0.9	0.1
Water	0.1	ε	ε	ε	ε	ε	0.3		0.9	
Plantations					ε			0.1		0.7

**Standard errors - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		47.2	0.1	0.5	1.6	0.6	0.6	9.5	0.3	ε
Open canopy forest	ε		21.5	0.1	0.6	0.2	0.1	0.7	ε	ε
Long fallow	0.4	0.1		1.6	ε	ε	0.2	1.0	ε	
Fragmented forest	0.1	0.1	ε		11.2	0.1	0.1	1.5	0.1	0.1
Shrubs	ε	ε	ε	ε		21.6	ε	2.7	1.7	ε
Short fallow	0.1	ε	0.1	0.4	ε		5.9	1.0	ε	
Other land cover	0.2	ε	0.1	0.9	1.1	3.3		33.7	0.5	0.1
Water	0.1	ε	ε	ε	0.6	ε	0.5		3.0	
Plantations					ε	ε		0.2		0.9

**95 % confidence intervals - Area transition matrix 1980-1990**

(million ha)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		[635.3;796.2]	[0.6;3.0]	[1.2;5.3]	[2.1;8.8]	[0.5;2.2]	[1.6;5.2]	[12.9;38.1]	[-1.1;4.5]	[0.0;0.1]
Open canopy forest	[0.0;0.2]		[35.8;121.5]	[0.0;0.2]	[0.1;0.9]	[-0.2;2.2]	[-0.2;1.3]	[2.7;5.7]	[-0.4;1.4]	[0.0;0.1]
Long fallow	[0.0;0.3]	[0.0;0.1]		[1.6;6.7]	[0.0;0.1]	[0.0;0.0]	[0.1;0.9]	[0.0;0.2]	[0.0;0.0]	[0.0;0.0]
Fragmented forest	[0.0;0.3]	[0.0;0.1]	[0.0;0.1]		[22.8;65.2]	[0.0;0.5]	[-0.5;3.6]	[-0.3;14.2]	[-0.1;0.8]	[-0.1;0.4]
Shrubs	[0.0;0.1]	[0.0;0.0]	[0.0;0.3]	[0.0;0.0]		[52.3;143.0]	[-0.1;0.2]	[1.6;32.0]	[-0.4;1.4]	[-0.1;0.4]
Short fallow	[0.0;0.2]	[0.0;0.2]	[0.0;0.3]	[0.0;0.2]	[0.0;0.0]		[2.3;22.9]	[-0.8;4.4]	[0.0;0.2]	[0.0;0.0]
Other land cover	[0.0;0.4]	[0.0;0.0]	[0.0;0.0]	[-0.1;0.5]	[-0.1;2.0]	[-0.6;2.1]		[138.6;248.0]	[-0.8;2.7]	[0.0;0.6]
Water	[-0.1;0.2]	[0.0;0.1]	[0.0;0.0]	[0.0;0.1]	[0.0;0.0]	[0.0;0.1]	[-0.1;1.2]		[0.2;3.6]	[0.0;0.0]
Plantations	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.3]	[0.0;0.0]		[-0.1;2.7]

**95 % confidence intervals - Area transition matrix 1990-2000**

(million ha)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		[584.7;769.5]	[0.0;0.3]	[0.3;2.5]	[-0.1;6.2]	[0.0;2.2]	[0.6;2.8]	[13.2;50.3]	[-0.3;1.0]	[0.0;0.1]
Open canopy forest	[0.0;0.0]		[34.4;118.7]	[-0.1;0.3]	[-0.3;1.9]	[-0.1;0.8]	[0.0;0.2]	[1.4;4.0]	[0.0;0.1]	[0.0;0.1]
Long fallow	[-0.4;1.3]	[0.0;0.2]		[2.1;8.4]	[0.0;0.1]	[0.0;0.0]	[0.0;0.7]	[-0.3;3.6]	[0.0;0.0]	[0.0;0.0]
Fragmented forest	[0.0;0.4]	[-0.1;0.4]	[0.0;0.1]		[23.5;67.5]	[0.1;0.3]	[0.0;0.3]	[0.9;6.9]	[0.0;0.2]	[-0.1;0.4]
Shrubs	[0.0;0.1]	[0.0;0.2]	[0.0;0.0]	[0.0;0.0]		[49.7;134.2]	[0.0;0.1]	[2.2;12.6]	[-1.6;5.1]	[0.0;0.1]
Short fallow	[0.0;0.3]	[0.0;0.1]	[0.0;0.5]	[-0.3;1.2]	[0.0;0.0]		[4.5;27.7]	[0.4;4.4]	[0.0;0.0]	[0.0;0.0]
Other land cover	[0.0;0.8]	[0.0;0.1]	[0.0;0.5]	[-0.2;3.2]	[1.3;5.4]	[-2.3;10.7]		[172.6;304.7]	[-0.2;1.6]	[0.0;0.4]
Water	[-0.1;0.4]	[0.0;0.0]	[0.0;0.0]	[0.0;0.1]	[-0.5;2.0]	[0.0;0.1]	[-0.1;1.8]		[-1.7;10.0]	[0.0;0.0]
Plantations	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.0]	[0.0;0.6]	[0.0;0.0]		[-0.3;3.5]

## Appendix 2. Forest area and forest area change estimates at regional and pan-tropical level

**Table 25. Forest area and area change estimates - pan-tropical level**

### Forest area

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	1 285	59	41.9	1.9	1 651	59	53.8	1.9	1 748	60	57.0	2.0	[53;61]
<b>1990</b>	1 205	60	39.3	2.0	1 558	62	50.8	2.0	1 657	62	54.0	2.0	[50;58]
<b>2000</b>	1 135	63	37.0	2.1	1 475	65	48.1	2.1	1 571	66	51.2	2.1	[47;55]

### Forest area change (10-years periods)

(million hectares)	Forest definition f1				Forest definition f2				Forest definition f3				
	Deforestation		Net forest area change		Deforestation		Net forest area change		Deforestation		Net forest area change		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	84.2		-79.5	11.2	99.4		-92.8	11.3	99.1		-91.6	10.7	[-112;-71]
<b>1990-2000</b>	73.6		-69.9	11.5	88.9		-83.4	11.9	92.2		-85.7	13.0	[-111;-60]

### Annual forest change (net area change and deforestation rate)

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	-7.9	1.1	0.62	0.09	-9.3	1.1	0.56	0.07	-9.2	1.1	0.52	0.07	[0.40;0.65]
<b>1990-2000</b>	-7.0	1.2	0.58	0.10	-8.3	1.2	0.54	0.08	-8.6	1.3	0.52	0.08	[0.35;0.68]

**Table 26. Forest area and area change estimates - Africa**

### Forest area

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	292.0	43.2	23.9	3.5	529	41.1	43.2	3.4	563	40	46.0	3.2	[40;52]
<b>1990</b>	275.6	40.8	22.5	3.3	506	39.8	41.3	3.3	539	38	44.1	3.1	[38;50]
<b>2000</b>	262.6	39.0	21.5	3.2	484	38.4	39.5	3.1	519	37	42.4	3.0	[36;48]

**Forest area change (10-years periods)**

(million hectares)	Forest definition f1			Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change		Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE	Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	18.2	-16.5	4.2	27.1	-23.8	3.9	26.9	-23.5	3.8	[-31;-16]
<b>1990-2000</b>	14.1	-13.0	3.5	23.6	-21.5	3.8	23.1	-20.7	3.6	[-28;-14]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	-1.6	0.4	0.56	0.11	-2.4	0.4	0.45	0.07	-2.3	0.4	0.42	0.06	[0.29;0.54]
<b>1990-2000</b>	-1.3	0.4	0.47	0.11	-2.2	0.4	0.43	0.07	-2.1	0.4	0.38	0.06	[0.26;0.50]

**Table 27. Forest area and area change estimates - Asia**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		Absolute forest cover (million hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	234.3	17.1	38.4	2.8	265.5	17.5	43.5	2.9	319	23	52.2	3.8	[45;60]
<b>1990</b>	213.0	17.3	34.9	2.8	244.0	17.7	40.0	2.9	295	23	48.4	3.7	[41;56]
<b>2000</b>	194.2	17.6	31.8	2.9	223.6	18.0	36.6	2.9	272	23	44.6	3.7	[37;52]

**Forest area change (10-years periods)**

(million hectares)	Forest definition f1			Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change		Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE	Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	23.4	-21.3	5.6	23.9	-21.5	5.6	26.1	-23.3	5.4	[-34;-13]
<b>1990-2000</b>	19.9	-18.8	5.0	21.7	-20.5	5.2	25.0	-23.3	6.0	[-35;-12]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		Annual net forest area change (million hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	-2.1	0.6	0.91	0.04	-2.2	0.6	0.81	0.14	-2.3	0.5	0.73	0.17	[0.41;1.05]
<b>1990-2000</b>	-1.9	0.5	0.88	0.03	-2.0	0.5	0.84	0.14	-2.3	0.6	0.79	0.20	[0.39;1.19]

**Table 28. Forest area and area change estimates - Latin America**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	<b>Absolute forest cover</b> (million hectares)		<b>Relative forest cover</b> (%)		<b>Absolute forest cover</b> (million hectares)		<b>Relative forest cover</b> (%)		<b>Absolute forest cover</b> (million hectares)		<b>Relative forest cover</b> (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	758.3	36.4	61.5	3.0	855.9	39.1	69.4	3.2	866.8	39.1	70.3	3.2	[64;76]
<b>1990</b>	716.6	41.0	58.1	3.3	808.5	43.9	65.5	3.6	822.0	43.3	66.6	3.5	[60;74]
<b>2000</b>	678.5	46.8	55.0	3.8	767.1	49.3	62.2	4.0	780.2	49.2	63.2	4.0	[55;71]

**Forest area change (10-years periods)**

(million hectares)	Forest definition f1				Forest definition f2			Forest definition f3			
	<b>Deforestation</b>	<b>Net forest area change</b>			<b>Deforestation</b>	<b>Net forest area change</b>		<b>Deforestation</b>	<b>Net forest area change</b>		
	Mean	Mean	SE		Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	42.6	-41.7	8.7		48.4	-47.4	9.1	46.0	-44.8	8.4	[-61;-28]
<b>1990-2000</b>	39.5	-38.1	9.7		43.6	-41.4	10.0	44.2	-41.8	10.9	[-63;-20]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	<b>Annual forest area change</b> (million hectares)		<b>Deforestation rate r</b> (%)		<b>Annual net forest area change</b> (million hectares)		<b>Deforestation rate r</b> (%)		<b>Annual net forest area change</b> (million hectares)		<b>Deforestation rate r</b> (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	-4.2	0.9	0.55	0.04	-4.7	0.9	0.55	0.04	-4.5	0.8	0.52	0.11	[0.30;0.73]
<b>1990-2000</b>	-3.8	1.0	0.53	0.03	-4.1	1.0	0.51	0.04	-4.2	1.1	0.51	0.15	[0.22;0.80]

Notes: SE = standard error of the mean; 95%CI = 95% confidence interval; absolute forest cover = forest area; relative forest cover = percentage of total land area; deforestation = gross forest loss; Net forest area change = net forest loss/gain



### Appendix 3. Results at subregional level – Africa

Notes: SE = standard error of the mean; 95%CI = 95% confidence interval; absolute forest cover = forest area; relative forest cover = percentage of total land area; deforestation = gross forest loss; Net forest area change = net forest loss/gain

**Table 29. Area transition matrices for the periods 1980-1990 and 1990-2000 - East Sahelian Africa (subregion code 13, thousand ha)**

		Land cover classes in 1990									State 1990	% of total land area
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations		
<b>Area transition matrix 1980-1990</b> ( <i>'000 ha</i> )												
Land cover classes in 1980		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	State 1980	% of total land area
Closed canopy forest		16 781	62	213	440	9	117	353			17 974	7.9
Open canopy forest		5	18 172		137	18		542			18 875	8.3
Long fallow				110	99		42	9			260	0.1
Fragmented forest		22	68		13 086	85	10	1 470	4		14 746	6.5
Shrubs		1			36	18 675		874			19 586	8.6
Short fallow							38	79			118	0.1
Other land cover		16	146		124	230	4	156 139	73		156 732	68.6
Water								99	- 1		98	0.0
Plantations										11	11	0.0
<b>State 1990 →</b>		<b>16 825</b>	<b>18 449</b>	<b>323</b>	<b>13 922</b>	<b>19 016</b>	<b>211</b>	<b>159 566</b>	<b>77</b>	<b>11</b>	<b>228 400</b>	
<b>% of total land area →</b>		<b>7.4</b>	<b>8.1</b>	<b>0.1</b>	<b>6.1</b>	<b>8.3</b>	<b>0.1</b>	<b>69.9</b>	<b>0.0</b>	<b>0.0</b>		
<b>Area transition matrix 1990-2000</b> ( <i>'000 ha</i> )												
Land cover classes in 1990		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	State 1990	% of total land area
Closed canopy forest		15 812	29	172	434	7	212	159			16 825	7.4
Open canopy forest		13	17 788		142	28		478			18 449	8.1
Long fallow				114	54		113	43			323	0.1
Fragmented forest		19			12 699	38	81	1 080	6		13 922	6.1
Shrubs		6			7	18 170		833			19 016	8.3
Short fallow							93	117			211	0.1
Other land cover		27	38		201	136		158 988	176		159 566	69.9
Water								16	61		77	0.0
Plantations										11	11	0.0
<b>State 2000 →</b>		<b>15 878</b>	<b>17 854</b>	<b>286</b>	<b>13 536</b>	<b>18 379</b>	<b>499</b>	<b>161 714</b>	<b>243</b>	<b>11</b>	<b>228 400</b>	
<b>% of total land area →</b>		<b>7.0</b>	<b>7.8</b>	<b>0.1</b>	<b>5.9</b>	<b>8.0</b>	<b>0.2</b>	<b>70.8</b>	<b>0.1</b>	<b>0.0</b>		

Notes: see Table 6.

**Table 30. Standard errors of the area transition matrices - East Sahelian Africa (subregion code 13, thousand ha)**

**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)

Land cover classes in 1980	Land cover classes in 1990								
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Closed canopy forest	5 850	44	214	282	6	118	205		
Open canopy forest	6	14 651		71	10		293		
Long fallow			111	99		42	9		
Fragmented forest	16	48		4 931	48	10	598		4
Shrubs	1			21	5 038		593		
Short fallow						39	80		
Other land cover	11	72		63	133	4	14 941		38
Water							56		20
Plantations									12

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)

Land cover classes in 1990	Land cover classes in 2000								
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Closed canopy forest	5 474	30	173	288	7	214	70		
Open canopy forest	14	14 353		73	23		322		
Long fallow			115	54		113	43		
Fragmented forest	20			4 767	32	81	599		6
Shrubs	5			7	4 790		545		
Short fallow						94	118		
Other land cover	29	28		120	86		14 965		95
Water							16		37
Plantations									12

**Table 31. Forest area and area change -East Sahelian Africa (subregion code 13)**

**Forest area**

	Forest definition f1		Forest definition f2				Forest definition f3						
	Absolute forest cover (thousand hectares)	Relative forest cover (%)	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)				
			Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980</b>	17 974	6 370	8	3	40 125	16 050	18	7	42 024	16 192	18	7	[5;32]
<b>1990</b>	16 825	5 854	7	3	38 368	15 752	17	7	40 237	15 893	18	7	[4;31]
<b>2000</b>	15 878	5 484	7	2	36 740	15 454	16	7	38 529	15 588	17	7	[3;30]

**Forest area change (10-years periods)**

(thousand hectares)

	Forest definition f1		Forest definition f2				Forest definition f3				
	Deforestation	Net forest area change	Deforestation		Net forest area change		Deforestation		Net forest area change		
			Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	1 193	-1 148	816	2 049	-1 758	760	2 063	-1 786	718	[-3,193;-379]	
<b>1990-2000</b>	1 013	- 947	713	1 772	-1 628	742	1 861	-1 708	768	[-3,213;-203]	

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2						Forest definition f3		
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	- 115	82	0.64	0.35	- 176	76	0.44	0.20	- 179	72	0.43	0.18	[0.08;0.77]
<b>1990-2000</b>	- 95	71	0.56	0.35	- 163	74	0.42	0.20	- 171	77	0.42	0.19	[0.04;0.81]

**Table 32. Area transition matrices for the periods 1980-1990 and 1990-2000 - West Sahelian and West Africa (subregion code 14, thousand ha)**

**Area transition matrix 1980-1990**

('000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total/ land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	Plantations		
Closed canopy forest	23 708	267	140	2 594	46	1 422	473	3	10	28 663	11.5	
Open canopy forest	8	32 267		3 154	38	19	607	3	13	36 100	14.5	
Long fallow			7 078			507				7 670	3.1	
Fragmented forest	35	211		44 578	3	6	1 482			46 314	18.6	
Shrubs	12	7		7	18 994		89			19 109	7.7	
Short fallow	19	21	53	144		29 416	691	12	62	30 418	12.2	
Other land cover	2	78		183	7	50	79 382	45	7	79 755	32.1	
Water							132	88		219	0.1	
Plantations									248	252	0.1	
<b>State 1990 →</b>	<b>23 785</b>	<b>32 851</b>	<b>7 270</b>	<b>50 660</b>	<b>19 088</b>	<b>31 421</b>	<b>82 934</b>	<b>151</b>	<b>340</b>	<b>248 500</b>		
<b>% of total land area →</b>	<b>9.6</b>	<b>13.2</b>	<b>2.9</b>	<b>20.4</b>	<b>7.7</b>	<b>12.6</b>	<b>33.4</b>	<b>0.1</b>	<b>0.1</b>			

**Area transition matrix 1990-2000**

('000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total/ land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	Plantations		
Closed canopy forest	20 340	59	107	2 510	15	193	536	4	20	23 785	9.6	
Open canopy forest		28 060		3 857	108	76	734	9	7	32 851	13.2	
Long fallow			7 134			126	10			7 270	2.9	
Fragmented forest	77	109		47 199	16	48	3 206	5		50 660	20.4	
Shrubs	20	9		24	18 841		193			19 088	7.7	
Short fallow	15	18	48	4		28 990	2 336	10		31 421	12.6	
Other land cover	20	67		30		190	82 532	70	24	82 934	33.4	
Water							91	60		151	0.1	
Plantations									324	340	0.1	
<b>State 2000 →</b>	<b>20 472</b>	<b>28 324</b>	<b>7 289</b>	<b>53 625</b>	<b>18 980</b>	<b>29 631</b>	<b>89 645</b>	<b>159</b>	<b>376</b>	<b>248 500</b>		
<b>% of total land area →</b>	<b>8.2</b>	<b>11.4</b>	<b>2.9</b>	<b>21.6</b>	<b>7.6</b>	<b>11.9</b>	<b>36.1</b>	<b>0.1</b>	<b>0.2</b>			

Notes: see Table 6.

**Table 33. Standard errors of the area transition matrices - West Sahelian and West**
**Africa (subregion code 14, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)	Land cover classes in 1990									
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	
Land cover classes in 1980										
Closed canopy forest	12 709	52	932	81	58	322	3 405	625	756	
Open canopy forest	10	527	22	79	49	10	40		2	
Long fallow	154	1	3 303			1 042	855		115	
Fragmented forest	26	ε	97	1 095	158	49	502	ε	20	
Shrubs				1	1 002	90	133	ε	2	
Short fallow	32		159	8		12 362	2 853	67	168	
Other land cover	24		18	ε	14	85	6 246	124	634	
Water							15	136		
Plantations	ε			ε		29	415		3 069	

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)	Land cover classes in 2000									
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations	
Land cover classes in 1990										
Closed canopy forest	9 913	59	92	1 923	15	105	422	5	16	
Open canopy forest		8 014		2 565	108	70	286	10	5	
Long fallow			5 420			78	7			
Fragmented forest	62	49		12 646	16	51	1 528	5		
Shrubs	20	9		24	14 247		172			
Short fallow	18	19	47	4		7 599	1 615	12		
Other land cover	18	55		30		136	26 980	43	26	
Water						ε	61	37		
Plantations						5	6		153	

**Table 34. Forest area and area change - West Sahelian and West Africa (subregion code 14)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980</b>	28 663	14 416	12	6	75 055	15 650	30	6	87 871	16 286	35	7	[23;48]
<b>1990</b>	23 785	11 695	10	5	67 893	13 299	27	5	80 792	14 192	33	6	[21;44]
<b>2000</b>	20 472	9 940	8	4	60 713	11 290	24	5	73 960	12 568	30	5	[20;40]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change			Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE		Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	4 955	-4 878	3038		7 574	-7 161	2753	7 546	-7 079	2488	[-11,955; -2,202]
<b>1990-2000</b>	3 445	-3 313	2230		7 489	-7 181	2786	7 174	-6 833	2580	[-11,889; -1,776]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	- 488	304	1.70	0.44	- 716	275	0.95	0.21	- 708	249	0.81	0.17	[0.47;1.14]
<b>1990-2000</b>	- 331	223	1.39	0.54	- 718	279	1.06	0.28	- 683	258	0.85	0.24	[0.37;1.32]

**Table 35. Area transition matrices for the periods 1980-1990 and 1990-2000 - Central Africa (subregion code 15, thousand ha)**
**Area transition matrix 1980-1990**

(*'000 ha*)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	152 576	1 687	214	342		5 012	522	30	38		160 421	40.7
Open canopy forest	128	63 513	2	464		867	1 885				66 858	16.9
Long fallow			1 973			31					2 004	0.5
Fragmented forest	65	74		37 774		25	1 815				39 754	10.1
Shrubs												
Short fallow	348	105		6		18 723	282	18	10		19 493	4.9
Other land cover	119	228		496		237	104 820	13	36		105 947	26.8
Water						63	4	- 3			64	0.0
Plantations									56		59	0.0
<b>State 1990 →</b>	<b>153 235</b>	<b>65 606</b>	<b>2 189</b>	<b>39 082</b>		<b>24 958</b>	<b>109 331</b>	<b>58</b>	<b>141</b>		<b>394 600</b>	
<b>% of total land area →</b>	<b>38.8</b>	<b>16.6</b>	<b>0.6</b>	<b>9.9</b>		<b>6.3</b>	<b>27.7</b>	<b>0.0</b>	<b>0.0</b>			

**Area transition matrix 1990-2000**

(*'000 ha*)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	148 027	461	260	260		3 947	220	19	40		153 235	38.8
Open canopy forest	8	64 593	76	311		376	243				65 606	16.6
Long fallow			2 162	19		8					2 189	0.6
Fragmented forest	31	8		37 696		800	546				39 082	9.9
Shrubs												
Short fallow	687	39		10		24 079	94	48			24 958	6.3
Other land cover		82		71		76	109 032	10	59		109 331	27.7
Water								58			58	0.0
Plantations									141		141	0.0
<b>State 2000 →</b>	<b>148 754</b>	<b>65 182</b>	<b>2 498</b>	<b>38 368</b>		<b>29 286</b>	<b>110 136</b>	<b>136</b>	<b>240</b>		<b>394 600</b>	
<b>% of total land area →</b>	<b>37.7</b>	<b>16.5</b>	<b>0.6</b>	<b>9.7</b>		<b>7.4</b>	<b>27.9</b>	<b>0.0</b>	<b>0.1</b>			

Notes: see Table 6.

**Table 36. Standard errors of the area transition matrices - Central Africa (subregion code 15, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		34 049	560	202	230		2 793	116	18	28
Open canopy forest		69	11 524	2	337		503	683		
Long fallow				1 862			30			
Fragmented forest		62	50		20 795		22	1 760		
Shrubs										
Short fallow		195	50		6		7 985	181	18	11
Other land cover		75	148		461		114	27 173	9	29
Water							63	4	3	
Plantations								2		47

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		32 875	288	246	171		1 648	86	19	41
Open canopy forest		8	11 909	71	181		161	133		
Long fallow				2 040	18		8			
Fragmented forest		31	8		20 770		660	490		
Shrubs										
Short fallow		482	20		10		10 496	36	48	
Other land cover			41		60		29	28 720	10	60
Water									43	
Plantations										114

**Table 37. Forest area and area change - Central Africa (subregion code 15)**
**Forest area**

	Forest definition f1				Forest definition f2						Forest definition f3		
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	160 421	35 611	41	9	236 113	30 257	60	8	242 535	28 483	61	7	[47;76]
<b>1990</b>	153 235	34 208	39	9	227 526	29 716	58	8	234 058	28 052	59	7	[45;73]
<b>2000</b>	148 754	33 255	38	8	222 463	29 193	56	7	229 223	27 595	58	7	[44;72]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1			Forest definition f2			Forest definition f3				
	Deforestation	Net forest area change		Deforestation	Net forest area change		Deforestation	Net forest area change			
	Mean	Mean	SE	Mean	Mean	SE	Mean	Mean	SE	95%CI	
<b>1980-1990</b>	7 845	-7 185	2535	9 605	-8 587	2427	9 535	-8 477	2508	[-13,393;-3,560]	
<b>1990-2000</b>	5 209	-4 481	1511	5 925	-5 064	1390	5 696	-4 835	1433	[-7,644;-2,025]	

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	- 719	253	0.45	0.13	- 859	243	0.36	0.10	- 848	251	0.35	0.10	[0.15;0.55]
<b>1990-2000</b>	- 448	151	0.29	0.08	- 506	139	0.22	0.06	- 483	143	0.21	0.06	[0.09;0.32]

**Table 38. Area transition matrices for the periods 1980-1990 and 1990-2000 - Tropical Southern Africa (subregion code 16, thousand ha)**

**Area transition matrix 1980-1990**

(’000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	80 805	643	333	1 231	26	667	1 190	5	72	72	<b>84 972</b>	24.1
Open canopy forest	116	78 715	297	1 468	11	720	1 697		34	34	<b>83 058</b>	23.6
Long fallow	75	24	6 626	77	45	205	187				<b>7 239</b>	2.1
Fragmented forest	334	295	77	41 014	87	2 136	1 009		7	7	<b>44 959</b>	12.8
Shrubs	20	6	19	6 550	224	273			37	37	<b>7 130</b>	2.0
Short fallow	133	99	72	329	58	10 007	545				<b>11 242</b>	3.2
Other land cover	197	295	35	355	32	106	111 837	34	204	204	<b>113 096</b>	32.1
Water	27	37		16	5		117	61			<b>263</b>	0.1
Plantations	14					4	33			489	<b>540</b>	0.2
<b>State 1990 →</b>	<b>81 721</b>	<b>80 108</b>	<b>7 447</b>	<b>44 510</b>	<b>6 814</b>	<b>14 069</b>	<b>116 886</b>	<b>101</b>	<b>844</b>		<b>352 500</b>	
<b>% of total land area →</b>	23.2	22.7	2.1	12.6	1.9	4.0	33.2	0.0	0.2			

**Area transition matrix 1990-2000**

(’000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	77 250	78	179	2 456	10	636	1 086	14	13	13	<b>81 721</b>	23.2
Open canopy forest	19	75 614	157	1 539	11	1 320	1 439	5	3	3	<b>80 108</b>	22.7
Long fallow	25	62	6 841	76	5	275	164				<b>7 447</b>	2.1
Fragmented forest	67	113	27	42 201	911	1 175	5	10	10	10	<b>44 510</b>	12.6
Shrubs			12	14	5 919	310	521		37	37	<b>6 814</b>	1.9
Short fallow	70	163	241	929	164	12 114	387				<b>14 069</b>	4.0
Other land cover	45	52	33	87	37	111	116 475	29	18	18	<b>116 886</b>	33.2
Water							99	2			<b>101</b>	0.0
Plantations	9			19			136			680	<b>844</b>	0.2
<b>State 2000 →</b>	<b>77 485</b>	<b>76 082</b>	<b>7 490</b>	<b>47 320</b>	<b>6 146</b>	<b>15 678</b>	<b>121 481</b>	<b>56</b>	<b>761</b>		<b>352 500</b>	
<b>% of total land area →</b>	22.0	21.6	2.1	13.4	1.7	4.4	34.5	0.0	0.2			

Notes: see Table 6.

**Table 39. Standard errors of the area transition matrices - Tropical Southern Africa (subregion code 16, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980		17 797	240	184	673	17	248	556	5	68
Closed canopy forest		45	21 186	203	703	11	378	574		33
Open canopy forest		47	21	3 929	63	44	87	93		
Long fallow		285	126	73	15 815	75	1 897	338		7
Fragmented forest		20		6	16	3 303	193	135		37
Shrubs		62	54	52	296	39	3 672	289		
Short fallow		139	89	22	206	17	49	18 141	21	197
Other land cover		27	37		11	5		63	59	
Water		13					5	22		387
Plantations										

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990		16 934	48	78	1 676	10	258	566	14	9
Closed canopy forest		17	20 076	105	757	11	612	593	5	3
Open canopy forest		22	66	3 861	59	4	150	86		
Long fallow		60	98	29	15 414		901	802	5	9
Fragmented forest				12	10	3 104	221	301		37
Shrubs		32	80	144	833	120	4 549	132		
Short fallow		31	30	21	29	21	64	17 938	17	10
Other land cover								86	23	
Water		8			19			126		538
Plantations										

**Table 40. Forest area and area - Tropical Southern Africa (subregion code 16)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	84 972	18 804	24	5	178 021	16 404	51	5	190 256	15 044	54	4	[46;62]
<b>1990</b>	81 721	18 047	23	5	171 720	16 582	49	5	184 113	15 156	52	4	[44;61]
<b>2000</b>	77 485	16 955	22	5	164 083	15 971	47	5	176 831	14 518	50	4	[42;58]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2				Forest definition f3				
	Deforestation		Net forest area change		Deforestation		Net forest area change		Deforestation		Net forest area change		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	4 167		-3 251	1075	7 888		-6 301	1151	7 790		-6 143	1090	[-8,280;-4,006]
<b>1990-2000</b>	4 472		-4 236	2184	8 454		-7 637	2058	8 395		-7 282	1954	[-11,111;-3,453]



**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	<b>Annual forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	- 325	108	0.38	0.09	- 630	115	0.35	0.08	- 614	109	0.32	0.06	[0.20;0.45]
<b>1990-2000</b>	- 424	218	0.52	0.23	- 764	206	0.44	0.11	- 728	195	0.40	0.10	[0.20;0.59]

## Appendix 4. Results at subregional level – Asia

Notes: SE = standard error of the mean; 95%CI = 95% confidence interval; absolute forest cover = forest area; relative forest cover = percentage of total land area; deforestation = gross forest loss; Net forest area change = net forest loss/gain

**Table 41. Area transition matrices for the periods 1980-1990 and 1990-2000 - South Asia (subregion code 44, thousand ha)**

**Area transition matrix 1980-1990**  
(*'000 ha*)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	40 272	808	580	40	37	268	440	14	33	<b>42 493</b>	21.1	
Open canopy forest	208	12 246	4	73	91	6	328	9	40	<b>13 006</b>	6.5	
Long fallow	52		8 989	4	2	1 378	281		4	<b>10 710</b>	5.3	
Fragmented forest	29	36	11	6 990	5	3	214	6	15	<b>7 309</b>	3.6	
Shrubs		18			1 855	1	58	5	13	<b>1 950</b>	1.0	
Short fallow	25		124	4	2	2 126	9			<b>2 290</b>	1.1	
Other land cover	91	87	35	104	67	21	120 441	100	69	<b>121 015</b>	60.2	
Water	7	3					40	57	9	<b>116</b>	0.1	
Plantations	31	15	ε	6	5	ε	40		2 114	<b>2 210</b>	1.1	
<b>State 1990 →</b>	<b>40 714</b>	<b>13 214</b>	<b>9 744</b>	<b>7 220</b>	<b>2 065</b>	<b>3 803</b>	<b>121 852</b>	<b>192</b>	<b>2 297</b>	<b>201 100</b>		
% of total land area →	20.2	6.6	4.8	3.6	1.0	1.9	60.6	0.1	1.1			

**Area transition matrix 1990-2000**  
(*'000 ha*)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	39 904	144	30	132	2	282	172	31	18	<b>40 714</b>	20.2	
Open canopy forest	61	12 807		99	25	30	171	19	1	<b>13 214</b>	6.6	
Long fallow	1		8 736	15	ε	881	111			<b>9 744</b>	4.8	
Fragmented forest	6	17	ε	7 049	ε	4	107	31	7	<b>7 220</b>	3.6	
Shrubs		1		4	2 020	15	22	4		<b>2 065</b>	1.0	
Short fallow	ε		269	ε	ε	3 483	50			<b>3 803</b>	1.9	
Other land cover	15	92	75	339	33	62	121 050	96	90	<b>121 852</b>	60.6	
Water	6			4			33	149		<b>192</b>	0.1	
Plantations							39		2 258	<b>2 297</b>	1.1	
<b>State 2000 →</b>	<b>39 994</b>	<b>13 061</b>	<b>9 110</b>	<b>7 643</b>	<b>2 080</b>	<b>4 755</b>	<b>121 754</b>	<b>330</b>	<b>2 374</b>	<b>201 100</b>		
% of total land area →	19.9	6.5	4.5	3.8	1.0	2.4	60.5	0.2	1.2			

Notes: see Table 6.

**Table 42. Standard errors of the area transition matrices - South Asia (subregion code 44, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		7 861	353	568	10	28	252	253	8	27
Open canopy forest		71	3 072	4	35	60	5	124	6	20
Long fallow		34		6 205	4	2	1 154	259		4
Fragmented forest		13	15	10	2 291	3	2	100	9	7
Shrubs			18			450	1	25	5	9
Short fallow		17		94	4	2	1 633	6		
Other land cover		34	28	30	44	47	21	13 939	61	36
Water		10	4					17	44	9
Plantations		15	8	ε	3	5	ε	14		929

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		7 665	74	25	57	2	216	74	45	8
Open canopy forest		52	3 317		45	23	25	100	15	1
Long fallow		1		6 306	15	ε	591	81		
Fragmented forest		3	8	ε	2 357	ε	4	35	45	4
Shrubs			1		4	484	15	12	4	
Short fallow		ε		234	ε	ε	2 252	33		
Other land cover		8	74	74	271	30	57	13 365	40	41
Water		9			4			17	106	
Plantations								21		1 017

**Table 43. Forest area and area change for the ecological zone - South Asia (subregion code 44)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980</b>	42 493	8 506	21	4	57 124	8 717	28	4	68 646	13 582	34	7	[21;47]
<b>1990</b>	40 714	7 836	20	4	55 533	8 195	28	4	66 079	12 122	33	6	[21;45]
<b>2000</b>	39 994	7 634	20	4	54 752	7 917	27	4	64 712	11 642	32	6	[21;44]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change			Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE		Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	2 221	-1 779	1087		1 996	-1 591	1093	3 091	-2 567	1819	[-6,132;997]
<b>1990-2000</b>	810	-721	340		993	-780	389	1 955	-1 367	797	[-2,930;196]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	- 178	109	0.42	0.21	- 159	109	0.28	0.17	- 257	182	0.37	0.21	[-0.03;0.78]
<b>1990-2000</b>	- 72	34	0.18	0.07	- 78	39	0.14	0.06	- 137	80	0.21	0.10	[0.01;0.41]

**Table 44. Area transition matrices for the periods 1980-1990 and 1990-2000 - Continental South-East Asia (subregion code 45, thousand ha)**

**Area transition matrix 1980-1990**

(*'000 ha*)

Land cover classes in 1980	Land cover classes in 1990										State 1980	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	60 576	656	1 957	428	126	778	2 369	224	930		<b>68 045</b>	36.5
Open canopy forest	89	11 528	96	64	207	49	632	53	2		<b>12 721</b>	6.8
Long fallow	375	18	16 205	31	56	581	999	56	2		<b>18 323</b>	9.8
Fragmented forest	69	30	60	5 928	153	87	881	26	39		<b>7 272</b>	3.9
Shrubs	24	42	21	46	4 899	17	767	32	15		<b>5 862</b>	3.1
Short fallow	151	40	128	13	53	5 115	1 020	27	2		<b>6 548</b>	3.5
Other land cover	94	142	83	58	178	23	60 407	97	43		<b>61 125</b>	32.8
Water	18			3	2		61	440	8		<b>531</b>	0.3
Plantations	2	2					12		5 757		<b>5 774</b>	3.1
<b>State 1990 →</b>	<b>61 399</b>	<b>12 459</b>	<b>18 550</b>	<b>6 571</b>	<b>5 674</b>	<b>6 650</b>	<b>67 148</b>	<b>953</b>	<b>6 797</b>		<b>186 200</b>	
% of total land area →	33.0	6.7	10.0	3.5	3.0	3.6	36.1	0.5	3.7			

**Area transition matrix 1990-2000**

(*'000 ha*)

Land cover classes in 1990	Land cover classes in 2000										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	57 572	142	1 027	475	41	1 061	952	107	22		<b>61 399</b>	33.0
Open canopy forest	80	10 994	150	37	112	215	863	7			<b>12 459</b>	6.7
Long fallow	272		17 193	18	9	677	346	34			<b>18 550</b>	10.0
Fragmented forest	49	28	88	5 766	1	173	448	ε	18		<b>6 571</b>	3.5
Shrubs	39	17	16	10	4 906	94	552	26	14		<b>5 674</b>	3.0
Short fallow	43	1	108	28	11	5 895	550	15			<b>6 650</b>	3.6
Other land cover	114	84	61	40	114	94	66 435	61	145		<b>67 148</b>	36.1
Water	15			5	13		53	868			<b>953</b>	0.5
Plantations	4						31		6 762		<b>6 797</b>	3.7
<b>State 2000 →</b>	<b>58 188</b>	<b>11 266</b>	<b>18 642</b>	<b>6 380</b>	<b>5 208</b>	<b>8 208</b>	<b>70 230</b>	<b>1 118</b>	<b>6 961</b>		<b>186 200</b>	
% of total land area →	31.3	6.1	10.0	3.4	2.8	4.4	37.7	0.6	3.7			

Notes: see Table 6.

**Table 45. Standard errors of the area transition matrices - Continental South-East Asia (subregion code 45, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		9 618	388	561	143	41	322	896	132	964
Open canopy forest		53	6 270	51	38	100	25	271	48	1
Long fallow		147	13	6 132	13	26	221	397	37	2
Fragmented forest		11	12	33	1 904	68	60	256	11	37
Shrubs		13	20	9	18	1 941	15	243	17	9
Short fallow		81	34	48	8	36	1 922	417	17	2
Other land cover		39	74	64	23	98	17	15 393	34	16
Water		14			3	2		34	284	8
Plantations		2	2					7		5 947

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		5 158	35	298	321	20	455	391	74	23
Open canopy forest		65	6 033	85	15	54	143	579	7	
Long fallow		145		6 257	11	6	188	108	31	
Fragmented forest		24	18	69	1 741	1	138	178		17
Shrubs		35	10	8	7	1 959	79	333	11	14
Short fallow		18	1	62	28	10	2 080	90	12	
Other land cover		99	61	33	17	67	77	15 151	28	112
Water		15			5	13		26	508	
Plantations		4						18		6 942

**Table 46. Forest area and area change - Continental South-East Asia (subregion code 45)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	68 045	10 805	37	6	82 382	11 280	44	6	101 513	13 007	55	7	[41;68]
<b>1990</b>	61 399	9 732	33	5	75 317	10 384	40	6	94 598	12 660	51	7	[37;64]
<b>2000</b>	58 188	9 421	31	5	70 871	9 999	38	5	90 222	12 584	48	7	[35;62]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2				Forest definition f3			
	Deforestation		Net forest area change		Deforestation		Net forest area change		Deforestation		Net forest area change	
	Mean	Mean	SE	Mean	Mean	SE	Mean	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	7 469	-6 646	2356	8 083	-7 064	2205	7 807	-6 915	2011			[-10,856;-2,974]
<b>1990-2000</b>	3 826	-3 211	1037	5 117	-4 446	1371	5 014	-4 376	1435			[-7,190;-1,563]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	- 665	236	0.98	0.29	- 706	221	0.86	0.23	- 691	201	0.68	0.20	[0.30;1.06]
<b>1990-2000</b>	- 321	104	0.52	0.16	- 445	137	0.59	0.17	- 438	144	0.46	0.16	[0.15;0.77]

**Table 47. Area transition matrices for the periods 1980-1990 and 1990-2000 - Insular South-East Asia (subregion code 46, thousand ha)**

**Area transition matrix 1980-1990**

(’000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	109 994	320	2 828	776	107	3 393	4 586	149	1 575		<b>123 728</b>	55.4
Open canopy forest	13	776	46	75	2	50	81		26		<b>1 069</b>	0.5
Long fallow	419		17 161	24	155	3 550	578		8		<b>21 894</b>	9.8
Fragmented forest	7	34	71	4 163	197	91	984		20		<b>5 566</b>	2.5
Shrubs	44		44	16	1 264	5	342		40		<b>1 755</b>	0.8
Short fallow	306	23	742	95	169	31 205	2 768	19	114		<b>35 440</b>	15.9
Other land cover	21		123	12	94	59	27 262	77	252		<b>27 899</b>	12.5
Water							3	9			<b>12</b>	0.0
Plantations	66		6	5		149	740	8	4 864		<b>5 837</b>	2.6
<b>State 1990 →</b>	<b>110 870</b>	<b>1 153</b>	<b>21 020</b>	<b>5 166</b>	<b>1 987</b>	<b>38 501</b>	<b>37 343</b>	<b>262</b>	<b>6 899</b>		<b>223 200</b>	
% of total land area →	49.7	0.5	9.4	2.3	0.9	17.2	16.7	0.1	3.1			

**Area transition matrix 1990-2000**

(’000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	95 569	105	2 557	122	90	1 821	8 246	608	1 751		<b>110 870</b>	49.7
Open canopy forest	17	911	33	80	49	10	52		2		<b>1 153</b>	0.5
Long fallow	257	1	15 774				2 372	2 380	236		<b>21 020</b>	9.4
Fragmented forest	33	ε	88	4 024	227	62	705	ε	26		<b>5 166</b>	2.3
Shrubs				1	1 655	116	213	ε	2		<b>1 987</b>	0.9
Short fallow	76		339	7		31 932	5 662	77	407		<b>38 501</b>	17.2
Other land cover	23		37	ε	14	154	35 206	160	1 748		<b>37 343</b>	16.7
Water							37	225			<b>262</b>	0.1
Plantations	ε			ε		28	609		6 262		<b>6 899</b>	3.1
<b>State 2000 →</b>	<b>95 976</b>	<b>1 017</b>	<b>18 828</b>	<b>4 234</b>	<b>2 036</b>	<b>36 494</b>	<b>53 110</b>	<b>1 071</b>	<b>10 435</b>		<b>223 200</b>	
% of total land area →	43.0	0.5	8.4	1.9	0.9	16.4	23.8	0.5	4.7			

Notes: see Table 6.

**Table 48. Standard errors of the area transition matrices - Insular South-East Asia (subregion code 46, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		11 924	252	895	424	73	1 100	2 614	127	752
Open canopy forest		9	445	30	74	2	28	50		26
Long fallow		220		3 763	16	171	1 592	225		4
Fragmented forest		4	26	79	1 100	190	83	511		20
Shrubs		48		48	16	884	5	302		40
Short fallow		230	14	298	73	160	12 348	1 160	17	107
Other land cover		10		52	5	76	34	6 761	45	156
Water								3	16	
Plantations		30		3	5		69	362	12	2 587

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		32 875	52	932	81	58	322	3 405	625	756
Open canopy forest		10	527	22	79	49	10	40		2
Long fallow		154	1	3 303			1 042	855		115
Fragmented forest		26	ε	97	1 095	158	49	502	ε	20
Shrubs					1	1 002	90	133	ε	2
Short fallow		32		159	8		12 362	2 853	67	168
Other land cover		24		18	ε	14	85	6 246	124	634
Water								15	135	
Plantations		ε			ε		29	415		3 069

**Table 49. Forest area and area change - Insular South-East Asia (subregion code 46)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		
	(thousand hectares)		(%)		(thousand hectares)		(%)		(thousand hectares)		(%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	123 728	10 232	55	5	126 033	10 190	56	5	148 546	13 782	67	6	[54;79]
<b>1990</b>	110 870	11 936	50	5	113 171	11 754	51	5	134 765	14 587	60	7	[48;73]
<b>2000</b>	95 976	12 815	43	6	97 933	12 683	44	6	117 231	15 001	53	7	[39;66]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2			Forest definition f3				
	Deforestation	Net forest area change			Deforestation	Net forest area change		Deforestation	Net forest area change			
	Mean	Mean	SE	SE	Mean	Mean	SE	Mean	Mean	SE	95%CI	
	<b>1980-1990</b>	13 734	-12 858	5013	5013	13 807	-12 863	4985	4985	15 272	-13 781	4616
<b>1990-2000</b>	15 301	-14 894	4914	4914	15 623	-15 238	4992	4992	18 092	-17 534	5760	[-28,823;-6,245]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	<b>Annual forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980-1990</b>	-1 286	501	1.04	0.42	-1 286	499	1.02	0.41	-1 378	462	0.93	0.32	[0.29;1.56]
<b>1990-2000</b>	-1 489	491	1.34	0.46	-1 524	499	1.35	0.46	-1 753	576	1.30	0.43	[0.45;2.15]



## Appendix 5. Results at subregional level - Latin America

Notes: SE = standard error of the mean; 95%CI = 95% confidence interval; absolute forest cover = forest area; relative forest cover = percentage of total land area; deforestation = gross forest loss; Net forest area change = net forest loss/gain

**Table 50. Area transition matrices for the periods 1980-1990 and 1990-2000 - Mexico and Central America (subregion code 31, thousand ha)**

**Area transition matrix 1980-1990**  
(\*000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	37 825	801	1 063	760	86	623	517	19			<b>41 695</b>	27.8
Open canopy forest	68	31 889	75	251	125	455	845	25	7		<b>33 739</b>	22.5
Long fallow	70	32	1 393	14		271	61				<b>1 841</b>	1.2
Fragmented forest	31	1	16	5 406	3	1	284	11	5		<b>5 758</b>	3.8
Shrubs		3			20 547		202	25	3		<b>20 781</b>	13.9
Short fallow	37	62	35	1	9	4 009	178	31			<b>4 362</b>	2.9
Other land cover	37	7	7	12	25	16	40 873	40	160		<b>41 179</b>	27.5
Water	3					2	13	41			<b>60</b>	0.0
Plantations							82			404	<b>485</b>	0.3
<b>State 1990 →</b>	<b>38 072</b>	<b>32 795</b>	<b>2 589</b>	<b>6 444</b>	<b>20 795</b>	<b>5 379</b>	<b>43 055</b>	<b>192</b>	<b>580</b>		<b>149 900</b>	
% of total land area →	25.4	21.9	1.7	4.3	13.9	3.6	28.7	0.1	0.4			

**Area transition matrix 1990-2000**  
(\*000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	35 572	50	565	1 230	3	244	403	6			<b>38 072</b>	25.4
Open canopy forest	9	31 843	119	256	11	105	432	7	14		<b>32 795</b>	21.9
Long fallow	53	15	2 267			230	24				<b>2 589</b>	1.7
Fragmented forest	9	10	26	6 199		4	176		20		<b>6 444</b>	4.3
Shrubs					20 718		77				<b>20 795</b>	13.9
Short fallow	11	43	62	16		5 173	73	2			<b>5 379</b>	3.6
Other land cover	8	17	5	10	1	3	42 904	6	100		<b>43 055</b>	28.7
Water						11	16	165			<b>192</b>	0.1
Plantations							94			485	<b>580</b>	0.4
<b>State 2000 →</b>	<b>35 662</b>	<b>31 978</b>	<b>3 043</b>	<b>7 711</b>	<b>20 744</b>	<b>5 775</b>	<b>44 183</b>	<b>185</b>	<b>619</b>		<b>149 900</b>	
% of total land area →	23.8	21.3	2.0	5.1	13.8	3.9	29.5	0.1	0.4			

Notes: see Table 6.

**Table 51. Standard errors of the area transition matrices - Mexico and Central America (subregion code 31, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		6 005	516	581	579	62	281	240	15	
Open canopy forest		38	5 351	29	133	84	365	326	20	5
Long fallow		58	16	585	12		175	55		
Fragmented forest		21	1	14	2 650	2	1	260	11	5
Shrubs			2			8 417		122	14	3
Short fallow		21	38	20	1	8	2 167	110	30	
Other land cover		22	5	4	6	19	8	8 369	23	124
Water		4					3	7	37	
Plantations								67		273

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		5 158	20	460	1 337	2	135	195	6	
Open canopy forest		5	5 533	117	232	10	51	171	4	12
Long fallow		34	15	959			158	13		
Fragmented forest		9	7	22	3 160		4	164		19
Shrubs						8 328		26		
Short fallow		9	22	34	13		2 284	58	2	
Other land cover		7	9	5	7	1	4	7 831	7	61
Water						8	19		138	
Plantations								87		363

**Table 52. Forest area and area change - Mexico and Central America (subregion code 31)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		Absolute forest cover (thousand hectares)		Relative forest cover (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980</b>	41 695	6 594	28	4	76 714	9 968	51	7	79 195	10 572	53	7	[39;67]
<b>1990</b>	38 072	6 027	25	4	72 298	8 716	48	6	75 603	9 395	50	6	[38;63]
<b>2000</b>	35 662	5 159	24	3	69 354	8 054	46	5	73 253	8 817	49	6	[37;60]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2				Forest definition f3			
	Deforestation		Net forest area change		Deforestation		Net forest area change		Deforestation		Net forest area change	
	Mean	Mean	SE		Mean	Mean	SE		Mean	Mean	SE	95%CI
<b>1980-1990</b>	3 870	-3 623	1230		4 698	-4 415	1496		3 820	-3 591	1336	[-6,211;-972]
<b>1990-2000</b>	2 500	-2 410	1413		3 113	-2 945	1492		2 534	-2 350	1290	[-4,878;178]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	- 362	123	0.87	0.25	- 442	150	0.58	0.14	- 359	134	0.45	0.12	[0.22;0.68]
<b>1990-2000</b>	- 241	141	0.63	0.31	- 294	149	0.41	0.19	- 235	129	0.31	0.15	[0.01;0.61]

**Table 53. Area transition matrices for the periods 1980-1990 and 1990-2000 - Tropical South America, excluded Brazil (subregion code 34, thousand ha)**

**Area transition matrix 1980-1990**

(’000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	296 900	42	457	695	223	850	3 032	1 218	8		303 418	67.0
Open canopy forest	19	20 332					97				20 448	4.5
Long fallow	56		845			151	4				1 063	0.2
Fragmented forest	7			5 266	4	36	525	57			5 896	1.3
Shrubs	11				12 674		76				12 761	2.8
Short fallow	11		52			2 401	35	13			2 512	0.6
Other land cover	89	11	4	9	482	10	104 855	777		2	106 239	23.4
Water	2		9	39			103	609			762	0.2
Plantations												
<b>State 1990 →</b>	<b>297 096</b>	<b>20 385</b>	<b>1 367</b>	<b>6 010</b>	<b>13 383</b>	<b>3 449</b>	<b>108 729</b>	<b>2 679</b>	<b>2</b>	<b>2</b>	<b>453 100</b>	
% of total land area →	65.6	4.5	0.3	1.3	3.0	0.8	24.0	0.6	0.0			

**Area transition matrix 1990-2000**

(’000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 2000	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	292 914		412	175	8	663	2 681	250			297 096	65.6
Open canopy forest		20 374					10				20 385	4.5
Long fallow	9		1 256			61	41				1 367	0.3
Fragmented forest	8		2	5 310	14		631	45			6 010	1.3
Shrubs					13 050		333				13 383	3.0
Short fallow	24		9			3 169	246	2			3 449	0.8
Other land cover	171		39	15	54	17	108 051	377		5	108 729	24.0
Water	138		11	32			499	2 000			2 679	0.6
Plantations										2	2	0.0
<b>State 2000 →</b>	<b>293 263</b>	<b>20 374</b>	<b>1 729</b>	<b>5 533</b>	<b>13 118</b>	<b>3 910</b>	<b>112 493</b>	<b>2 673</b>	<b>7</b>	<b>7</b>	<b>453 100</b>	
% of total land area →	64.7	4.5	0.4	1.2	2.9	0.9	24.8	0.6	0.0			

Notes: see Table 6.

**Table 54. Standard errors of the area transition matrices - Tropical South America, excluded Brazil (subregion code 34, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		14 631	31	257	436	137	339	1 646	1 382	8
Open canopy forest		14	18 339					69		
Long fallow		51		687			94	4	6	
Fragmented forest		7			1 465	4	37	386	58	
Shrubs		10				5 423		45		
Short fallow		11		52			1 189	32	12	
Other land cover		53	10	4	6	469	6	24 288	897	2
Water		2		9	33			64	410	
Plantations										

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		14 453		184	66	8	277	1 474	298	
Open canopy forest			18 373					7		
Long fallow		9		890			48	26		
Fragmented forest		6		2	1 506	14		522	46	
Shrubs						5 354		296		
Short fallow		23		9			1 421	206	2	
Other land cover		127		40	15	43	13	24 560	384	7
Water		124		11	33			422	2 415	
Plantations										2

**Table 55. Forest area and area change - Tropical South America, excluded Brazil (subregion code 34)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		
	(thousand hectares)		(%)		(thousand hectares)		(%)		(thousand hectares)		(%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	303 418	14 648	67	3	325 177	25 579	72	6	326 895	25 759	72	6	[61;83]
<b>1990</b>	297 096	14 639	66	3	318 816	26 165	70	6	320 851	26 383	71	6	[59;82]
<b>2000</b>	293 263	14 467	65	3	314 867	26 111	69	6	317 211	26 302	70	6	[59;81]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change			Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE		Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	6 518	-6 322	3133		6 557	-6 360	3089	6 254	-6 044	2966	[-11,857;-231]
<b>1990-2000</b>	4 182	-3 833	1462		4 307	-3 949	1520	4 054	-3 640	1432	[-6,447;-834]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Annual forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		Annual net forest area change (thousand hectares)		Deforestation rate r (%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	- 632	313	0.21	0.10	- 636	309	0.20	0.10	- 604	297	0.18	0.09	[0.00;0.37]
<b>1990-2000</b>	- 383	146	0.13	0.05	- 395	152	0.12	0.05	- 364	143	0.11	0.04	[0.03;0.20]

**Table 56. Area transition matrices for the periods 1980-1990 and 1990-2000 - Brazil (subregion code 35, thousand ha)**

**Area transition matrix 1980-1990**

(’000 ha)

Land cover classes in 1980	Land cover classes in 1990										State 1980	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	381 001	981	1 760	3 991	1 066	1 931	21 969	465	31	31	<b>413 195</b>	65.5
Open canopy forest	39	26 424	47	236	844	136	3 257	480	58	58	<b>31 521</b>	5.0
Long fallow	16		1 896	13	4	53	37	ε			<b>2 019</b>	0.3
Fragmented forest	94	41	11	33 321	252	1 532	6 146	262	143	143	<b>41 803</b>	6.6
Shrubs	39	10	156	15	64 472	67	16 540	505	149	149	<b>81 953</b>	13.0
Short fallow	49	22	64	82	3	6 152	1 608	55			<b>8 036</b>	1.3
Other land cover	101	2	4	198	443	712	47 536	142	116	116	<b>49 255</b>	7.8
Water	89	18	5	27	3	23	434	1 233			<b>1 832</b>	0.3
Plantations				1			36		851	851	<b>888</b>	0.1
<b>State 1990 →</b>	<b>381 430</b>	<b>27 499</b>	<b>3 943</b>	<b>37 884</b>	<b>67 087</b>	<b>10 606</b>	<b>97 561</b>	<b>3 143</b>	<b>1 348</b>	<b>630 500</b>		
% of total land area →	60.5	4.4	0.6	6.0	10.6	1.7	15.5	0.5	0.2			

**Area transition matrix 1990-2000**

(’000 ha)

Land cover classes in 1990	Land cover classes in 2000										State 1990	% of total land area
	Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations			
Closed canopy forest	348 613	110	412	1 606	1 131	786	28 643	94	34	34	<b>381 430</b>	60.5
Open canopy forest	3	24 363	1	524	318	23	2 221	27	19	19	<b>27 499</b>	4.4
Long fallow	435	49	1 771	57	18	45	1 567	ε			<b>3 943</b>	0.6
Fragmented forest	181	157	17	33 986	156	125	3 096	35	129	129	<b>37 884</b>	6.0
Shrubs	19	54	18	3	58 192	38	7 005	1 739	19	19	<b>67 087</b>	10.6
Short fallow	78	27	170	460	16	7 783	2 071	1			<b>10 606</b>	1.7
Other land cover	222	37	246	1 467	3 295	4 193	87 709	311	81	81	<b>97 561</b>	15.5
Water	8	17		8	745	23	364	1 978			<b>3 143</b>	0.5
Plantations				12	8		214		1 115	1 115	<b>1 348</b>	0.2
<b>State 2000 →</b>	<b>349 560</b>	<b>24 816</b>	<b>2 636</b>	<b>38 122</b>	<b>63 879</b>	<b>13 016</b>	<b>132 889</b>	<b>4 185</b>	<b>1 397</b>	<b>630 500</b>		
% of total land area →	55.4	3.9	0.4	6.0	10.1	2.1	21.1	0.7	0.2			

Notes: see Table 6.

**Table 57. Standard errors of the area transition matrices - Brazil (subregion code 35, thousand ha)**
**Standard errors - Area transition matrix 1980-1990**

(thousand hectares)		Land cover classes in 1990								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1980										
Closed canopy forest		37 883	308	839	1 543	412	830	6 195	317	21
Open canopy forest		16	10 625	39	157	605	109	716	471	30
Long fallow		18		916	14	3	50	30	ε	
Fragmented forest		65	33	12	10 383	108	1 033	3 667	208	151
Shrubs		27	7	92	8	20 857	71	7 750	451	138
Short fallow		49	24	71	65	2	4 643	1 310	57	
Other land cover		89	1	2	152	233	675	10 894	100	83
Water		79	18	5	17	2	18	339	760	
Plantations					1			26		659

**Standard errors - Area transition matrix 1990-2000**

(thousand hectares)		Land cover classes in 2000								
		Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other Land Cover	Water	Plantations
Land cover classes in 1990										
Closed canopy forest		44 589	65	236	884	566	471	9 348	93	35
Open canopy forest		2	9 706	ε	503	238	18	638	27	15
Long fallow		433	49	938	42	12	37	990	ε	
Fragmented forest		109	139	15	10 685	55	91	1 416	24	136
Shrubs		18	50	11	2	19 149	38	2 635	1 728	20
Short fallow		69	30	105	387	10	5 272	996	1	
Other land cover		145	22	119	874	1 055	3 333	21 708	260	58
Water		5	15		6	619	19	244	1 752	
Plantations					13	6		123		875

**Table 58. Forest area and area matrices - Brazil (subregion code 35)**
**Forest area**

	Forest definition f1				Forest definition f2				Forest definition f3				
	Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		Absolute forest cover		Relative forest cover		
	(thousand hectares)		(%)		(thousand hectares)		(%)		(thousand hectares)		(%)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI
<b>1980</b>	413 195	32 686	66	5	454 005	27 830	72	4	460 669	27 385	73	4	[65;82]
<b>1990</b>	381 430	37 819	60	6	417 347	34 185	66	5	425 499	33 047	67	5	[57;78]
<b>2000</b>	349 560	44 177	55	7	382 847	41 009	61	7	389 719	40 637	62	6	[49;74]

**Forest area change (10-years periods)**

(thousand hectares)	Forest definition f1				Forest definition f2			Forest definition f3			
	Deforestation	Net forest area change			Deforestation	Net forest area change		Deforestation	Net forest area change		
	Mean	Mean	SE		Mean	Mean	SE	Mean	Mean	SE	95%CI
<b>1980-1990</b>	32 194	-31 765	8000		37 185	-36 658	8402	35 935	-35 170	7778	[-50,416;-19,924]
<b>1990-2000</b>	32 817	-31 870	9501		36 156	-34 500	9767	37 564	-35 780	10756	[-56,862;-14,698]

**Annual forest change (net area change and deforestation rate)**

	Forest definition f1				Forest definition f2				Forest definition f3				
	<b>Annual forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		<b>Annual net forest area change</b> <i>(thousand hectares)</i>		<b>Deforestation rate r</b> <i>(%)</i>		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	95%CI		
<b>1980-1990</b>	-3 177	800	0.77	0.23	-3 666	840	0.81	0.22	-3 517	778	0.76	0.20	[0.37;1.16]
<b>1990-2000</b>	-3 187	950	0.84	0.31	-3 450	977	0.83	0.28	-3 578	1 076	0.84	0.30	[0.26;1.42]