

APPENDIX 5 – Zambia

Table A5.1. Carbon debt calculation of Zambia case

Carbon debt due to conversion of miombo			estimates					references				
Aboveground carbon stock loss	24.0	Mg C ha ⁻¹	19	6.8	9.8	35.4	36.5	14.2	32.5	37.5	(Chidumayo 2002, Chidumayo and Kwbisa 2003, Williams et al. 2008, Romijn 2010)	
-9% forest products (50 years)	2.2	Mg C ha ⁻¹										
subtotal	21.8	Mg C ha⁻¹									(Romijn 2010)	
Belowground carbon stock loss											(Romijn 2010)	
biomass	7.9	Mg C ha ⁻¹	33%									
soil C stock	57.9	Mg C ha ⁻¹									(Williams et al. 2008)	
soil C stock loss			33%	23%	42%						(Williams et al. 2008)	
biomass and soil C stock	80.0	Mg C ha ⁻¹									(Walker and Desanker 2004)	
biomass and soil C stock loss			47%								(Walker and Desanker 2004)	
subtotal	29.4	Mg C ha⁻¹										
Carbon stocked in oil Jatropha plantation											(Achten 2010)	
aboveground	8.4	Mg C ha ⁻¹										
belowground	2.5	Mg C ha ⁻¹	30%								(Achten 2010, Reubens et al. 2010)	
subtotal	10.9	Mg C ha⁻¹										
Conservative (500 kg/ha.yr)	1.8											
Estimation (1000 kg/ha.yr)	3.6											
Optimistic (1500 kg/ha.yr)	5.5											
Total carbon debt		Mg C ha⁻¹	C	E	O							
		Mg CO₂ ha⁻¹	49.4	47.6	45.8							
			181.7	175.0	168.3							

Table A5.1. continued Carbon debt calculation of Zambia case

Carbon debt due to conversion of fallow

			estimates			references
Aboveground carbon stock loss (8-11 years)	6.7	Mg C ha⁻¹				(Williams et al. 2008)
			0.7		<i>Mg C ha⁻¹ yr⁻¹</i>	
Belowground carbon stock loss biomass + soil (Fallow)	44.9	Mg C ha ⁻¹				(Walker and Desanker 2004)
biomass + soil (Agriculture)	42.4	Mg C ha ⁻¹				(Walker and Desanker 2004)
subtotal (loss)	2.5	Mg C ha⁻¹				
Carbon stocked in oil Jatropha plantation aboveground	8.4	Mg C ha ⁻¹				(Achten 2010)
belowground	2.5	Mg C ha ⁻¹		30%		(Achten 2010, Reubens et al. 2010)
subtotal	10.9	Mg C ha⁻¹				
Conservative (500 kg/ha.yr)	1.8					
Estimation (1000 kg/ha.yr)	3.6					
Optimistic (1500 kg/ha.yr)	5.5					
Total carbon debt		Mg C ha⁻¹	C	E	O	
		Mg CO₂ ha⁻¹	7.3	5.5	3.7	
			26.9	20.2	13.6	

Carbon debt due to conversion of cropland

Total carbon debt			C	E	O	
biomass	-13.4	Mg C ha ⁻¹	-2.2	-4.5	-6.7	ENCOFOR tool (IPCC 2006)
soil C (20 yr)	-4.44	Mg C ha ⁻¹				
Total carbon debt	-17.8	Mg C ha⁻¹	-6.7	-8.9	-11.1	
		Mg CO₂ ha⁻¹	-24.5	-32.7	-40.9	

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