

APPENDIX 3 - Ghana

Table A3.1. Carbon debt calculation of Ghana case

Carbon debt due to conversion of open to closed forest in Ghana			estimates		references
Loss of biomass carbon stock					
Aboveground + belowground carbon stock loss		Mg C ha ⁻¹	240	92.6	(Tan et al. 2009)
aboveground		Mg C ha ⁻¹	136	30	(Houghton and Hackler 2001)
belowground biomass			21.6%		(Fargione et al. 2008)
-9% forest products or trees left (50 years)			9%		(Fargione et al. 2008)
subtotal	121.6	Mg C ha⁻¹			
Loss of soil carbon stock					
carbon stock		Mg C ha ⁻¹	30.2	20.9	(Tan et al. 2009)
carbon loss			38.8%		(IPCC 2006)
subtotal	9.9	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 (2500 kg/ha.yr)	9.1				
Estimation (3000 kg/ha.yr)	10.9				
Optimistic (3500 kg/ha.yr)	12.7				
Total carbon debt		Mg C ha⁻¹	C	E	O
			122.4	120.6	118.8
		Mg CO₂ ha⁻¹	449.8	443.1	436.4

Table A3.1. continued Carbon debt calculation of Ghana case

Carbon debt due to conversion of fallow land			estimates			references
Loss of biomass carbon stock	46.8	Mg C ha ⁻¹				(Tan et al. 2009)
subtotal	46.8	Mg C ha⁻¹				
Loss of soil carbon stock						
carbon stock	21.4	Mg C ha ⁻¹				(Tan et al. 2009)
carbon loss			38.8%			(IPCC 2006)
subtotal	8.3	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 (2500 kg/ha.yr)	9.1					
Estimation (3000 kg/ha.yr)	10.9					
Optimistic (3500 kg/ha.yr)	12.7					
Total carbon debt		Mg C ha ⁻¹	C	E	O	
		Mg CO₂ ha⁻¹	46.0	44.2	42.4	
			169.0	162.4	155.7	
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Carbon debt due to conversion of agricultural land						
Total carbon debt			C	E	O	
biomass	-13.4	Mg C ha ⁻¹	-11.1	-13.4	-15.6	ENCOFOR tool
soil C (20 yr)	-3.7	Mg C ha ⁻¹				(IPCC 2006)
Total carbon debt	-17.0	Mg C ha⁻¹	-14.8	-17.0	-19.3	
	-62.6	Mg CO₂ ha⁻¹	-54.4	-62.6	-70.7	

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