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REDD-PAC

REDD+ Policy Assessment Centre

Project under the International Climate Initiative of the Federal Ministry

for the Environment, Nature Conservation,

Building and Nuclear Safety (BMU), Germany

DELIVERABLE 2.1.4

Model ready driver and REDD+ policy database

DRAFT v.1.0

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REDD-PAC Partner Information

List of Beneficiaries / Deliverable Lead				
Beneficiary Number	Beneficiary name	Beneficiary short name	Country	Deliverable Lead
1 (Coord.)	International Institute for Applied Systems Analysis	IIASA	Austria	X
2	United Nations Environment Programme World Conservation Monitoring Centre	UNEP-WCMC	UK	
3	Instituto Nacional de Pesquisas Espaciais	INPE	Brazil	
4	Central African Forest Commission	COMIFAC	Cameroon	

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GLOBIOM Default Data



The following section presents the database underlying the GLOBIOM default version.

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
GLOBIOM default data									
<u>1. Land characteristics</u>									
1.1. Topography									
Soil	GEOBENE Soil	6 classes: sandy, loamy, clay, stony, peat, no-soil	Dominant soil class represents most frequent soil class of DSMW soil mapping unit assigned to global grid pixel by intersection of global grid centroid lattice and original DSMW layer. Soil typological units of the particular DSMW soil mapping unit were classified into five pre-defined soil classes. Based on WISE (Batjes, 2006, ISRIC) soil profile data on aggregated soil texture classes (coarse, medium and heavy texture) sandy, loamy and clay soil classes were interpreted; soil typological units classification was applied for stony and peat soil classes interpretation.	Skalsky et al. (2008), GEOBENE project: global database for bio-physical modeling v. 1.0;	2008	5 arc minutes	Raster		
Slope	GEOBENE Slope	7 classes of degree intervals	Temporary raster used for calculations was interpreted from original SRTM and GTOPO30 data as follows. The SRTM data calculated slopes at 3" spatial resolution were grouped into the classes 0°- 3°, 3°-6°, 6°-10°, 10°-15°, 15°-30°, 30°-50° and >50°. For the 30" resolution raster zonal majority procedure was done to get the 60 N to 60 S extent raster of slope classes. To fill up the missing regions from 60°N to 90°N and 60°S to 90°S a slope raster with the GTOPO30 was calculated. The region 60°N to 60°S was covered by both SRTM and GTOPO30 derived slope data. This overlapping region was used to create a look-up table which allowed transforming the slope from the GTOPO30 to the slope class shares of the SRTM and fill up the missing regions.	Skalsky et al. (2008), GEOBENE project: global database for bio-physical modeling v. 1.0	2008	5 arc minutes	Raster		
Altitude	GEOBENE Altitude	5 classes of elevation intervals (meters above a sea level)	Dominant altitude class was calculated by raster algebra as a zonal majority value of pre-classified GTOPO30 raster altitude class over a one global grid pixel area. Classes have been defined as following: 1 (0 – 300), 2 (300 – 600), 3 (600 – 1100), 4 (1100 – 2500), 5 (> 2500).	Skalsky et al. (2008), GEOBENE project: global database for bio-physical modeling v. 1.0	2008	5 arc minutes	Raster		
1.2. Climate									
Climate	ECWMF climate data	Celsius degree for temperature	Global daily weather (further referred as ECWMF) was used to calculate monthly statistics required by EPIC weather generator.	The European Centre for Medium-Range Weather Forecasts, Reading, United	1960-1990	2.5 arc minutes	Raster		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
-	Tyndall climate data	Celsius degree for temperature and mm for precipitation	Global historical time series of global weather for the period from 1901 – 2000. Climate data on cloud cover, diurnal temperature range, precipitation, temperature, vapor pressure.	Mitchel et al. (2004), Tyndall Centre for Climate Change Research of University of East Anglia, Norwich, UK	1901-2000	30 arc minutes			
-	Agro-Ecological zones (AEZ)	3 classes	The Agro-ecological zones are based on temperature and length of growing period (LGP), the number of days per year during which crop growth is possible. Arid and semi-arid, LGP ≤ 180 days, Humid and sub-humid, LGP > 180 days and Tropical highlands or temperate. Temperate regions are defined as those with one month or more with monthly mean temperature, corrected to sea level, below 5 °C. Tropical highlands are defined as those areas with a daily mean temperature, during the growing period, of between 5 and 20 °C.	Herrero et al. (2013) adapted from Robinson T, et al. (2011), Food and Agriculture Organisation (FAO), Roma, Italy	2013	1km			
1.3. Vegetation									
Land cover	GLC 2000	21 land cover classes	Based on SPOT 4 VEGETATION 1 program satellite imagery (http://www.cnes.fr/web/1468-vegetation.php) using Land Cover Classification System of FAO (Di Gregorio et Jansen 2000)	Institute for Environment and Sustainability- Joint Research Center (IES-JRC), Ispra, Italy, (http://www.gvm.jrc.it/glc2000/defaultGLC2000.htm).	2000	32 arc minutes horizontal resolution (approximately 1 km at the equator)	raster		
1.4. Transportation									
Roads and Railways	Digital Chart of the World	n.a.	The Digital Chart of the World is a comprehensive 1:1,000,000 scale vector basemap of the world. The charts were designed to meet the needs of pilots and air crews in medium-and low-altitude en route navigation and to support military operational planning, intelligence briefings, and other needs.	US Defense Mapping Agency's (DMA) Operational Navigation Chart (ONC) series produced by the United States, Australia, Canada, and the United Kingdom.		1:1M	vector		
Navigable rivers	CIA World Data Bank II	n.a.	The original World Databank II is a vector dataset produced in the 1980s by the CIA. It includes world coastlines, rivers, and political boundaries, and has over five million points.	Central Intelligence Agency (CIA), USA	Ca. 1990	n.a.	vector		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
1.5. Administrative units									
Country and sub-national administrative units	Global Administrative Regions Layer (GAUL)	n.a.	Countries are identified both by country name and country code which can be easily compared with official United Nations coding list of countries and world regions (http://unstats.un.org/unsd/methods/m49/m49.htm). 2 levels of sub-national administrative units are available.	Food and Agriculture Organisation (FAO), Roma, Italy and European Commission	version 2007	n.a.	vector		
1.6. Population									
Cities	Global Rural-Urban Mapping Project (GRUMP, 2004)	number of inhabitants; inhab./km2	GRUMPv1 consists of eight global data sets: population count grids, population density grids, urban settlement points (>5000 hab), urban-extents grids, land/geographic unit area grids, national boundaries, national identifier grids, and coastlines. The population density and population count grids build on SEDAC's Gridded Population of the World, Version 3 data set (GPWv3), which does not distinguish between urban and rural areas. GRUMPv1 identifies urban areas based in part on observations of lights at night collected by a series of Department of Defense meteorological satellites over several decades.	NASA Socioeconomic Data and Applications Center (SEDAC), CIESIN, Columbia University, USA	2000, 1995, and 1990	30 arc-seconds	raster		
Population number	FAO Population	number of inhabitants	The FAOSTAT Population module contains time series data on population, including urban/rural, labour force, agricultural and economically active population. The series consist of both estimates and projections for different periods as available from the original sources, namely: Population data come from the UN Population Division and economically active population from the ILO. Long term series estimates and projections are available from 1980 to 2020.	Food and Agriculture Organisation (FAO), Roma, Italy	2000	Country	excel, csv		
<u>2. Productive use of land</u>									
2.1. Crops									
Production	FAO crop production	Area Harvested in hectares; yield in hectogram/hectare; production in tonnes	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi-official and mirror data and estimates and calculated data from 1961 onwards.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2002	Country	excel, csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	IFPRI Spatial crop distribution	physical area in ha and production in tons	Estimated crop cultivation area and production for 20 globally most important crops or crop groups (wheat, rice, maize, barley, millet, sorghum, potatoes, sweet potatoes and yams, cassava, bananas and plantains, soybean, other pulses, sugar cane, sugar beet, coffee, cotton, other fiber crops, groundnuts, other oil crops). Estimations are done separately for the four agricultural production systems (high input - irrigated, high input - rainfed, low input - rainfed and subsistence management systems). Final dataset resulted from downscaling of many national and sub-national agricultural census data using additional spatial information.	You and Wood (2006), International Food Policy and Research Institute (IFPRI), Washington D.C., USA	2000	5 arc minutes	raster		
	EPIC spatial potential yields	ton/ha	The Environmental Policy Integrated Climate model (EPIC) is applied at global scale and simulates major biophysical processes in agricultural ecosystems (Williams, 1995). Potential biomass is adjusted to actual biomass through daily stress caused by extreme temperatures, water and nutrient deficiency or inadequate aeration. In GLOBIOM, EPIC simulations for 17 crops, 4 management systems and 103,000 spatial simulation units are included.	Erwin Schmid at the University of Natural Resources and Life Sciences (BOKU), Vienna, Austria		Simulation Unit	csv		
Input use	FAO Fertilizer use	ton nutrients	FAO provides statistics on total consumption of nutrients (Nitrogen, Phosphate, and Potash) only for selected countries and crops from 2002 onwards.	Food and Agriculture Organisation (FAO), Roma, Italy	2000	Country	csv		
	IFA Fertilizer use	ton nutrients per ha; ton nutrients	IFA provides data on crop and country specific fertilizer application rates and total country-level average nutrients consumption for Nitrogen, Phosphate and Potash (N, P ₂ O ₅ , K ₂ O).	International Fertilizer Industry Association (IFA)		Country	csv		
	FAO Water use	m ³ /year	Specific information on water management in agriculture, including irrigation areas statistics and water withdrawal by agriculture statistics. Country and crop specific irrigation calendar for the 90 countries of the world was used for global database as the source information on start and end days of crop planting and harvesting.	Food and Agriculture Organisation (FAO), Roma, Italy		Country	csv		
	EPIC spatial fertilizer and water requirements	ton nutrients and m ³	The Environmental Policy Integrated Climate model (EPIC) is applied at global scale and simulates major biophysical processes in agricultural ecosystems (Williams, 1995). Nitrogen and phosphorous fertilization rates are based on nutrients stress levels	Erwin Schmid at the University of Natural Resources and Life Sciences (BOKU), Vienna, Austria		Simulation Unit	csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
			(N-stress free days in 90% of the vegetation period). The upper limit of N application is 200 kg/ha/a and of irrigation 300 mm/a. Synthetic fertilizer use is therefore built in a bottom up approach, but upscaled to the IFA statistics on total fertilizer use per crop at the national level for the case where calculated fertilizers are found too low at the aggregated level.						
Production costs	Irrigation costs	USD/ha	Irrigation costs include capital costs and costs for operation and maintenance. Operation costs are composed of pressure-related energy costs in terms of energy prices by source [EIA, 2006; Metschies, 2005], and labor costs in terms of average agricultural wages per hour [IMF, 2007; World Bank, 2006]. Non-labor capital and maintenance costs differ between systems but are assumed to be globally identical. Using average discounted annual capital costs per spatial unit for sprinklers [Reinbott, 2005] and additional information on technical and economic comparisons of sprinkler, drip, and surface irrigation systems [Phocaidis, 2000], we determine cost ratios to derive average capital cost per year for each irrigation method. Maintenance cost was set to 5 % of capital cost for non-surface and furrow irrigation, and to 3 % for basin irrigation [Paul, 1997; Phocaidis, 2000].	Sauer et al. (2008)	2008	Simulation Unit	csv		
	Fertilizer price	USD per kg	U.S. farm prices of fertilizers from 1960 onwards (2 times per year April and September). Available for Anhydrous ammonia, nitrogen solutions, urea, ammonium nitrate, sulfate of ammonium, superphosphate, diammonium phosphate and potassium chloride. Recalculated on pure nutrients.	USDA (http://www.ers.usda.gov/D ata/FertilizerUse/ Table 7)	avg. 2001-2005	only for the U.S.A	csv		
2.2. Livestock									
Pasture productivity	CENTURY pasture productivity	ton dry matter/ha	The CENTURY model (Parton et al., 1993) was run globally to estimate native forage and browse and planted pastures productivity. It was initiated with 2000 year spin-ups using mean monthly climate from the Climate Research Unit (CRU) of the University of East Anglia with native vegetation for each grid cell. Plant community and land management (grazing) was based on growing-season grazing and 50 per cent forage removal. Areas under native vegetation that were grazed were identified using the map of native biomes subject to grazing and subtracting estimated	Havlik et al. (2013), International Livestock Research Institute (ILRI), Nairobi, Kenya	2000	30 arc minutes	Raster		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
			crop area within those biomes in 2006. We assumed 50 per cent grazing efficiency for grass, and 25 per cent for browse for native grasslands.						
	EPIC pasture productivity	ton dry matter/ha	The Environmental Policy Integrated Climate model (EPIC) is applied at global scale and simulates major biophysical processes in agricultural ecosystems (Williams, 1995). Potential biomass is adjusted to actual biomass through daily stress caused by extreme temperatures, water and nutrient deficiency or inadequate aeration.	Erwin Schmid at the University of Natural Resources and Life Sciences (BOKU), Vienna, Austria	Ca. 2000	Simulation Unit	csv		
Livestock number	FAO live animals production	head	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi-official and mirror data and estimates and calculated data from 1961 onwards.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2006	Country	csv		
	FAO Gridded livestock of the world	Tropical Livestock Unit (TLU)	The maps are created through the spatial disaggregation of sub-national statistical data based on empirical relationships with environmental variables in similar agro-ecological zones. The first stage in the mapping process is to collect available subnational livestock statistics. Complete subnational population datasets for all livestock species are not available for all countries. Therefore these incomplete datasets were, where possible, rectified by using data available for a higher administrative level. As a next step, the extent of land unsuitable for livestock production was delineated based on criteria such as protected areas, land cover, climate, topography and vegetation.	Wint W & Robinson T (2007), Food and Agriculture Organisation (FAO), Roma, Italy	2000	3 arc minutes (approximately 5 km at the Equator)	raster		
Livestock feed	FAO feed demand	ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi-official and mirror data and estimates and calculated data from 1961 onwards. In Supply and Use Account (SUA) data.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2006	Country	csv		
	RUMINANT input coefficient	ton/TLU	Feed rations in GLOBIOM are defined with the digestion model RUMINANT, consisting of grass, stovers, feed crops aggregates, and other feedstuffs.	Herrero et al. 2008		Country	csv		
Meat and milk production	FAO production livestock primary	ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi-official and mirror data and estimates and calculated data from 1961 onwards.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2006	Country	csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	RUMINANT output coefficient	ton/TLU	Outputs include four meat types, milk, and eggs by animal type and production system.	Herrero et al. 2008	2008	Country	csv		
2.3. Managed forests									
Mean annual increment	G4M Increment	m3/ha	The mean annual increment is calculated by multiplying the estimated carbon uptake and a transformation factor which brings the carbon weight to a wood volume. The carbon uptake is calculated by multiplying the net primary production (NPP) with a factor describing the share of carbon uptake from the net primary production set-up to 35%.	Kinderman et al. (2006), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria based on NPP from MODIS.	ca 2000	30 arc minutes	Raster		
Costs of production	G4M costs of production	USD/ha	The planting costs are calculated by multiplying the planting costs of the reference country with a price index and a factor which describes the share of natural regeneration. The price index is calculated using the purchasing power parity of the respective countries. The stumpage wood price is calculated from the harvest cost free income range of wood in the reference country. This price is at the lower bound when the population density is low and the forest share is high and at the higher bound when the population density is high and the forest share is low. The price is also multiplied with a price index converting the price range from the reference country to the examined country.	Kinderman et al. (2006), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	not known	30 arc minutes	Raster		
2.4. Short rotation plantations (SRP)									
Suitable area	SRP suitable area	ha	The estimation of area potentials for biomass plantations followed an approach proposed by Zomer et al. (2008). It included thresholds of tree growth based on aridity, temperature, elevation, population density, and existing land cover.	Havlik et al. (2010), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2010	30 arc minutes	Csv, Raster		
Potential NPP	SRP NPP	m3/ha	The NPP values were based on potential NPP from Cramer et al. (1999). The NPP, truncated for the highest values corresponding to 5% of area in each region, was then used to scale the maximum mean annual increments derived from FAO and other various databases proportionally for each SimU providing finally the SimU specific potentials.	Havlik et al. (2010), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2010	30 arc minutes	Csv, Raster		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
Production costs	SRP production costs	USD/ha	Sapling cost for manual planting (Carpentieri et al., 1993; Herzogbaum GmbH, 2008), labour requirements for plantation establishment (Jurvélius, 19997), average wages (ILO, 2007), unit cost of harvesting equipment and labour (FPP, 1999; Jiroušek et al., 2007; Stokes et al., 1986; Wang et al., 2004), slope factor (Hartsough et al., 2001), ratio of mean PPP adjustment (Heston et al., 2006).	Havlik et al. (2010), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2010	variable	Csv		
2. <u>Markets</u>									
3.1. Consumption									
	FAO Food demand	ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi- official and mirror data and estimates and calculated data from 1961 onwards. Commodity balances (or Supply and Use Account-SUA) are expressed in crops primary equivalent.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2003	Country	csv		
	FAO Feed demand	ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi- official and mirror data and estimates and calculated data from 1961 onwards. Commodity balances (or Supply and Use Account-SUA) are expressed in crops primary equivalent. Feed demand is not specified by animal in FAO statistics.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2004	Country	csv		
	USDA Own-price elasticity of food demand	n.a.	In a 2003 report, International Evidence on Food Consumption Patterns, ERS economists estimated income and price elasticities of demand for broad consumption categories and food categories across 114 countries using 1996 International Comparison Program (ICP) data. This report updates that analysis with an estimated two-stage demand system across 144 countries using 2005 ICP data. Food sub-categories are: Bread and cereals, Meat, Fish, Dairy products, Fruits and vegetables, Oils and fats, Beverages and tobacco and Other food products.	Muhammad et al. (2011), USDA	2005	Country	csv		
3.2. Prices									
	FAO Producer prices	USD/ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi- official and mirror data and estimates and calculated data from 1991 onwards. Producer prices are annual prices received by farmers as collected at the farm-gate or at the first point of sale at 2004-2006	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2006	Country	csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
International Dollar Prices.									
3.3. Trade									
	FAO Net exports	ton	FAOSTAT provides wide range of country specific agricultural statistics. This includes time series of official data, semi- official and mirror data and estimates and calculated data from 1961 onwards. Commodity balances (or Supply and Use Account-SUA) are expressed in crops primary equivalent.	Food and Agriculture Organisation (FAO), Roma, Italy	avg. 1998-2006	Country	csv		
	BACI Bilateral trade flows	ton	BACI provides bilateral values and quantities of exports at the HS 6-digit product disaggregation, for more than 200 countries since 1995. It is updated every year. Original data are provided by the United Nations Statistical Division (COMTRADE database). Original procedures have been developed to reconcile data reported by almost 150 countries to the United Nations Statistics Division.	Gaulier and Zignago (2009), CEPII, Paris, France (http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1#sthash.l4bZIUno.dpuf)	1995-2009	Country	csv		
	MACMapHS 6-v1 tariff database	USD/ton	It provides information about customs tariffs (including tariff preferences) applied by 191 countries and faced by 239 countries and territories at the HS 6-digit product disaggregation level.	Bouet et al. (2008), International Trade Center (ITC), the United Nations Conference on Trade and Development (UNCTAD), the World Trade Organization (WTO), Geneva) and the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII, Paris)	2008	Country	csv		
	International freight costs	USD/ton	Hummels et al. (2001) have estimated the technological relationship between the ad-valorem freight rate and distance with a log-linear function that includes distance shipped, importer intercepts, and the weight to value ratio of the shipment to capture differences in transportability across goods from using freight rates and import flows from US, New Zealand, Argentina, Brazil, Chile, Paraguay and Uruguay. We use the estimated coefficients and the distance data compiled by the CEPII to compute bilateral transportation costs.	International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2001	Country	csv		
3.4. Processing									

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
Timber processing	4DSM model		Production costs for sawn wood and wood pulp	Rametsteiner et al. (2007), internal IIASA database and RISI database (http://www.risiinfo.com)	ca 2000	Simulation Unit	csv		
Bioenergy processing	Conversion coefficients and costs for energy		Conversion coefficients and costs for energy based on literature review (Biomass Technology Group, 2005; Hamelinck and Faaij, 2001; Leduc et al., 2008; Sørensen, 2005). For ethanol based on Hermann and Patel (2008). For biodiesel based on Haas et al. (2007).	Havlik et al. (2010), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	various	n.a.	csv		
4. Exogenous drivers									
4.1. Population and GDP growth									
	SSP database	% change compared to 2000	The SSP quantifications build upon the collaborative effort between the IAV and IAM community, which has met in a series of meetings and identified a limited set of five SSP storylines/narratives (O'Neill et al, 2012). The narratives describe the main characteristics of the SSP future development pathways. Currently, the database includes projections for population and economic development, which are the elements that are most used as basis of both integrated assessment and IAV studies. Specifically, for the following elements quantifications are available: population by age, sex, and education; urbanization; and economic development (GDP). For each SSP a single population and urbanization scenario is provided. For GDP, three alternative interpretations of the SSPs have been developed. The GDP projections are based on harmonized assumptions for the interpretation of the SSP storylines in terms of the main drivers of economic growth.	O'Neill et al (2012), IPCC, International Institute for Applied Systems Analysis (IIASA), the National Center for Atmospheric Research (NCAR), Organisation for Economic Co-operation and Development(OECD), Potsdam Institute for Climate Impact Research (PIK) (https://secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page=about)	up to 2100	32 regions	csv		
4.2. Bioenergy demand									
	WEO 2010 Bioenergy demand	Mtoe	Power generation, heat and electricity from modern and traditional biomass, 1st and 2nd generation biofuels demand. The central scenario is called the New Policies Scenario. It takes account of the broad policy commitments and plans that have been announced by countries around the world, to tackle either environmental or energy security concerns. In the Current Policies Scenario, no change in policies as of mid-2010 is assumed. The 450 Scenario sets out an energy pathway consistent with the goal to limit the increase in global temperature to 2°C.	World Energy Outlook (WEO), OECD/International Energy Agency (IEA), Paris, France	up to 2035	25 regions	csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Biofuel demand	1000 GJ	1st generation biofuel consumption per feedstock based on literature review	Lotze-Campen et al. (2014), PIK, Potsdam, Germany and International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	up to 2030	Country	csv		
4.3. Technological change									
	Crop Yield Growth	relative change compared to 2000	Linear extrapolation of past trend. Historical trend is estimated on the period 1980-2010 using FAOSTAT data, except for Eastern Europe and Former Soviet Union countries where we took the 1995-2010 period to take into account the change in farming structure during the 1990s.	Valin et al. (2013), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria based on FAOSTAT	n.a.	30 regions	csv		
	Livestock Breeding Improvement	relative change compared to 2000	Relative change in feed conversion efficiencies.	Bouwman et al. (2005)	n.a.	30 regions	csv		
4.4. Food diets									
	Calorie consumption shifter	relative change compared to 2000	The shifters for calorie consumption from one period to another are defined at the level of nine aggregated commodity categories – cereals, roots, sugar, pulses, oilseeds, ruminant meat, non-ruminant meat milk and eggs.	Alexandratos et al. (2006), Food and Agriculture Organisation (FAO), Roma, Italy	up to 2050		csv		
	Own-price elasticity		Elasticity trajectories over time reflect Engel's curves in line with evolution of diet such as projected by FAO (Alexandratos et al., 2006).		up to 2050		csv		
5. GHG accounting									
5.1. Land use change									
	FRA Forest living biomass	ton carbon per ha	Global Forest Resources Assessment (FRA) is based on two primary sources of data: Country Reports prepared by National Correspondents and remote sensing that is conducted by FAO together with national focal points and regional partners and is produced every 5 to 10 years.	Food and Agriculture Organisation (FAO), Roma, Italy	2005	Country			
	G4M Forest living biomass	ton carbon per ha	Downscaling of FRA2005 forest growing stock, biomass and carbon stock values using a relationship between net primary productivity (NPP) and biomass and the relationship between human impact and biomass.	International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2005	30 arc minutes			

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Biomass carbon stored in above and belowground living vegetation	ton carbon per ha	Carbon in above and below living biomass is used in GLOBIOM. Global map of biomass carbon stored in above and belowground living vegetation created using the International Panel on Climate Change (IPCC) Good Practice Guidance for reporting national greenhouse gas inventories. 2 main steps: 1) estimate carbon stocks in 124 carbon zones or regions, and 2) map values using a range of spatially-explicit climate and vegetation datasets. It is used for carbon stock from grasslands and other natural vegetation in GLOBIOM.	Ruesch and Gibbs (2008) (http://cdiac.ornl.gov/epubs/ndp/global_carbon/carbon_documentation.html), Center for Sustainability and the Global Environment (SAGE), University of Wisconsin-Madison, USA	2008	1 kilometer by 1-kilometer resolution			
5.2. Livestock									
	Methane (CH4) from enteric fermentation	tCO2	CH4 from enteric fermentation is a simultaneous output of the feed-yield calculations in the RUMINANT model, as well as nitrogen content of excreta and the amount of volatile solids.	Herrero et al. (2013), International Livestock Institute, Nairobi, Kenya and International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	ca 2010			Country	
	Nitrogen (N2O) and methane (CH4) from manure management	tCO2	The assumptions about proportions of different manure management systems, manure uses, and emission coefficients are based on detailed literature review.	Herrero et al. (2013), International Livestock Institute, Nairobi, Kenya and International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	ca 2010			Country	
	Nitrogen (N2O) from excreta on pasture	tCO2	The assumptions about proportions of different manure management systems, manure uses, and emission coefficients are based on detailed literature review.	Herrero et al. (2013), International Livestock Institute, Nairobi, Kenya and International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	ca 2010			Country	
5.3. Crops									
	Nitrogen (N2O) fertilization emissions	kg CO2/ha	From both synthetic fertilizer and organic fertilizers. Synthetic fertilizers are calculated on a Tier 1 approach, using the information provided by EPIC on the fertilizer use for each management system at the simulation unit level and applying the emission factor from IPCC AFOLU guidelines. Organic fertilizer emissions are calculated with RUMINANT, following a methodology similar to what was applied for livestock allocated emissions.	IPCC Guidelines, 1996	ca 1995	n.a.	pdf		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Methane (CH ₄) emissions from rice cultivation	ton CO ₂ /ha	In the case of rice, we apply a Tier 1 approach, with a simple formula where emissions are proportional to the area of rice cultivated.	EPA, 2006	ca 1995	n.a.	pdf		
5.4. Biofuel									
	Carbon savings/emission coefficients	kg CO ₂ /MJ	Carbon accounting of bio fuels including substitution effects	CONCAWE/JRC/EUCAR (2007) , Renewable Fuels Agency (2008)	ca 2008	n.a.			
<u>6. Biodiversity and conservation</u>									
6.1. Species									
	IUCN species list		This dataset contains distribution information of species assessed for The IUCN Red List of Threatened Species™. The maps are developed as part of a comprehensive assessment of global biodiversity in order to highlight taxa threatened with extinction, and thereby promote their conservation. The data are extent of occurrence polygons.	IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. http://www.iucnredlist.org .	Various from 1979-2014	n.a.	Vector	IUCN	
6.2. KBAs									
	KBA		Key Biodiversity Areas are globally significant sites for biodiversity conservation identified using universal standards. They include Important Bird Areas (IBAs), Important Plant Areas (IPAs), Important Sites for Freshwater Biodiversity, Ecologically and Biologically Significant Areas (EBSAs) in the High Seas and Alliance for Zero Extinction (AZE) sites.	BirdLife International and Conservation International, July 2013. (mapping@birdlife.org)	ca 2005	n.a.	Vector	BirdLife International and Conservation International	
<u>7. Validation of the results</u>									
7.1. Quantities									
	FAO Supply and Use Account (SUA) times series	ton or m ³	Production, consumption, exports, imports time series.	FAOSTAT, Food and Agriculture Organisation (FAO), Roma, Italy	1980-2010	Country	csv		
7.2. Land use									
	FAO harvested area times	ha	Harvested area by crop	FAOSTAT, Food and Agriculture Organisation (FAO), Roma, Italy	1980-2010	Country	csv		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	series								
	FAO land cover times series	ha	Land cover area LLCC classification	FAOSTAT, Food and Agriculture Organisation (FAO), Roma, Italy	1980-2010	Country	csv		
7.3. Emissions									
	UNFCCC		GHG data reported by Parties contain estimates for direct greenhouse gases, such as: CO2 - Carbon dioxide, CH4 - Methane, N2O - Nitrous oxide, PFCs - Perfluorocarbons, HFCs - Hydrofluorocarbons, SF6 - Sulphur hexafluoride as well as for the indirect greenhouse gases such as SO2, NOx, CO and NMVOC.	United Nations Framework convention on Climate Change (UNFCCC), Bonn, Germany	2012	Country	csv		

GLOBIOM Brazil Data



The following section presents the GLOBIOM Brazil database.

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
Brazil Data									
<u>1. Land characteristics</u>									
1.3. Vegetation									
Biomes	6 biomes		Brazilian biomes (official definition)	IBGE ; Description: http://www.ibge.gov.br/home/presidencia/noticias/21052004biomashtml.shtml ; Download at ftp://geofpt.ibge.gov.br/mapas_tematicos/mapas_murais/shapes/biomas/		25 km x 25 km	Vector	licensed as Creative Commons License Attribution Share Alike (CC-BY-SA)	
Forest-non forest mask	n.a.		Data from the PRODES project, which maps annual complete removal of forest cover in the Amazonia biome	INPE; See document describing the methodology in http://www.obt.inpe.br/prodes/metodologia_TaxaProdes.pdf	2002-2012	25 km x 25 km	Raster	CC-BY-SA	
Land cover/use on deforested areas	6 LC-classes		Data from the TerraClass project, that identifies land use in deforested areas	INPE/EMBRAPA; http://www.inpe.br/cra/ingles/project_research/terraaclass2008.php	2008 and 2010	25 km x 25 km	Raster	CC-BY-SA	
SOS Mata Atlântica Forest Maps	n.a.		Forest maps for the Mata Atlântica biome. These maps can be combined with other sources for forest information, to improve the consolidated forest maps for Brazil.	SOS Mata Atlântica (www.sosma.org.br)	2012	25 km x 25km	Vector		
IBGE vegetation map	Various LC-classes		Vegetation maps according to IBGE, based on analysis on satellite images, and based on field work	IBGE	2002	25 km x 25km	Vector		
Land cover for Brazil	Various LC-classes		Land cover/land use for Brazil, using the MODIS MCD12Q1 product, with additional classes for agriculture (single and double cropping) and sugarcane for years 2001, 2006 and 2010	NASA/INPE	2001-2010	25 km x 25km	Raster	NASA is PD; INPE is licensed as CC-BY-SA	
Deforestation	n.a.		Results from time-series analysis of 654,178 Landsat images in characterizing forest extent and change, 2000–2012. Trees are defined as all vegetation taller than 5m in height and are expressed as a percentage per output grid cell as '2000 Percent Tree Cover'. 'Forest Loss' is defined as a stand-replacement disturbance, or a change from a forest to non-	Hansen et al 2013 "High-Resolution Global Maps of 21st-Century Forest Cover Change" Science, Maryland University. http://earthenginepartner	2000-2012	30m	Raster	Creative Commons Attribution 4.0 International License.	Used within the Brazil Atlas report

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
			forest state. 'Forest Gain' is defined as the inverse of loss, or a non-forest to forest change entirely within the study period. 'Forest Loss Year' is a disaggregation of total 'Forest Loss' to annual time scales.	s.appspot.com/science-2013-global-forest					
1.4. Transportation									
	Roads & Railways	n.a.	Transportation map for whole Brazil	Brazil Ministry of Transportation - PNLT Data (National Plan for Transportation Logistics) – 2010	2010	25 km x 25km	Vector	CC-BY-SA	
	Ports	n.a.	Location of main export ports	Same as above	2010	25 km x 25km	Vector	CC-BY-SA	
	Distance to nearest port	n.a.	Road distance to nearest port (calculated using minimum distance algorithms)	Same as above	2010	25 km x 25km	Vector	CC-BY-SA	
<u>2. Productive use of land</u>									
2.1. Crops									
	Total planted area (census)	ha	Temporary and permanent area for crops, based on Census data	Temporary and permanent area for crops, based on Census data	2006	10 x 10 km	Raster	CC-BY-SA	
	Private forest reserve	%	Area of forest reserve inside farms to comply with Forest Code, based on Census data	Area of forest reserve inside farms to comply with Forest Code, based on Census data. Available for download: http://www.csr.ufmg.br/forestcode/	2006	60m	Raster	CC-BY-SA	
	Total Planted area (PAM)	ha	Temporary and permanent area for crops, based on Agrarian Production Estimates (PAM)	Temporary and permanent area for crops, based on Agrarian Production Estimates (PAM)	2000, 2010	10 x 10 km	Vector	CC-BY-SA	
	Planted area GLOBIOM crops (PAM)	ha	Area for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	Area for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	2000, 2010	10 x 10 km	Vector	CC-BY-SA	
	Harvested	ha	Temporary and permanent area(total) and area for	Temporary and permanent	2000,	10 x 10	Vector	CC-BY-SA	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	area		GLOBIOM crops, based on Agrarian Production Estimates (PAM)	area(total) and area for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	2010	km			
	Production Value	Real	Value of production for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	Value of production for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	2000, 2010	10 x 10 km	Vector	CC-BY-SA	
	Crop productivity	Tons/ha	Productivity for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	Productivity for GLOBIOM crops, based on Agrarian Production Estimates (PAM)	2000, 2010	10 x 10 km	Vector	CC-BY-SA	
	Property size	Ha	Area for farm per size class (Census)	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
	Property numbers	n.a.	Number of farms per size class (Census)	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
	Land price	Real/ha	Land price per municipality	Agriannual	2003, 2007, 2008	10 x 10 km	Raster	CC-BY-SA	
	Agrarian settlements	ha	Area and number of settlements	INCRA	2006	10 x 10 km	Raster	CC-BY-SA	
2.2. Livestock									
	Grazed Area (census)	ha	Pasture area, based on Census data	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
	Livestock number	heads	GLOBIOM herds based on Livestock Production Estimates (PPM)	IBGE	Annual data from 2000 to 2010	10 x 10 km	Raster	CC-BY-SA	
	Property size	ha	Area for farm per size class (Census)	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
	Property numbers	n.a.	Number of farms per size class (Census)	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
	Land price	Real	Land price per municipality	Agriannual	2003,	10 x 10	Raster	CC-BY-SA	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Agrarian settlements	ha	Area and number of settlements	INCRA	2006	10 x 10 km	Raster	CC-BY-SA	
2.3. Managed forests									
	Planted forest area	ha	Planted forest derived from Agricultural Census	IBGE	2006	10 x 10 km	Raster	CC-BY-SA	
<u>5. GHG accounting</u>									
5.1. Land use change									
	Above ground living biomass in Amazon Basin	ton carbon per ha	Above ground living biomass in Amazon Basin estimates from Saatchi et al. 2007	Saatchi et al. (2007). Distribution of aboveground live biomass in the Amazon basin. <i>Global Change Biology</i> , 13(4), 816-837.	2007	1km	Raster	Saatchi et al 2007	
	Forest Carbon stocks	ton carbon per ha	Map of carbon stocks in tropical forests from Saatchi et al. 2011	Saatchi et al (2011). "Benchmark map of forest carbon stocks in tropical regions across three continents." <i>Proceedings of the National Academy of Sciences</i> 108, no. 24 (2011): 9899-9904.	2011	1km	Raster	Saatchi et al 2011	
	Carbon emissions from deforestation	ton carbon per ha	Carbon density (Mg C ha ⁻¹) of aboveground live woody vegetation for the pan-tropics (including tropical Africa, America and Asia) at a spatial resolution of 500 m using a combination of remote sensing and field data (for the period 2007–2008; Fig. 1). Field measurements were collected from forests across tropical Africa, America and Asia from 2008 to 2010 at sample points co-located with LiDAR ‘footprints’ using a sampling protocol specifically designed for the optimal integration of field and satellite data.	Baccini et al (2012). "Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps." <i>Nature Climate Change</i> 2, no. 3 (2012): 182-185.	2010	500m	Raster	Baccini et al 2012	
<u>6. Biodiversity and conservation</u>									
6.1. Species									
	Species ranges	n.a.	Distribution information on species collected by ICMBio, Brazil. The dataset is not yet completed but will be included	Instituto Chico Mendes (ICMBio)	2014	n.a.	Vector	CC-BY-SA	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
			once it is.	http://www.icmbio.gov.br/portal/					
6.2. Biodiversity priority areas									
Biodiversity Priority Areas	n.a.		Areas identified by MMA as priorities for biodiversity conservation through a consultative process. (It is currently in the process of being updated and the updated data will be included when available).	Ministry of Environment (MMA) Data available online from: http://mapas.mma.gov.br/i3geo/database/download.htm	2007	n.a.	Vector	CC-BY-SA	
Areas of restoration potential	n.a.		Areas of high potential for restoration within the Mata Atlantica biome.	Cunha, A.A. and Guedes, F.B. 2013 Mapeamentos para conservacao e recuperacao da biodiversidade na Mata Atlantica: em busca de uma estrategia especial integradora para orientar acoes aplicadas. MMA	2013	5000 ha	Polygons of equal size)	CC-BY-ND 3.0	Presented within the Brazil Atlas report, may not be used within the modelling assessments
Natural vegetation remnants	n.a.		Areas where vegetation, both forest and non-forest, is still present in its natural state.	Isabella Lorenzini (2014): All biomes vegetation remnants. CSR/UFMG. Data available online from: http://www.csr.ufmg.br/formulario/	2014	60m	Raster	CC-BY-SA	
<u>8. Policies</u>									
8.1. Targeted on forests and/or conservation									
Protected areas	n.a.		Protected areas according to IUCN classification and legal status in Brazil	Ministry of Environment (MMA)	Annual data from 2000 to 2010	25 x 25 km	Raster	CC-BY-SA	
Indigenous land	n.a.		Indigenous land according to legal status in Brazil	National Foundation for Indigenous People	2010	25 x 25 km	Raster	CC-BY-SA	
Planned protected areas	n.a.			Ministry of Environment (MMA)			Vector		
8.2. Not targeted on forests and/or conservation									

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
Planned Infrastructures		n.a.	Map of planned infrastructure for whole Brazil	Ministry of Planning.	2008	n.a.	Vector		

GLOBIOM Congo Basin Data



The following section presents the GLOBIOM Congo Basin database.

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
Congo Basin									
<u>1. Land characteristics</u>									
1.3. Vegetation									
Land cover	UCL Congo Basin 2010	20 land cover classes	The cornerstone of this research is to take most advantages of MERIS and SPOT VGT 15 time series in various ways and according to the persistence of cloud coverage. The land cover mapping methodology actually involves 4 steps: (a) selection and processing of seasonal composites, (c) stratification of the study area according to seasonality and cloud coverage, (b) unsupervised multispectral clustering of one or several composites for each stratum, (d) automatic pre-labelling and visual 25 interpretations and interactive editing of each stratum.	Verhegghen, A. et al., 2012. Mapping Congo Basin vegetation types from 300m and 1km multi-sensor time series for carbon stocks and forest areas estimation. Biogeosciences,9:5061-5079. Available at: http://www.biogeosciences.net/9/5061/2012/bg-9-5061-2012.html	2012	1km	Raster		
	UCL DRC 2000	18 vegetation classes	Only for Democratic republic of Congo (DRC), Semi-automatic processing method for vegetation mapping and seasonality characterization based on temporal and spectral information from SPOT VEGETATION time series. The floristic composition and physiognomy of each vegetation type are described using the Land Cover Classification System developed by the FAO. This mapping exercise delivers the first area estimates of seven different forest types, five different savannas characterized by specific seasonality behavior and two aquatic vegetation types.	Vancutsem, C. et al., 2009. Mapping and characterizing the vegetation types of the Democratic Republic of Congo using SPOT VEGETATION time series. International Journal of Applied Earth Observation and Geoinformation, 11:62-76. Available at: http://www.sciencedirect.com/science/article/pii/S0303243408000585	2000	1km	Raster		
	MODIS Collection 5	22 vegetation classes	Collection 5 NBAR data are produced on a rolling 8-day interval based on 16 days of MODIS surface reflectance data at a spatial resolution of 500-m. This change has two positive implications for the MLCT product. First, the availability of 500-m NBAR data provided the basis for increasing the spatial resolution of the MLCT product to 500-m in Collection 5. Second, because the MLCT algorithm aggregates 8-day values to 32-day averages, fewer missing values caused by clouds and other sources are present in the input features relative to Collection 4.	Friedl, M. A. et al., 2010. MODIS Collection 5 global landcover: Algorithm refinements and characterization of new datasets. Remote Sensing of Environment, 114:168–182. Available at: http://www.sciencedirect.com/science/article/pii/S0034425709002673	2008	500m	Raster		
	GlobCover	22 classes	The GlobCover initiative of ESA developed and	Defourny, P. et al., 2009. The first 300-	2005	300m	Raster		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	2005		demonstrated a service for the generation of global land cover maps, based on Envisat MERIS Fine Resolution (300 m) mode data. For maximum user benefit the thematic legend of GlobCover is compatible with the UN Land Cover Classification System (LCCS). The system is based on an automatic pre-processing and classification chain.	m Global Land Cover Map for 2005 using ENVISAT MERIS time series: a Product of the GlobCover System, in Proceedings of the 33rd International Symposium on Remote Sensing of Environment (ISRSE), Stresa, Italy.	- 2006				
	FACET DRC	4 forest classes, wetlands, and non-forest	The method used is the "wall-to-wall", a method developed jointly by the universities of South Dakota and Maryland. It is an adaptation of the approach of Hansen et al. (2008). MODIS Satellite data (Moderate Resolution Imaging Spectroradiometer) were used to pretreat the Landsat series, themselves used to characterize the extension and the loss of the forest cover. Landsat ETM + data were sampled at a spatial resolution of 60 meters. Mapping the extent and loss of forest cover by Landsat is severely limited to areas permanently covered by clouds. MODIS data were used to overcome this problem.	Mane et al., 2010. FACET-Forest Monitoring of Central Africa using remotely sensed data sets. Atlas of forest cover extent and loss in the Democratic Republic of Congo, 2000 to 2010. Observatoire Satellital des Forets d'Afrique Centrale (OSFAC) in collaboration with South Dakota State University and the University of Maryland.	2000, 2005, 2010	60m	Raster		
	Cameroon Agro-ecological zones	5 zones	This study treated the Soudano-sahelian zone, the elevated Guinean savannas, the Western high plateaus, the zone of monomodal humid forests and the zone of bi-modal humid forests	2eme rapport sur l'Etat des ressources phytogenetiques pour l'alimentation et l'agriculture au Cameroon, IRAD Mars 2008	2008		Raster		
	Ecoregions	n.a.	Coverage of the ecoregions in the Congo Basin	Olson et al 2001 Terrestrial ecoregions of the world: a new map of life on Earth, Bioscience 51(11) 933-938. Available for download at http://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world	2011	n.a.	Vector	Olson et al.	
1.4. Transportation									
Roads and Railways	Digital Chart of the World	n.a.	The Digital Chart of the World is a comprehensive 1:1,000,000 scale vector basemap of the world. The charts were designed to meet the needs of pilots and air crews in medium-and low-altitude en route navigation and to support military operational planning, intelligence briefings, and other needs.	US Defense Mapping Agency's (DMA) Operational Navigation Chart (ONC) series produced by the United States, Australia, Canada, and the United Kingdom.	n.a.		Vector		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	DRC Referentiel Geographique Commun (RGC)	n.a.	Contains the fields name of the road, name of the economic corridor, road category, road type /capacity and status of the road, train lines, navigable rivers and harbors; RGC is a data repository set up by both governmental and non-governmental institutions in DRC	http://www.rgc.cd/	2010	n.a.		vector	
<u>2. Productive use of land</u>									
2.1. Crops									
	Cameroon Production Statistics	Area Harvested in hectares, production in tonnes, number of production cycles	For 26 traditional food crops: pineapple, groundnuts, banana, plantain, cucumber, ginger, gombpo, bean, oil palm, igname, macabot, maize, cassava, millet/sorghum, niebe, onion, watermelon, sweet potato, chili, potato, rice, sesame, soybean, tomato, voandzou. For the modern sector: pineapple, banana, rubber, cotton, palm oil, tea, sugarcane, rice, only production by company.	AGRISTAT no. 13-17 Annuaire des statistiques du secteur agricole. Direction des Enquetes et statistiques agricoles, 2003, 2005, 2007; Annuaire Statistique du Cameroun (2011), Institut national de la statistique. Available through http://www.statistics-cameroon.org/	2000-2010	Departement	Excel		
	DRC Agricultural statistics	Production in tonnes	1999-2009 series the following crops: cassava, maize, sweet potatoes, millet, rice , potato, bean, igname, plantain, banana, groundnut. Wheat, sorghum, taro, niebe, peas, voandzou, soybean, sesame, oil palm, oranges, lemons, grapefruit, mango, papaya, avocado, pineapple, coffee, cocoa and tea only available at the country level. 2006-2011 series for the following crops: Corn, paddy rice, sorghum, cassava, potato, sweet potato, igname, beans, niébé, peas, pigeon pea, voandzou, ground nut, soy bean, banana, plantain, beer banana. Coffee, cocoa, tea, tobacco, palm oil, kernel oil, palm meal, cotton (fiber, oil , meal), quinquina, rubber only available at the country level	Statistiques de Production Agricole, serie 1999-2009 and 2006-2011, Service National des Statistiques Agricoles;	1999-2011	Province	pdf, Excel	(1999-2009 series) and district (2006-2011 series)	
	DRC Oil crop plantations	Area of crop plantations in DRC	For the following crops: Rubber, coffee, oil palm, cocoa. Comprises information on plantation area, name of plantation, name of concession holder, name of person or institution who issued the concession, abandoned (yes/no)	MOABI project. See: http://rdc.moabi.org/xredd_risk_map/en/	Ca. 2010	n.a.	Vector	MOABI project	
	Congo Basin	Area	Estimated crop cultivation area and production	Mosnier, International Institute for	2000	Simulati	Csv	IIASA	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Downscaled crop harvested area	harvested in ha	for the GLOBIOM crops. Final dataset resulted from downscaling of many national and sub-national agricultural census data using population distribution, internal transportation costs, and EPIC crop potential productivity.	Applied Systems Analysis (IIASA), Laxenburg, IIASA					on Unit
	DRC fallow time for extensive agriculture	years	Literature review of typical fallow times and factors which determine fallow times	Bokelo (2014): Analyse des principaux facteurs qui déterminent le temps de jachère en agriculture de subsistance en RDC. Internal report of the REDD-PAC project	2014	n.a.	pdf		
Production costs	CMR Fertilizer prices, taxes and costs	FCFA/tonne	Only for Cameroon.	www.fertilizercameroon.cm	2008, 2010	Cities	csv		
	Labor requirements	Days/ha/year	Activities: SF-food intercropping, LF-food intercropping, SF-intensive cocoa w/fruit, SF-intensive cocoa w/o fruit, FOR-extensive cocoa w/fruit, FOR-extensive cocoa w/o fruit, SF-oil palm, FOR-oil palm, community-based forest.	Kotto-Same et al., 2002 Table 17, Alternatives to Slash-and-Burn (ASB) Programme, ICRAF, Nairobi, Kenya	2002	Forest Margins Benchmark Area of southern Cameroon	pdf		
2.2. Livestock									
	DRC Live animal production	1000 heads	Divided by poultry, pork, sheep, goat, bovines. Available at the national level only for the 1985-2006 series; at the district level for the 2006-2011 series.	Etude du secteur agricole, Rapport préliminaire diagnostic et note d'orientation 2009, Tables 31 and 32, RDC, Ministère de la Pêche, Agriculture et Elevage (MINAGRI) (1985-2006 series); Statistiques de Production Agricole, serie 2006-2011, Service National des Statistiques Agricoles	1985-2011	National and Provincial (1985-2006 series); District level (2006-2011 series)	Excel		
	DRC meat production	tons	Same as above at the national level only. An indication on the bush meat production.	Etude du secteur agricole, Rapport préliminaire diagnostic et note d'orientation 2009, Table 31, RDC, Ministère de la Pêche, Agriculture et Elevage based on SNSA, MINAGRI	1985-2006	National	pdf		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	DRC prevalence of livestock diseases	Notation system	Degree of infection of livestock with production limiting diseases	Etude du secteur agricole, Rapport preliminaire diagnostic et note d'orientation 2009, Tables 36 -39, p.124. Ministere de la Peche, Agriculture et Elevage (MINAGRI)	2009	Province	pdf		
2.3. Managed forests									
	DRC Area under exploitation	n.a.	Artisanal logging permit, logging concession (CCF) signed, CCF awaiting signature, conservation concession; differentiation of exploited and non-exploited concessions	World Resource Institute (WRI) Forest Atlas for the Democratic Republic of Congo	2013	n.a.	vector		
	DRC round wood production	m3	Round wood production at the country level in the period 2005-2011.	Statistiques de Production Agricole, serie 2005-2011, Service National des Statistiques Agricoles	2012	country level	Excel		
	DRC Artisanal Logging		Information and data about the legislative background, consumption and trade flows	Lescuyer et al. 2011 "The domestic market for small-scale chainsaw milling in the Republic of Congo- Present situation, opportunities and challenges" CIFOR, IFAD	2011		pdf		
	Eq. Guinea Area under exploitation	n.a.	Forest plots, Communal forests, National forests active logging, National forests logged, National forests not logged, National forests no data available	World Resource Institute (WRI) Forest Atlas for Equatorial Guinea	2013	n.a.	vector		
	Rep. Congo Area under exploitation	n.a.	Forest concession allocated and non-allocated, and plantation + Management plan status: completed, in process, absent, non-allocated + Company nationality	World Resource Institute (WRI) Forest Atlas for Republic of Congo	2013	n.a.	vector		
	Cameroon Area under exploitation	n.a.	Temporary permits, Community forests, Communal forests, Concessions + Management plan status: under management plan, management plan under revision, no management plan + certification status	World Resource Institute (WRI) Forest Atlas for Cameroon	2013	n.a.	vector		
	CAR Area under exploitation	n.a.	Logging concessions allocated and non-allocated + Concessions holder nationality + Harvested wood by concession over 2005-2011 + Forest Management series + Forest Management Unit + Annual harvestable area by concession	World Resource Institute (WRI) Forest Atlas for Central African Republic	2013	n.a.	vector		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Gabon Area under exploitation	n.a.	Concession under sustainable management plan (CFAD), concession with a non-validated management plan, concession not yet under management plan, other forest permit	World Resource Institute (WRI) Forest Atlas for Gabon	2009	n.a.	vector		
	Management parameters	m3/ha p.a.	Timber harvest per ha, rotation time, species harvested	Ruiz Pérez et al. 2005 "Logging in the Congo Basin: a multi-country characterization of timber companies. For Ecol Manag 214:221–236" and Karsenty A, Gourlet-Fleury S 2006 "Assessing sustainability of logging practices in the Congo Basin's managed forests: the issue of commercial species recovery". Ecol Soc 11(1):26	2005	n.a.			
	Gabon Artisanal logging		Timber harvest per ha, rotation time, species harvested	Lescuyer et al. 2011 "The domestic market for smallscale chainsaw milling in Gabon- Present situation, opportunities and challenges" Brainforest, IRET, CIFOR	2011	n.a.	pdf		
	Cameroon Artisanal logging		Characterization of the artisanal logging sector	Cerutti et al. 2013 "Cameroon's Hidden Harvest: Commercial Chainsaw Logging, Corruption, and Livelihoods" CIFOR published in Society & Natural Resources	2013	n.a.	pdf		
	Rep. Congo Forest statistics	various	Evolution of round wood production at the department level from in 2000, 2005 and 2011	Annual report of the regional forest management offices (DDEF)	2012	n.a.	Excel		
2.4. Short rotation plantations (SRP)									
	Productivity of fast-growing species	m3/ha/year	Productivity of main fast-growing species for fuel wood production	Ministry of Agriculture (2009): Etude du secteur agricole, p.179	2009	n.a.	Excel		
2.5. Oil and Mining									
	DRC Mining permits		Under exploration and under exploitation.	World Resource Institute (WRI) Forest Atlas- DRC Ministère de l'Environnement, Conservation de la Nature et Tourisme;	2013	n.a.	Vector	WRI	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	Rep. of Congo Mining permits		Exploration permit, prospecting authorization, exploitation permit with mineral type and year of allocation.	World Resource Institute (WRI) Forest Atlas for the Republic of Congo	2013	n.a.	Vector	WRI	
	Cameroon mining permits		Only the distribution of permit. Only sometimes type of mineral is specified.	World Resource Institute (WRI) Forest Atlas for Cameroon	2013	n.a.	Vector	WRI	
	DRC Artisanal mining		Type of resource, number of workers, armed group, title holder, ownership structure	"The formalisation of artisanal mining in the Democratic Republic of the Congo and Rwanda", International Peace Information Service (IPIS) and CIFOR	2012	n.a.	Vector point data	WRI	
	CAR artisanal mining		Mineral deposits by mineral type and diamond mining area	Matthysen and Clarkson 2013 "Gold and diamonds in the Central African Republic- The country's mining sector, and related social, economic and environmental issues" , International Peace Information Service (IPIS), ActionAid Nederland and Cordaid	2013	n.a.	Vector point data	WRI	

3. Markets

3.1. Consumption

Cameroon Final consumption of energy from biomass	ktep	Split by sector: industry, transport, other sectors, residential. Split by use: cooking, other domestic use, transport, industry, other use. Split by source: fuelwood, charcoal, pellets. Average consumption by household in kg biomass.	Systeme d'information energetique du Cameroun, Ministere de l'energie et de l'eau SIE Cameroun	2007, 2008	Country	Excel		
RoC bio energy consumption	various	State of consumption of fuelwood and charcoal in rural and urban areas: annual consumption (tons), consumer price, supply catchment area, forest types, mode of transport, origin of wood (forest status) for 2000 and 2005	Ministry of Forest Economics and fisheries (MEFPRH)	2006	per city	Excel		

3.2. Prices

Cameroon market prices of agricultural products	FCFA/kg and others	Monthly data for 26 traditional food crops: pineapple, groundnuts, banana, plantain, cucumber, ginger, gombpo, bean, oil palm, igname, macabot, maize, cassava, millet/sorghum, niebe, onion, watermelon, sweet potato, chili,	AGRISTAT n13- Annuaire des statistiques du secteur agricole- Campagnes 2004 et 2005, Direction des Enquetes et statistiques agricoles, Fevrier 2007	2006	Main cities by province	Pdf, Excel		
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Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
	RoC Bio energy prices	FCFA/kg	potato, rice, sesame, soybean, tomato, voandzou. Fuel						
3.3. Trade									
	Cameroon agricultural trade	ton	Monthly exports for the main crops by mean of travel and city of departure.	AGRISTAT n13- Annuaire des statistiques du secteur agricole-Campagnes 2004 et 2005, Direction des Enquetes et statistiques agricoles, Fevrier 2007	2006	Country	word		
	DRC imports of agricultural goods	ton	Annual imports of agricultural goods to DRC from 2005-2010 for the following goods: Sugar, corn flour, wheat flour, rice, malt, beans, wheat in grains, corn in grains, vegetable oils, fats, garlic, tomato conserves, onions.	Ministry of Agriculture (2009): Etude du secteur agricole, p.63 et p.114 (for the years 2006-2007); Statistiques de Production Agricole, serie 2005-2010	2009	Country	Excel		
	DRC exports of agricultural goods and round wood	tons; m3	Annual exports of agricultural goods from DRC in the period 2005-2011 for the following products: robusta coffee, Arabica coffee, cocoa, round wood (m3), palm oil, rubber, tea.	Statistiques de Production Agricole, serie 2005-2011, based on an estimate of the Central Bank of the Congo	2012	Country	Excel		
	DRC domestic trade flows	verbal description	Verbal description of main domestic trade flows between provinces.	Etude du secteur agricole, Rapport preliminaire diagnostic et note d'orientation 2009. Ministere de la Peche, Agriculture et Elevage (MINAGRI), Table 26, p.89,	2009	Province	pdf		
3.4. Processing									
Timber processing	ROC Processing Plant		Location of the timber processing plants: Sawmill industrial carpentry and other.	World Resource Institute (WRI) Forest Atlas for Republic of Congo		Point	Vector		
	ROC wood processing statistics	tons; m3	Quantities of round wood and the following processed products: Sawn wood, veneer, plywood per sawmill for the years 2000 and 2005	Ministry of Forest Economics and fisheries (MEFPRH)	2006	Country	Excel		
	Cameroon Processing Capacity		Volumes and constraints of the sector	Karsenty et al. 2006- Audit du secteur forestier du Cameroun -p36, CIRAD and Institut National de la Statistique du Cameroun	2000-2006	Country	pdf		
Bioenergy processing	Stover energy efficiency	%	Comparison of energy efficiency of different cooking stoves	Systeme d'information energetique du Cameroun, Ministere de l'energie et de l'eau SIE Cameroun, Tableau 23	2007	Country	word		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
(Thermal yield)									
4. Exogenous drivers									
4.1. Population and GDP growth									
	Congo Basin Population density	hab/km2	B2 scenario from GGI Scenario Database- To be updated with SSP scenarios projections once available	Grubler et al. (2007), International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	up to 2050	0.5 degree grid			
	DRC demographic data	--	Number of total population and households; Number of population and households dependent on agricultural activities	National Statistics Institute (INS) of the Ministry of Agriculture (MINAGRI) (2012): National Agricultural Statistics Service (SNSA), Kinshasa, DRC.	2012	District	Excel		
	ROC demographic data	--	Census (2000, 2005, 2010) and forecast (2020, 2030) of number of total population number of population dependent on agricultural activities per department	National Statistics Institute, Brazzaville	2011 (?)	Department	Excel		
4.2. Bioenergy demand									
	Traditional Bioenergy demand	1000 GJ	Based on population projections and average consumption rate per inhabitant in 2000	IIASA based on National Statistics	up to 2050	Country	csv		
5. GHG accounting									
5.1. Land use change									
	FRA Forest living biomass 2010	ton carbon per ha	Global Forest Resources Assessment (FRA) is based on two primary sources of data: Country Reports prepared by National Correspondents and remote sensing that is conducted by FAO together with national focal points and regional partners and is produced every 5 to 10 years.	Food and Agriculture Organisation (FAO), Roma, Italy	2000	Country pdf	Raster	FAO	
	G4M Forest living biomass 2010	ton carbon per ha	Downscaling of FRA2005 forest growing stock, biomass and carbon stock values using a relationship between net primary productivity (NPP) and biomass and the relationship between human impact and biomass. Carbon in above and below living biomass is used in GLOBIOM.	International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria	2000	30 arc minutes	Raster	IIASA	
	NASA	ton	Here, we report on our use of global forest height	Saatchi et al. 2011 "Benchmark map of	2000	1km	Raster	NASA	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
		carbon per ha	data measured by the Geoscience Laser Altimeter System (GLAS), onboard the Ice, Cloud, and land Elevation Satellite (ICESat), in combination with other remote sensing data bases and ground data, to model the spatial distribution of aboveground standing biomass density (AGB) (in megagrams of mass per unit area) in forests across three continental regions for the early 2000s. We estimate belowground biomass carbon in roots from AGB using tree allometry. Our approach results in a benchmark map of forest carbon density at 1-km resolution.	forest carbon stocks in tropical regions across three continents", PNAS					
	WHRC	ton carbon per ha	Estimation of the carbon density (Mg C ha ⁻¹) of aboveground live woody vegetation for the pan-tropics (including tropical Africa, America and Asia) at a spatial resolution of 500 m using a combination of remote sensing and field data (for the period 2007–2008; Fig. 1).Field measurements were collected from forests across tropical Africa, America and Asia from 2008 to 2010 at sample points co-located with LiDAR ‘footprints’ using a sampling protocol specifically designed for the optimal integration of field and satellite data.	Baccini et al. 2012 "Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps", Nature Climate Change	2010	500m	Raster	WHRC	

6. Biodiversity and conservation

6.1. Species

DRC important biodiversity areas	n.a.	DRC specific datasets. Reptiles, invertebrates, mammals, birds, plants and biological priority areas. Produced by WWF in consultation with National experts	Shapiro, A., Thieme, M., Kamdem Toham, A., Sindorf, N., and Blom, A. 2009. Strategic Biodiversity Assessment for the Democratic Republic of Congo: using a decision support system and expert review to define priority areas for conservation. WWF, Germany, <i>unpublished report</i>	2009	n.a.	Vector		
Conservation priorities for Prunus Africana	n.a.	Dataset on the distribution of one important non-timber forest product	Vinceti, B. et al 2013 Conservation priorities for Prunus africana defined with the aid of spatial analysis of genetic data and climate variables PLoS One 8(3):pe59987 Available at: http://dx.plos.org/10.1371/journal .	2013	n.a.	Vector		

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
pone.0059987									
6.2 Ecological zoning									
	Intact forest landscapes	n.a.	Intact Forest Landscapes (IFLs) are defined as “an unbroken expanse of natural ecosystems within the zone of current forest extent, showing no signs of significant human activity, and large enough that all native biodiversity, including viable populations of wide-ranging species, could be maintained” – more information on the methodology to identify IFLs can be found in Potapov et al., 2008.	Potapov, P. et al., 2008. Mapping the World’s Intact Forest Landscapes by Remote Sensing. Ecology and Society, 13(2), p.51–58. Available for download at: http://www.intactforests.org/	2012	1:1M	Vector, KML	IFL Mapping team	
	Ecoregions	n.a.	Coverage of distinct ecoregions in the Congo Basin	Olson et al 2001 Terrestrial ecoregions of the world: a new map of life on Earth, Bioscience 51(11) 933-938. Available for download at http://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world	2011	n.a.	Vector	WWF	
<u>7. Validation of the results</u>									
7.2. Land use									
	FACET Deforestation		The method used is the "wall-to-wall", a method developed jointly by the universities of South Dakota and Maryland. It is an adaptation of the approach of Hansen et al. (2008). Landsat ETM + data were sampled at a spatial resolution of 60 meters. Mapping the extent and loss of forest cover by Landsat is severely limited to areas permanently covered by clouds. MODIS data were used to overcome this problem. The forest was defined as a space occupied by trees over 5 meters in height and having a canopy density of above 30%. DRC, Congo Republic, Gabon and Cameroon	OSFAC in collaboration with South Dakota State University and the University of Maryland, and supported by USAID CARPE	2000 - 2010	60m	Raster	University of Maryland	
	Hansen deforestation map		Results from time-series analysis of 654,178 Landsat images in characterizing forest extent and change, 2000–2012. Trees are defined as all vegetation taller than 5m in height and are expressed as a percentage per output grid cell as ‘2000 Percent Tree Cover’. ‘Forest Loss’ is defined	Hansen et al 2013 "High-Resolution Global Maps of 21st-Century Forest Cover Change" Science, Maryland University. http://earthenginepartners.appspot.com/science-2013-global-forest	2000-2012	30m	Raster	Used for validation of hybrid	

Title	Name	Unit	Description	Source	Year	Resolution	Format	Copyright	Remark
			as a stand-replacement disturbance, or a change from a forest to non-forest state. 'Forest Gain' is defined as the inverse of loss, or a non-forest to forest change entirely within the study period. 'Forest Loss Year' is a disaggregation of total 'Forest Loss' to annual time scales.						
<u>8. Policies</u>									
8.1. Targeted on forests and/or conservation									
	Protected areas in the Congo Basin		Status of nature protection areas: National parks, forest reserves, buffer areas.	World Resource Institute (WRI) Forest Atlas, WDPA database	various	n.a.	Vector		
	DRC REDD+ projects		REDD+ pilot projects: activities and project holder	DRC REDD National Coordination	2012	n.a.	Vector		
8.2. Not targeted on forests and/or conservation									
	Planned infrastructures	n.a.	Roads and railways rehabilitation and construction for which funding is already secured	National statistics from Cameroon, CAR, and Gabon and AICD (World Bank) for DRC and Congo	2010	n.a.	Vector		