BIODIVERSITY

ESTIMATES GLOBAL CARBON IMPACT

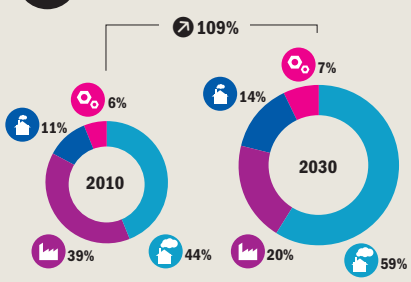
2010 EFFECT TODAY

USD **LOSS** PER YEAR **300 BILLION**

2030 EFFECT TOMORROW

USD **LOSS** PER YEAR **1,750 BILLION**

ECONOMIC IMPACT



CONFIDENCE **INDICATIVE**

SEVERITY

AFFECTED

MDG EFFECT

- Natural resources support businesses, communities and economies but are rarely accounted for in company balance sheets or GDP calculations
- Emissions of greenhouse gases, especially toxic ground-level ozone and acid rain, are causing significant losses to biodiversity, much of which will add invisible costs to businesses and economies around the world
- Countries with the richest ecosystems will suffer these effects the most
- Reducing emissions of sulphur and sources of ozone as a priority in the energy, transport and agricultural sectors forms the basis of any plan for stemming these losses

RELATIVE IMPACT

$$$$$$$$$$ 2010
97 3

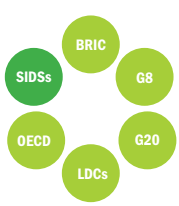
$$$$$$$$$$ 2030
94 3

HOTSPOTS

2010 $ 2030

35,000 **BRAZIL** 300,000
80,000 **USA** 250,000
20,000 **CHINA** 200,000
15,000 **RUSSIA** 100,000
10,000 **INDONESIA** 90,000

GEOPOLITICAL VULNERABILITY



$ Economic Cost (2010 PPP non-discounted)
Developing Country Low Emitters
Developed
Developing Country High Emitters
Other Industrialized

$ = Losses per 1,000 USD of GDP

$ = Millions of USD (2010 PPP non-discounted)

Change in relation to overall global population and/or GDP

Global biodiversity is undergoing a period of phenomenal decline across all major land-based and aquatic ecosystems (WWF, 2012). Measured in economic terms the costs of decline in global biodiversity have been estimated at close to seven trillion dollars today, or around 10% of global GDP (UNEP, 2010). This represents the impact of the sum of human activities and changes made to the environment. Carbon economy and GHG emissions that could be eliminated through targeted mitigation efforts are estimated to contribute a modest share of these costs. The effects of climate change further affect biodiversity independently from the direct effects of pollution. Solving climate change will not resolve the biodiversity crisis facing the planet but it will significantly help.

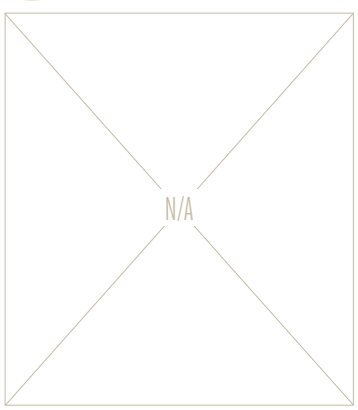
HAZARD MECHANISM

Biodiversity comprises the totality of all genes, species, and ecosystems. When healthy, ecosystems provide so-called ecosystem services to economic systems in abundance: including water catchment, pest control, pollination, air purification, heat regulation, drought stabilization or numerous other values (Mace et al. in Hassan et al. (eds.), 2005). Businesses and communities operating in eco-service abundant areas ultimately reap the benefits through lower operating costs or higher productivity (Costanza et al., 1997; Bayon and Jenkins, 2010). Industrial or transport-related emissions, such as high-sulphur-content acid rain and ground-level ozone, are toxic for plants and have a negative effect on primary productivity, affecting plant growth and health. That negative effect is transferred to the whole ecosystem and damages the abundance and quality of ecosystem services generated. Communities, businesses and economies ultimately suffer these losses through reduced prosperity and returns to investors (UNEP, 2010).

IMPACTS

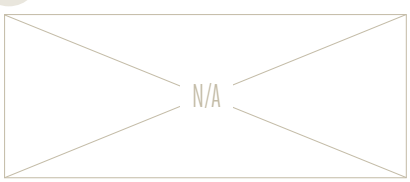
The global impact of GHG emissions on biodiversity is causing large-scale and widespread losses, estimated at over 290 billion dollars for 2010. As the carbon economy is expected to expand over the next 20 years, these losses will climb to 1.7 trillion dollars by 2030, doubling in scale in proportion to GDP. Around 20 countries are acutely vulnerable to these effects, all tropical developing countries with highly abundant ecosystems in Africa, Latin America and Southeast Asia. The impacts will undermine development, especially since lowest income groups are more dependent on ecosystem services, such as water treatment, pollination and pest control. The greatest overall effects, however, are suffered by the world's most powerful economies: the US, China, Russia and Brazil, each with losses numbering in the tens of billions of dollars. The US is estimated to already suffer 80 billion dollars' worth of lost biodiversity potential in the year 2010.

BIGGER PICTURE

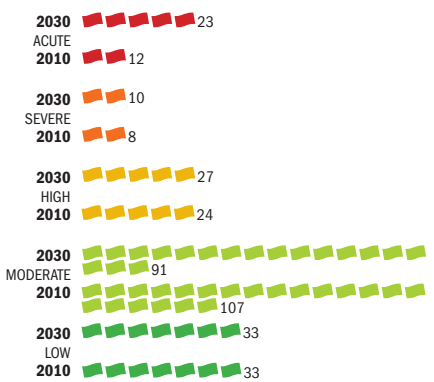


SURGE

OCCURRENCE



VULNERABILITY SHIFT



PEAK IMPACT

GENDER BIAS

INDICATOR INFORMATION

MODEL: Costanza, 2006; Hooper, 2012; Reilly, 2008

BASE DATA: OECD, 2012; Reilly, 2008

= 5 countries (rounded)

Acute Severe High Moderate Low

THE INDICATOR

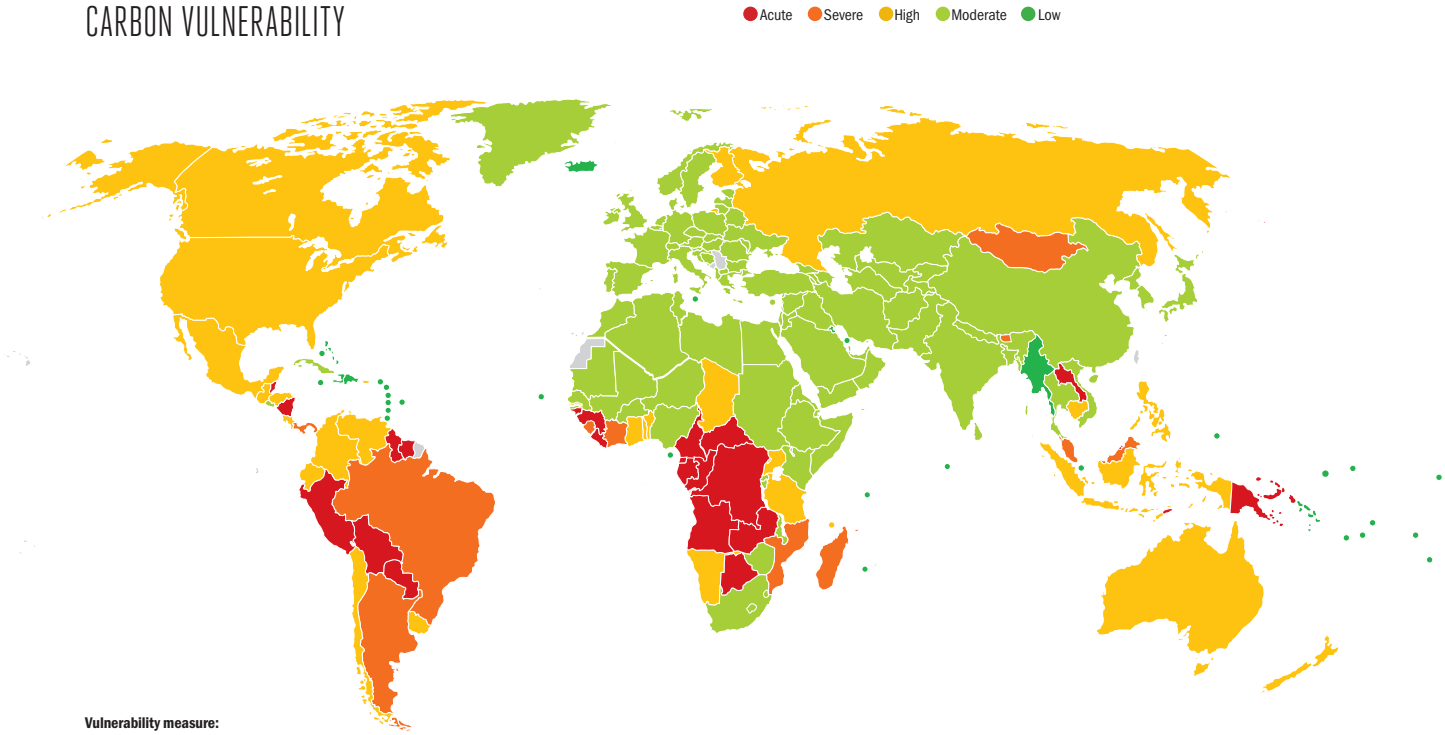
The indicator measures losses in biodiversity richness resulting from ground-level ozone toxicity and acid rain and their effect on net primary productivity (Reilly, 2007; Hooper et al., 2012). The change is mapped on the basis of vegetation distribution and translated into losses in ecosystem services value per hectare per year (Costanza et al., 2007). While emissions intensities and projections are fairly reliable, the indicator is very sensitive to changes in the relationship between acid rain and ozone and their effects on primary productivity. Vegetation changes introduce further uncertainty (Ruesch and Gibbs, 2008). Overall however, the large difference between countries currently rich in biodiversity – those countries with the most at stake – and those with comparatively little, is a principal factor in determining vulnerability.

ESTIMATES COUNTRY-LEVEL IMPACT

COUNTRY	2010	2030
ACUTE		
Angola	4,500	30,000
Belize	150	1,000
Bolivia	4,000	30,000
Botswana	600	4,000
Brunei	700	5,500
Cameroon	1,250	7,750
Central African Republic	400	2,500
Congo	1,250	7,250
DR Congo	1,000	6,500
Equatorial Guinea	1,250	7,250
Gabon	5,250	35,000
Guinea	300	2,000
Guinea-Bissau	55	350
Guyana	2,250	15,000
Laos	350	3,750
Liberia	55	350
Nicaragua	400	3,000
Papua New Guinea	1,500	15,000
Paraguay	1,500	10,000
Peru	7,250	55,000
Suriname	1,250	9,000
Timor-Leste	150	1,500
Zambia	600	3,750
SEVERE		
Argentina	9,000	70,000
Bhutan	55	450
Brazil	35,000	300,000
Cote d,Ivoire	700	4,500
Madagascar	250	1,750
Malaysia	7,750	60,000
Mongolia	150	1,750
Mozambique	450	2,750
Panama	700	5,250
Sierra Leone	85	550
HIGH		
Australia	8,500	25,000
Benin	150	950
Cambodia	300	3,500
Canada	10,000	30,000
Chad	100	650
Chile	1,750	15,000
Colombia	5,500	40,000
Comoros	5	25
Costa Rica	250	2,000
Ecuador	1,000	8,000
Finland	850	2,500
Gambia	20	100
Ghana	600	4,000
Guatemala	350	2,750
Honduras	400	3,250
Indonesia	10,000	90,000
Mexico	8,000	60,000
Namibia	150	1,000
New Zealand	1,000	3,000
Philippines	1,750	15,000
Russia	15,000	100,000
Tanzania	500	3,000
Togo	45	300
Uganda	200	1,500
United States	80,000	250,000
Uruguay	200	1,500
Venezuela	4,000	30,000
MODERATE		
Afghanistan	10	65
Albania	30	200
Algeria	60	450
Armenia	15	85
Austria	250	800
Azerbaijan	45	300
Bangladesh	55	400
Belarus	250	1,750
Belgium	55	150
Bosnia and Herzegovina	50	350
Bulgaria	150	1,000
Burkina Faso	15	90
Burundi	1	10
China	20,000	200,000
Croatia	70	500
Cuba	250	1,750
Cyprus	5	15
Czech Republic	100	800
Denmark	55	150
Djibouti		1
Egypt	10	80
El Salvador	200	1,250
Eritrea	1	5
Estonia	35	250
Ethiopia	95	650
France	950	3,000
Georgia	65	450
Germany	750	2,250
Greece	350	1,000
Hungary	95	650
India	2,750	20,000

$ Additional economic costs (million USD PPP) - yearly average

CARBON VULNERABILITY



Vulnerability measure:
comparative losses as a share of GDP in USD (national)

COUNTRY	2010	2030
Iran	550	4,250
Iraq	10	85
Ireland	100	350
Israel	10	70
Italy	550	1,750
Japan	5,250	15,000
Jordan	1	5
Kazakhstan	350	2,250
Kenya	100	650
Kyrgyzstan	25	150
Latvia	40	300
Lebanon	10	70
Lesotho	5	25
Libya	15	150
Lithuania	65	450
Luxembourg	5	15
Macedonia	35	250
Malawi	35	250
Mali	30	200
Mauritania	10	55
Moldova	10	50
Morocco	35	250
Nepal	150	1,000
Netherlands	45	150
Niger	5	40
Nigeria	900	6,000
North Korea	15	150
Norway	450	1,250
Oman	10	70
Pakistan	100	800
Poland	400	2,750
Portugal	250	750
Romania	200	1,500
Rwanda	1	15
Saudi Arabia	35	250
Senegal	60	400
Slovakia	100	750
Slovenia	50	350
Somalia	10	50
South Africa	1,500	9,000
South Korea	350	2,750
Spain	1,250	3,500
Sri Lanka	300	2,250
Sudan/South Sudan	40	300
Swaziland	5	45
Sweden	1,000	3,250
Switzerland	85	250
Syria	5	50
Tajikistan	10	70
Thailand	1,750	15,000
Tunisia	20	150
Turkey	650	2,000
Turkmenistan	40	250
Ukraine	350	2,250
United Arab Emirates	5	30
United Kingdom	350	1,000
Uzbekistan	20	150
Vietnam	800	8,750
Yemen	15	100
Zimbabwe	30	200

LOW

COUNTRY	2010	2030
Antigua and Barbuda		
Bahamas		
Bahrain		
Barbados		
Cape Verde		
Dominica		
Dominican Republic		
Fiji		
Grenada		
Haiti		
Iceland		
Jamaica		
Kiribati		
Kuwait		
Maldives		
Malta		
Marshall Islands		
Mauritius		
Micronesia		
Myanmar		
Palau		
Qatar		
Saint Lucia		
Saint Vincent		
Samoa		
Sao Tome and Principe		
Seychelles		
Singapore		
Solomon Islands		
Tonga		
Trinidad and Tobago		
Tuvalu		
Vanuatu		