

Mitigation prospects referring to Articles 3.1 and 3.2 of the Convention

IDDRI's COP 9 Side Event
“Climate, Energy and Development”

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UNFCCC's articles

- Art. 3.1 : “Countries should protect the climate system (...) on the basis of equity and in accordance with their **common but differentiated responsibilities** and **respective capabilities**. (...)”
- Art.3.2 : “The **specific needs and special circumstances** of developing country Parties (...) should be given full consideration.”

Climate Analysis Indicators Tool (CAIT)

<http://cait.wri.org>

- Provides a database and analysis features relevant for the climate negotiations
- Indicators selected on the basis of the Climate Convention principles
- Three Categories
 - ✓ GHG Emission Indicators
 - ✓ Socio-Economic Indicators
 - ✓ Natural Factor Indicators
- Coverage : over 180 countries and regional aggregations

1. GHG emissions along the causal chain

- Annual emissions*: CO₂-fossil fuel and cement, CO₂ from LUC, non CO₂ gases
- Historical responsibility :
 - ✓ Cumulative Emissions
 - ✓ Country's Contributions to Concentration Increase (decay function of cumulative emissions)
 - ✓ Country's Contributions to Present Temperature Increase* (response function to radiative forcing)
- Uncertainties of data (LUC)

GHG Emissions in 2000

CO2 (energy), CO2 (land use change), CH4, N2O, PFCs, HFCs, SF6

rank	country	MtC	% of world total	tons C per person
--	non-Annex I	6,405.1	56.91%	1.4
--	Annex I	4,583.3	40.72%	3.9
1	United States of America	1,781.8	15.83%	6.2
2	China	1,342.7	11.93%	1.1
3	European Union (15)	1,077.1	9.57%	2.9
4	Indonesia	834.5	7.41%	4.0
5	Brazil	604.0	5.37%	3.6
6	Russian Federation	534.7	4.75%	3.7
7	India	495.0	4.40%	0.5
8	Japan	365.2	3.25%	2.9
13	Mexico	165.8	1.47%	1.7
15	Korea (South)	143.7	1.28%	3.1
21	South Africa	113.2	1.01%	2.6
31	Thailand	84.3	0.75%	1.4

Contributions to Temperature Increase from 1950 to 2000

CO2 (energy), CO2 (land use change)

rank	country	index	% of world	per capita
			total	index
--	Annex I	307.2	51.76%	17.3
--	non-Annex I	272.7	45.94%	8.4
1	United States of America	100.0	16.80%	21.0
2	European Union (15)	79.2	13.29%	15.0
3	China	58.8	9.85%	7.9
4	Russian Federation	50.3	8.41%	20.8
5	Indonesia	42.6	7.12%	14.8
6	Brazil	37.4	6.23%	15.3
8	Japan	23.1	3.82%	13.7
15	India	9.0	1.44%	6.3
17	Mexico	7.6	1.21%	9.1
21	South Africa	5.9	0.91%	11.4
26	Korea (South)	4.4	0.66%	9.5
45	Thailand	2.3	0.32%	7.2

2. Socio-economic indicators

- CAIT indicators ...
 - ✓ GDP (PPP) (total and per cap) *
 - ✓ Health, Education*
 - ✓ Energy use (total & per capita)
 - ✓ Carbon intensities (C/GDP^* , C/E , C/E_{el})
 - ✓ Governance
- ... reflecting mitigative capacities or opportunities
 - ✓ Financial resources, opportunity cost of resources for CC,
 - ✓ Human skills, technology options,
 - ✓ Institutions, decision-making and information processes

Education in 2000

rank	country	index	Literacy rate	Enrollment ratio
10	United States of America	97.6	99.0	94
16	European Union (15)	96.2	--	--
21	Korea (South)	95.4	97.8	91
28	Japan	93.2	99.0	83
31	Russian Federation	92.8	99.0	82
49	Brazil	88.6	87.3	95
62	Thailand	86.0	95.5	72
76	Mexico	83.5	91.4	74
90	South Africa	80.2	85.3	78
101	Indonesia	75.9	86.9	64
106	China	75.0	85.8	64
142	India	48.8	57.2	56

Gross Domestic Product - Purchasing Power Parity in 2000

rank	country	international \$ per person	total, mill. intl. \$	% of world
2	United States of America	33,960	9,680,850	21.9%
11	Japan	25,280	3,207,344	7.2%
18	European Union (15)	23,670	8,911,558	20.1%
37	Korea (South)	14,720	691,772	1.6%
46	South Africa	10,990	470,467	1.1%
58	Mexico	8,570	839,150	1.9%
64	Brazil	7,250	1,233,633	2.8%
69	Russian Federation	6,760	983,864	2.2%
73	Thailand	6,230	378,476	0.9%
101	China	3,740	4,724,163	10.7%
113	Indonesia	2,970	613,299	1.4%
116	India	2,730	2,772,730	6.3%

Carbon intensity of economy in 2000

rank	country	tons of C / mill. intl. \$	index
10	Russian Federation	427	67.1
38	China	201	31.1
39	South Africa	200	31.0
42	Korea (South)	185	28.7
50	United States of America	162	25.1
70	Indonesia	127	19.5
71	Mexico	125	19.2
74	Thailand	124	18.9
88	Japan	104	15.8
95	European Union (15)	99	15.0
96	India	99	15.0
120	Brazil	73	10.8

3. Natural factors

- CAIT indicators ...
 - ✓ Climatic conditions (Heating degree days*, Cooling DD)
 - ✓ Resource endowments (Fossil fuel reserves, carbon content of energy mix)
 - ✓ Geography (Land area influenced by humans)
 - ✓ Population
- ... reflecting unchangeable facts of nature, geography, geology or climate that Parties face ; circumstances partly beyond the reach of public policy, that could generate “specific needs” for some Parties or result in “disproportionate or abnormal burden”

Heating degree days

rank	country	Degree Days	Weighted by Pop.
2	Russian Federation	5,235	761,941
37	European Union (15)	2,588	974,386
38	Korea (South)	2,480	116,572
46	United States of America	2,159	618,099
47	China	2,158	2,724,466
51	Japan	1,901	241,132
77	South Africa	630	26,975
82	Mexico	364	35,701
94	Brazil	118	20,080
99	India	80	81,443
116	Thailand	1	87
129	Indonesia	0	62

A synthetic picture through indexing

- Combining all the previous indicators into a single composite index may contribute to compare countries in terms of their common but differentiated responsibilities and respective capabilities, given their special circumstances
- Weightings of indicators in the index are chosen by the user ; natural factors may be set “to mitigate” the other categories of indicators
- Highest value in the dataset is set to 100 ; lowest value to 0

Aggregate Index of Selected Indicators

rank	country	index
1	United States of America	100,0
2	European Union (15)	68,3
3	Russian Federation	54,7
4	Indonesia	51,1
5	Brazil	47,5
7	Japan	45,2
29	China	35,3
30	Korea (South)	35,2
48	South Africa	31,7
54	Mexico	30,3
67	Thailand	26,9
79	India	25,2

Current Indicator Weightings:

Yearly Emissions, Total (20%)

Temperature Change, Total (20%)

Climate: Heating Needs, Total (20%)

Education (13.3%)

Income Per Capita (13.3%)

Carbon Intensity of Economy (13.3%)

Note: Natural factors set to 'mitigate'

Another synthetic picture...

- Setting the index weightings differently
- Not considering natural factors
- Leads to highly different ranking for some countries

Aggregate Index of Selected Indicators

rank	country	index
1	United States of America	100,0
2	European Union (15)	75,3
5	Japan	42,6
6	China	39,6
8	Russian Federation	37,9
21	Brazil	30,5
22	Indonesia	28,7
37	Korea (South)	18,8
47	South Africa	15,4
50	Mexico	13,7
78	India	7,8
79	Thailand	7,7

Current Indicator Weightings:

Temperature Change, Total (50%)

Income Per Capita (50%)

Conclusion (1)

- Illustration of multi-faceted responsibility and capability principles
- Ranks of countries differ according to indicators chosen to assess responsibility and capability, and whether natural factors are considered
- Ranks of countries also differ in aggregate index, depending on the indicators and weightings considered
- Mitigation prospects may be viewed differently, depending on the lens used (which indicators, which weightings)

Conclusion (2)

On a more general basis,

- As a data base, CAIT may provide useful information to policy- makers and analysts
- Analyses drawn from CAIT may spur dialogue between negotiators and contribute to decision-making