Building a global assessment cluster for sustainability politics

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Beyond the Crossroads: New Issues, Persistent Problems. Linking food security, sustainability science and sustainability politics.

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The present way of living is not sustainable at all:

- ***We overexploit non-renewable resources***
- ***We rapidly change global climate***
- ***We partly overexploit renewable resources***
- ***Inequality grows in most countries***

Hence we scientists have to develop sustainability science

Consensual definition of sustainability science is as elusive as the definition of "sustainability" or "sustainable development". As outlined by the Sustainability Science Program at Harvard University's Center for International Development sustainability science seeks to:

Advance basic understanding of the dynamics of human-environment systems; to facilitate the design, implementation, and evaluation of practical interventions that promote sustainability in particular places and contexts; and to improve linkages between relevant research and innovation communities on the one hand, and relevant policy and management communities on the other.

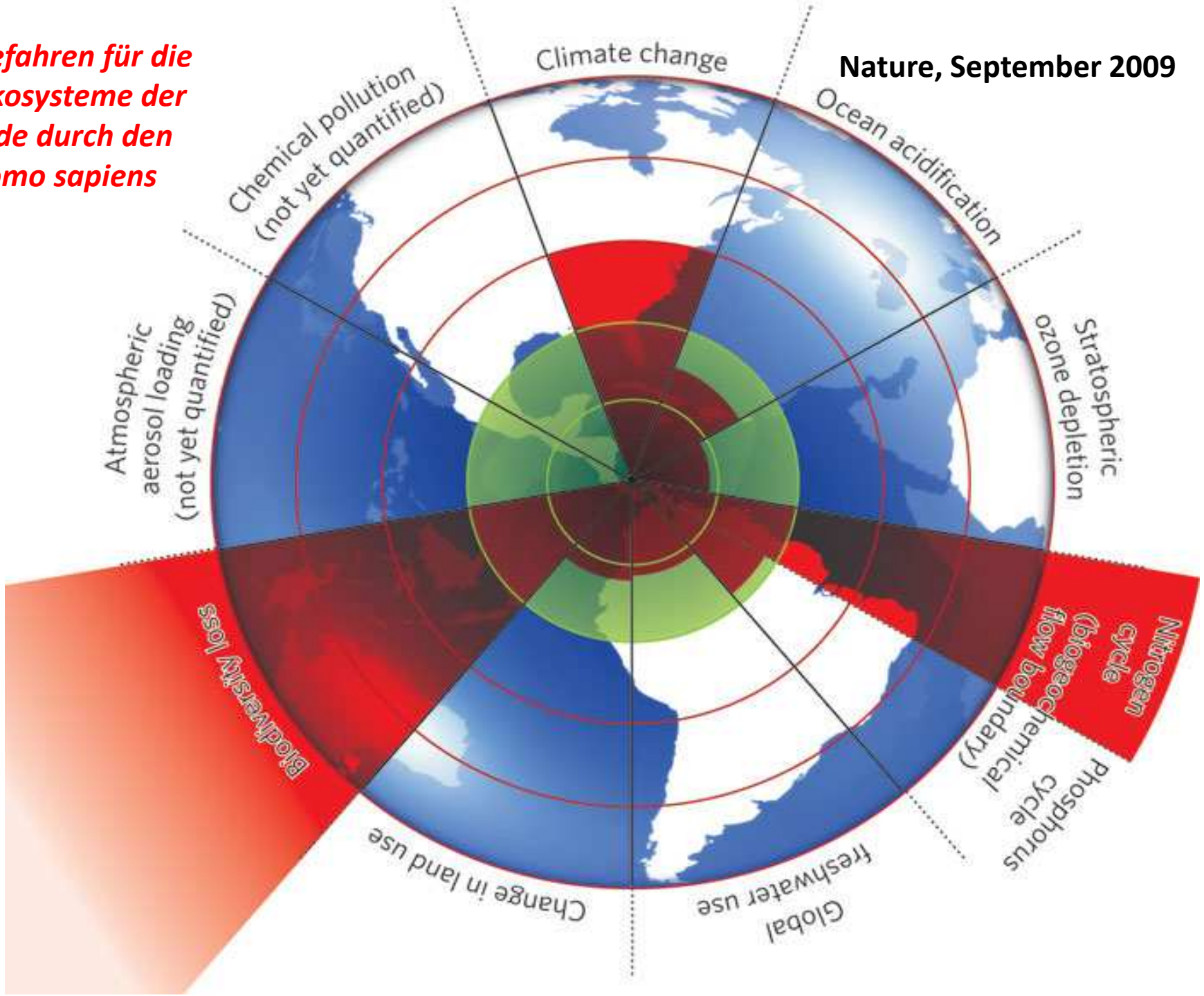
Kates, R., Clark, W., Corell, R., Hall, J., Jaeger, C., Lowe, I., McCarthy, J., Schellnhuber, H-J., Bolin, B., Dickson, N., Faucheux, S., Gallopin, G., Grubler, A., Huntley, B., Jager, J., Jodha, N., Kasperson, R., Mabogunje, A., Matson, P., & Mooney, H. 2001. Sustainability science. *Science* 292(5517): 641–642.

A more broad-based definition is:
“*The cultivation, integration, and application of knowledge about Earth systems gained especially from the holistic and historical sciences (such as geology, ecology, climatology, oceanography) coordinated with knowledge about human interrelationships gained from the social sciences and humanities, in order to evaluate, mitigate, and minimize the consequences, regionally and worldwide, of human impacts on planetary systems and on societies across the globe and into the future – that is, in order that humans can be knowledgeable Earth stewards*.”

It has been noted that the new paradigm
"must encompass different magnitudes of scales (of time, space, and function), multiple balances (dynamics), multiple actors (interests) and multiple failures (systemic faults)."

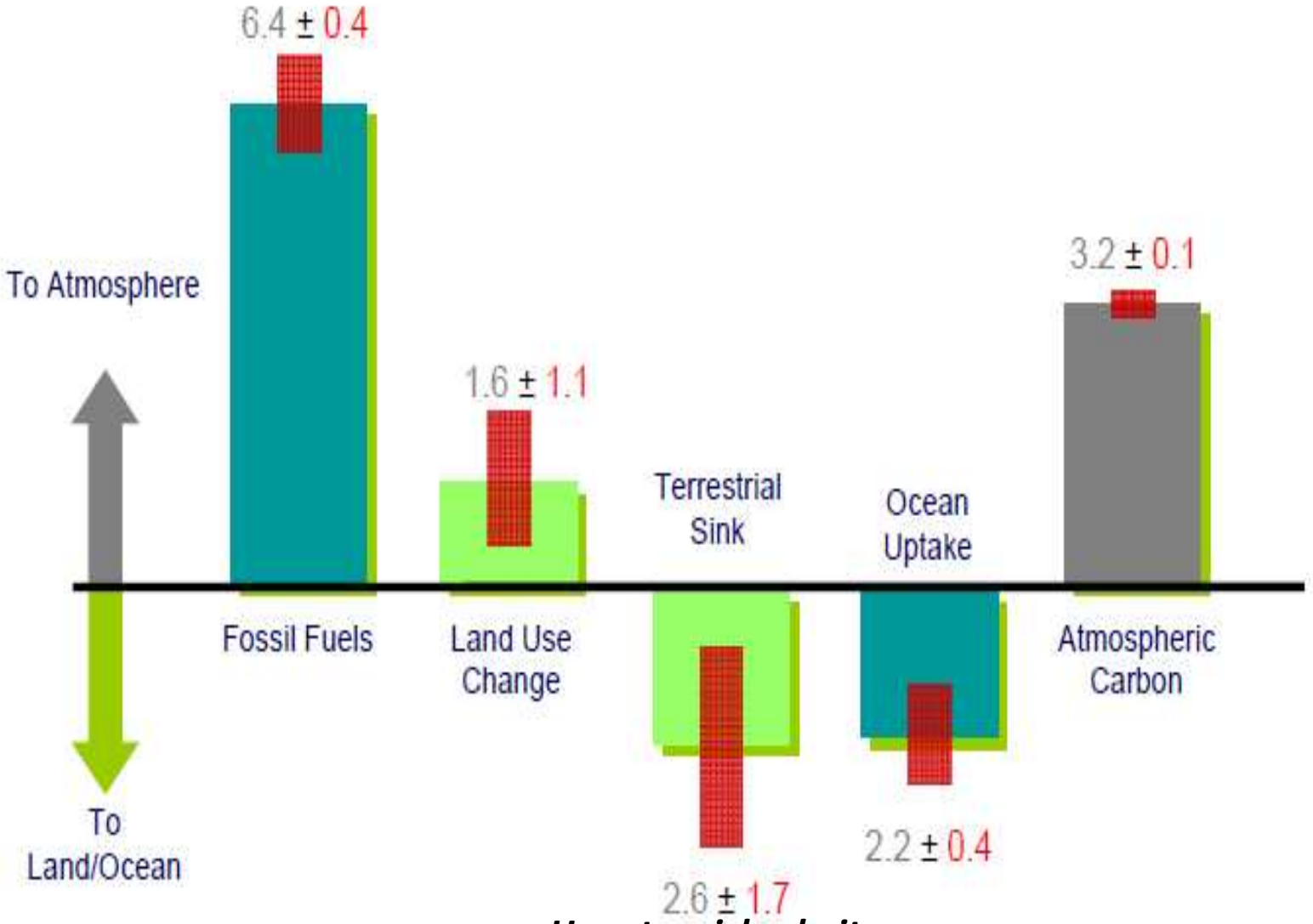
Gefahren für die Ökosysteme der Erde durch den homo sapiens

Nature, September 2009



Disturbances and Uncertainties in the Global Carbon Cycle

Störung und Unsicherheit im globalen Kohlenstoffkreislauf



Hauptunsicherheit

Main Uncertainty

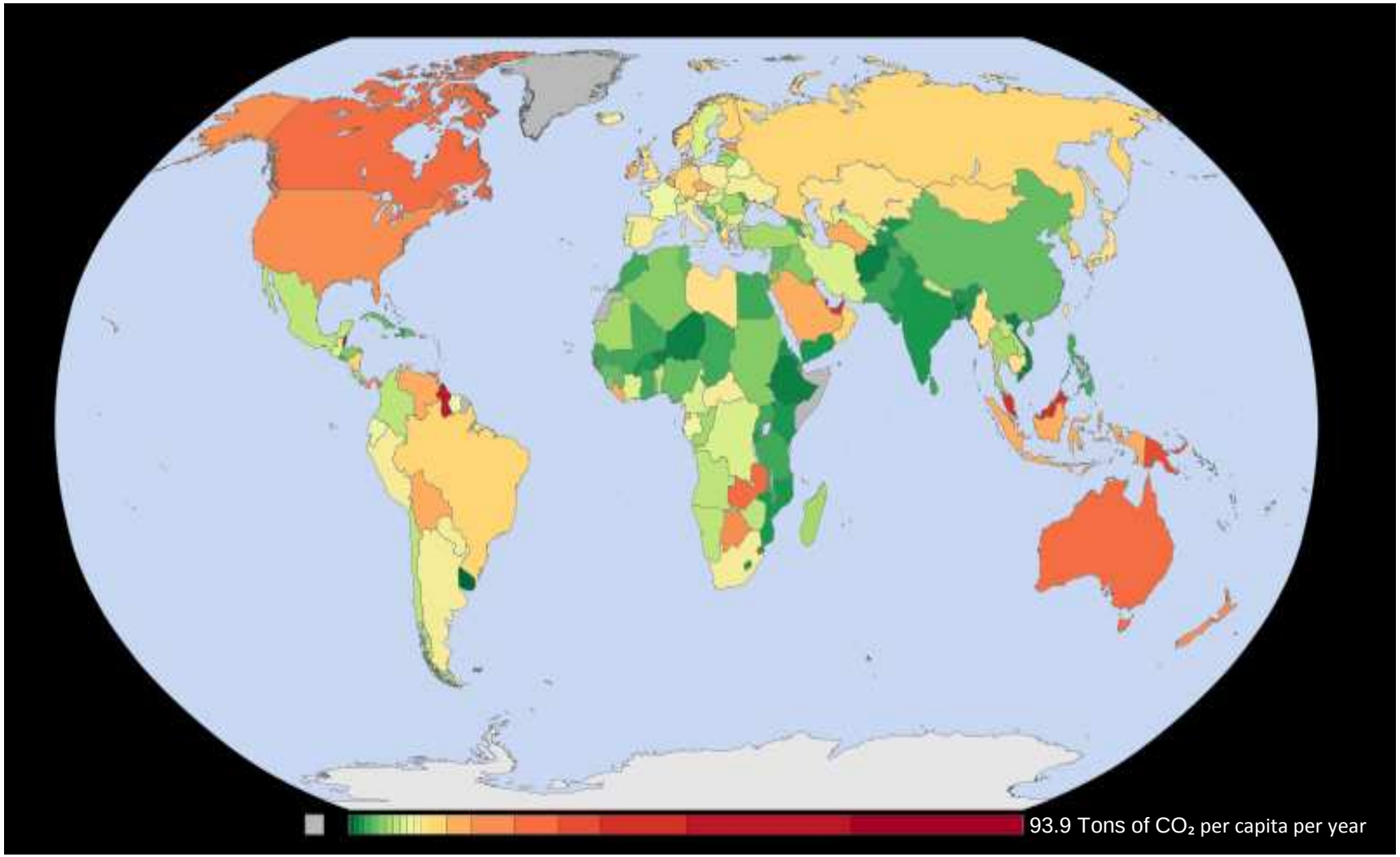
Global Emissions

We emit now about 35 Gigatons of CO_2 per year and if we add the CO_2-equivalents of CH_4 and N_2O emissions (mostly from agriculture) we reach the overall amount of about 45 Gigatons of CO_2 equivalent per year, leading to nearly 2 ppmv/year increase in CO_2 concentration in the atmosphere.

Who is emitting most?

Until recently highest per capita emissions originated from the richest quarter of the world‘s population, but now also emerging and very poor countries are among the main emitters per person per year, caused mainly by land use changes often related to agriculture

Per capita emissions of greenhouse gases in 2000 including land use change



Is Carbon Dioxide Hazardous Waste?

1. *it is an important greenhouse gas (No. 2) of the atmosphere;*

2. *it is the key substance for photosynthesis of plants;*

3. *it is the final product (exhaust) of metabolism of bacteria, fungi, animals and humans;*

4. *it is a waste originating from industrialized societies as well as from vegetation destruction and soil degradation in many other societies, because it is the main cause of observed climate change. The rapidly growing surplus in the atmosphere is hazardous.*

Path to a Sustainable Future (for any global problem)

- ***Step 1 Regular, ‚official' Scientific Assessment***
- ***Step 2 Acceptance by governments and NGOs***
- ***Step 3 Political reactions on regional, national and international scale***
- ***Step 4 International Law (e.g. Convention)***
- ***Step 5 Compliance*** (also assessed by scientists)

There is only one really successful environmental convention so far:

The Montreal Protocol as part of the Vienna Convention to Protect the Ozone Layer

How many of these steps have been implemented in other conventions?

(UN)CBD	***UNFCCC***	***UNCCD***	***MDGs***
(1), 3, 4	***1, 2, 3, 4, (5)***	***(1), 3, 4***	***3***

Importance of these conventions for food security

+++	**++**	**+++**

Impact of renewable energy systems on these conventions

-	**+++**	***?***

An Example of Recent International Law

Article 1. Objective

The objective of this Protocol is the fair and equitable sharing of the benefits arising from the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components.

Nagoya Protocol for (UN)CBD of 2010

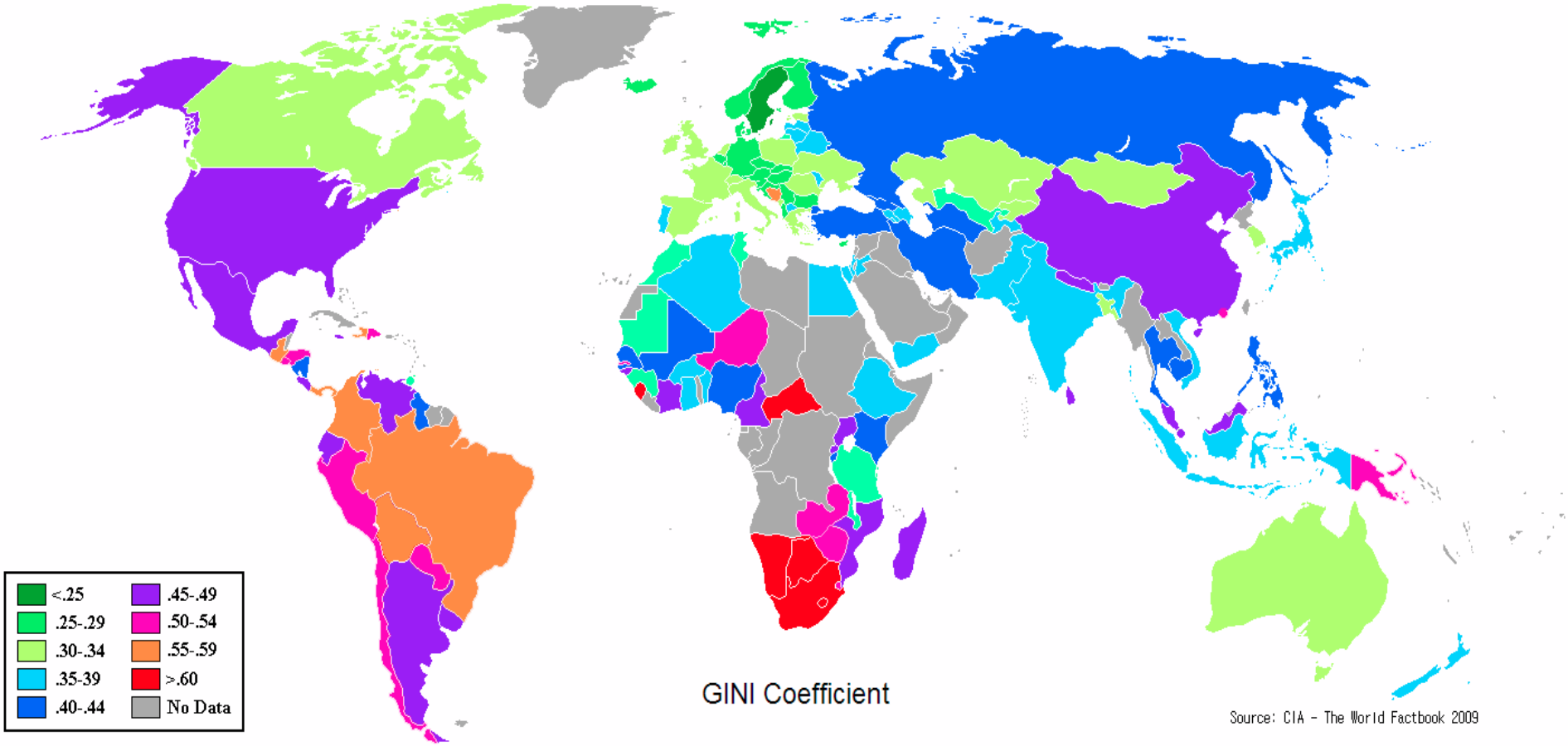
Major Reasons for Food Insecurity

- ***Too high Gini coefficients***
  (in many countries)

- ***Animal husbandry disconnected from the area***
  (mostly in rich countries)

- ***Weak governance***
  (in many developing countries)

Differences in national income equality around the world as measured by the national Gini coefficient. The Gini coefficient is a number between 0 and 1, where 0 corresponds with perfect equality (where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income, and everyone else has zero income).



A disappointing statement 15 years after the enactment of a United Nations Convention

Desertification, land degradation and drought as defined by the United Nations Convention to Combat Desertification results from dynamic, interconnected, human-environment interactions in land systems, where land includes water, soil, vegetation and humans requiring a rigorous scientific framework for monitoring and assessment, which has heretofore been lacking.

(First Science Conference of UNCCD in 2009, Buenos Aires)

The Conference result continues with:

To be sufficiently realistic and insightful in light of this complexity, monitoring and assessment must make use of a wide range of analytical methodologies, and distil their lessons into forms useful for decision makers through integrated assessment modelling.

and finally states:

Public land-use and land-management decisions are mainly taken at national and sub-national levels, and so a United Nations Convention to Combat Desertification Monitoring and Assessment Strategy should be designed to be compatible and synergistic with these levels.

The nice words of a partly successful UN conference

COP10 of UNCCD in October 2011 concludes with major progress and success

COP10 successfully concluded after two weeks of more than 6,000 delegates and participants meeting and negotiating on efforts to reverse desertification, land degradation and drought.

Final meetings of the Committees for the Review of the Implementation of the Convention and of the Whole took place with actions taken on many important issues for the COP, such as the advocacy policy framework, collaboration with the Global Environment Facility, streamlining the governance of the Global Mechanism and the Secretariat of the Convention, and approval of programme of work and budget for 2012 and 2013. The COP was called to a close at 2:00 am on Saturday morning.

"This conference has been highly successful and this is a big chance for Korea to increase its international cooperation on sustainable development issues," Dr. Lee Don Koo, Minister of the Korea Forest Service, which hosted the conference, and President of COP10, said.

"COP 10 will be remembered as the session that has brought lots of innovative both in the actions and the way parties interact among themselves," said Luc Gnacadja, Executive Secretary of the Convention.

The major outcomes of COP10 include: creating a solid scientific foundation within UNCCD; high-level political support, including the Changwon Initiative, for the process of UNCCD; and sending a strong message on combating land degradation to next year's UN Conference on Sustainable Development, often called Rio+20, to be held in Brazil next June.

"We do hope that following the path of the Republic of Korea, several other countries and international organisations will do their utmost to reinforcing actions to combat desertification and land degradation," Mr. Gnacadja said.

Agriculture at a Crossroads

IAASTD

International Assessment of Agricultural Knowledge, Science and Technology for Development





Executive Summary of the Synthesis Report

IAASTD

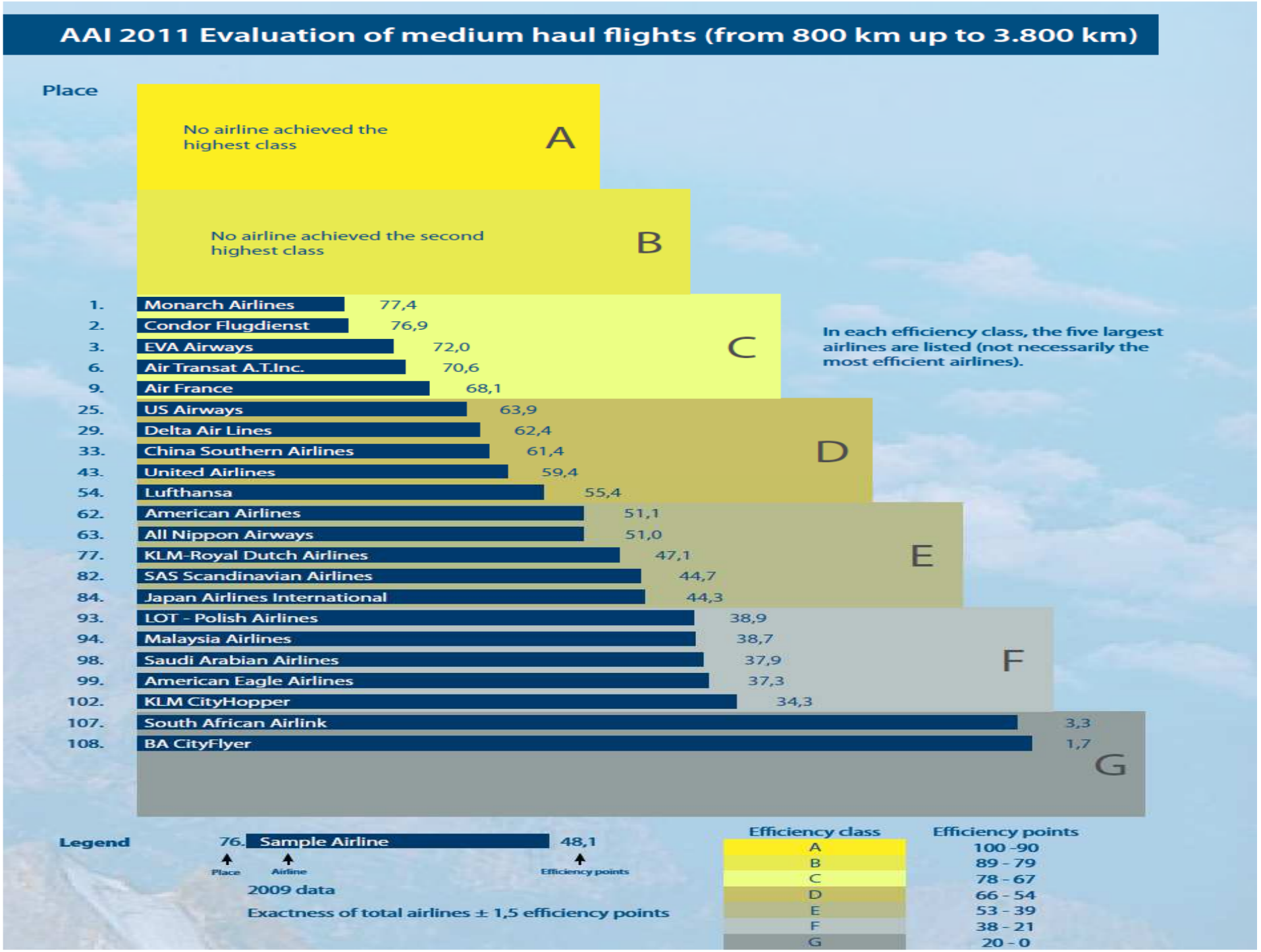
International Assessment of Agricultural Knowledge, Science and Technology for Development

***Armenia, Azerbaijan, Bahrain, Bangladesh, Belize, Benin, Bhutan, Botswana, Brazil, Cameroon, People's Republic of China, Costa Rica, Cuba, Democratic Republic of Congo, Dominican Republic, El Salvador, Ethiopia, Finland, France, Gambia, Ghana, Honduras, India, Iran, Ireland, Kenya, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Libyan Arab Jamahiriya, Maldives, Republic of Moldova, Mozambique, Namibia, Nigeria, Pakistan, Panama, Paraguay, Philippines, Poland, Republic of Palau,Romania, Saudi Arabia, Senegal, Solomon Islands, Swaziland, Sweden, Switzerland, United Republic of Tanzania, Timor-Leste, Togo, Tunisia, Turkey, Uganda, United Kingdom of Great Britain and Northern Ireland, Uruguay, Viet Nam, Zambia (58* countries).**

While approving the above statement the following governments did not fully approve the Executive Summary of the Synthesis Report and their reservations are entered in Annex A. *Australia, Canada, United States of America (3 countries).*

An example for a new global monitoring index: The atmosfair Airline Index

AAI 2011 Evaluation of medium haul flights (from 800 km up to 3.800 km)

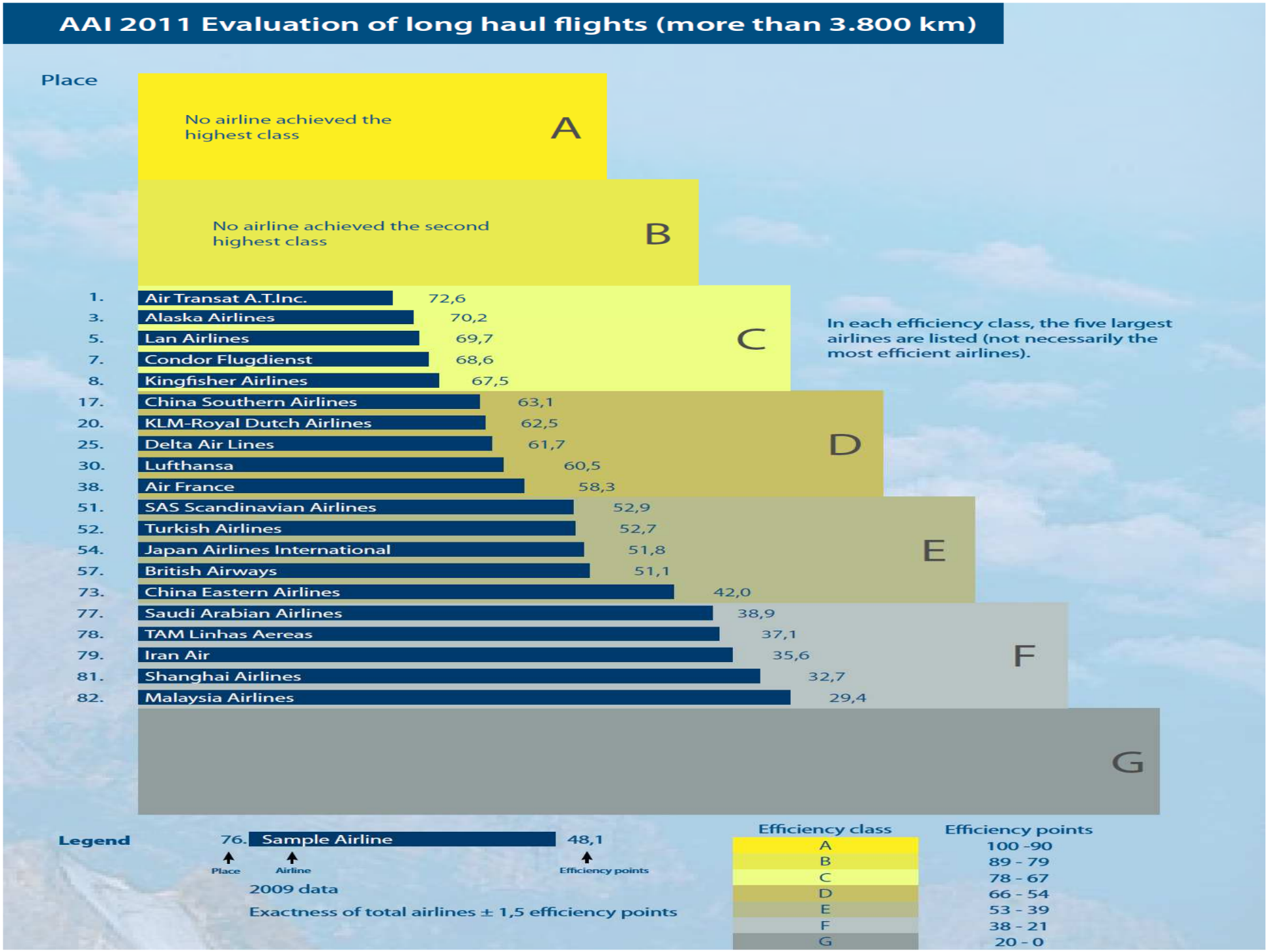


Main Conclusion

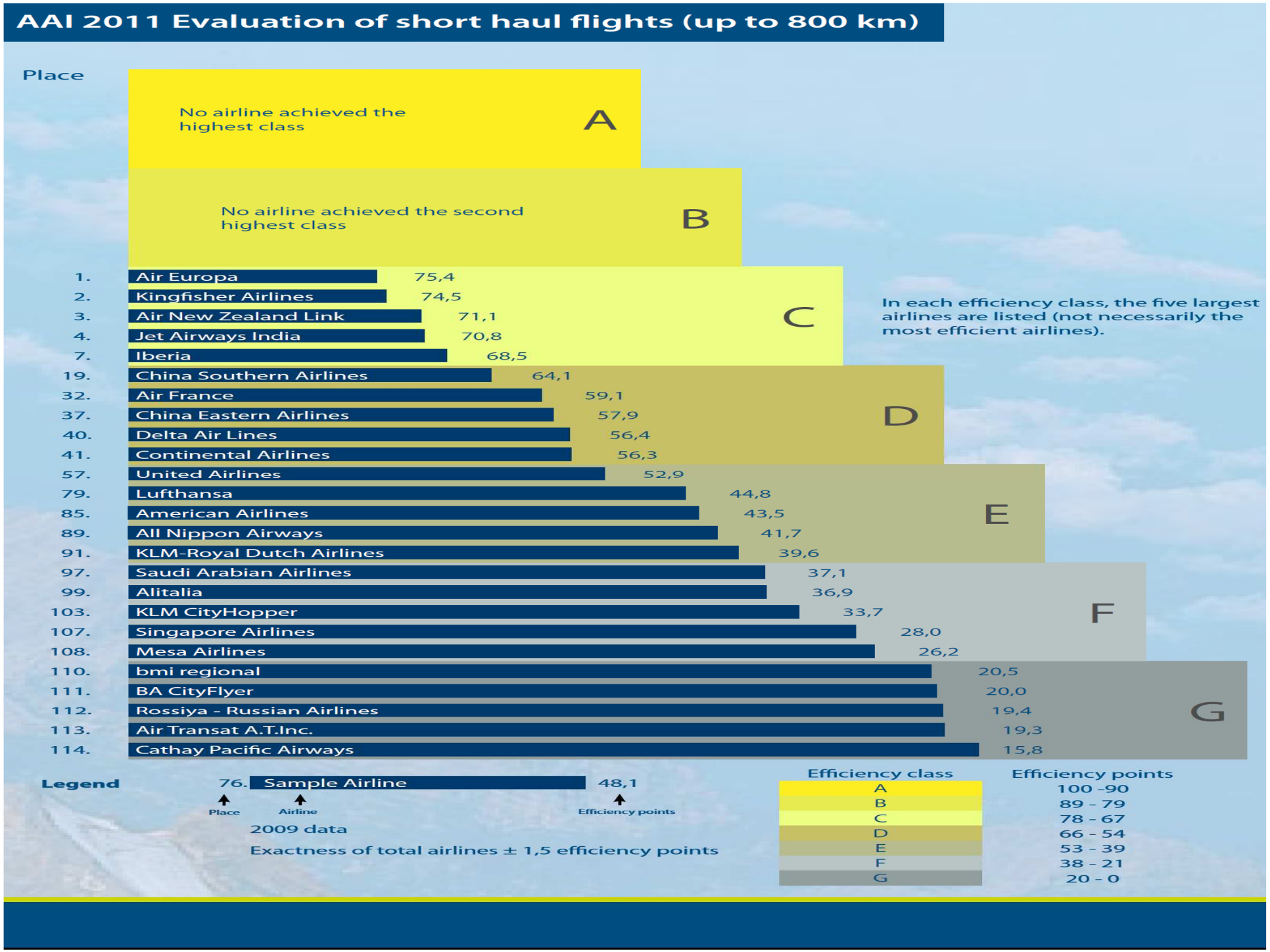
We urgently need at least IAASTD 2

Rio+20 should in addition decide on the scientific assessment bodies for all those environmental conventions without a rigorous scientific assessment so far and their co-ordination

AAI 2011 Evaluation of long haul flights (more than 3.800 km)



AAI 2011 Evaluation of short haul flights (up to 800 km)



Detailed ranking (1)

Overall ranking						Distance-based ranking								
						<800 km			800–3800 km			>3800 km		
Place	Airline	EP*	EC*	Type*	Pax (in Mio.)*	EP*	EC*	Place	EP*	EC*	Place	EP*	EC*	Place
1	Monarch Airlines	77,4	C	Charter	6,1				77,4	C	1			
2	Condor Flugdienst	73,5	C	Charter	5,6	64,9	D	17	76,9	C	2	68,6	C	7
3	Air Transat A.T.Inc.	71,8	C	NetCarrier	3,2	19,3	G	113	70,6	C	6	72,6	C	1
4	Air New Zealand Link	71,1	C	Regional	4,0	71,1	C	3						
5	Kingfisher Airlines	70,3	C	NetCarrier	11,0	74,5	C	2	67,7	C	11	67,5	C	8
6	EVA Airways	70,0	C	NetCarrier	6,0	66,8	D	13	72,0	C	3	69,1	C	6
7	Air Europa	69,6	C	NetCarrier	9,0	75,4	C	1	71,3	C	5	64,8	D	12
8	Srilankan Airlines	68,7	C	NetCarrier	2,6	63,2	D	21	66,6	D	17	71,7	C	2
9	TAM Regional[1]	68,6	C	Regional	1,1	69,1	C	6	58,6	D	47			
10	Edelweiss Air	68,0	C	Charter	0,59	66,5	D	14	71,9	C	4	62,5	D	19
11	QantasLink	67,3	C	Regional	4,1	67,5	C	11	60,7	D	38			
12	Hawaiian Airlines	66,4	D	NetCarrier	8,3	69,5	C	5				65,6	D	10
13	Shenzhen Airlines	66,1	D	NetCarrier	15,1	67,9	C	10	65,8	D	18	56,7	D	46
14	Jet Airways India	65,7	D	NetCarrier	12,0	70,8	C	4	66,6	D	16	61,2	D	26
15	Virgin America	65,4	D	NetCarrier	3,7	58,1	D	36	67,8	C	10	65,8	D	9
16	Sichuan Airlines	64,9	D	NetCarrier	9,2	62,3	D	26	65,4	D	19			
17	Martinair Holland	64,4	D	NetCarrier	0,1							64,4	D	13
17	China Airlines	64,4	D	NetCarrier	10,0	62,8	D	23	68,3	C	8	61,9	D	24
19	Lan Airlines	64,2	D	NetCarrier	15,4	53,4	E	53	62,3	D	31	69,7	C	5
20	Korean Air	63,8	D	NetCarrier	20,7	58,4	D	33	66,7	D	14	63,5	D	15
21	Icelandair	63,7	D	NetCarrier	1,3	64,8	D	18	64,0	D	24	63,3	D	16
21	Hainan Airlines	63,7	D	NetCarrier	17,4	68,0	C	9	64,4	D	21	51,6	E	55
23	Dragonair	63,4	D	NetCarrier	6,0	62,7	D	24	63,6	D	26	62,7	D	18
24	Alaska Airlines	63,3	D	NetCarrier	15,6	45,7	E	74	63,4	D	27	70,2	C	3
25	Iberia	63,2	D	NetCarrier	20,5	68,5	C	7	70,4	C	7	56,1	D	48
26	Avianca	63,1	D	NetCarrier	9,3	55,3	D	44	64,1	D	23	70,2	C	4
27	Shandong Airlines	63,0	D	NetCarrier	6,6	63,3	D	20	62,8	D	28			
28	Air India Express	62,6	D	Regional	2,5	68,4	C	8	62,3	D	30			
29	US Airways	62,5	D	NetCarrier	51,0	55,3	D	43	63,9	D	25	61,0	D	27
30	Emirates	61,9	D	NetCarrier	27,5	53,2	E	56	60,8	D	37	62,4	D	22
30	China Southern Airlines	61,9	D	NetCarrier	66,3	64,1	D	19	61,4	D	33	63,1	D	17
32	Swiss/Crossair	61,8	D	NetCarrier	14,0	65,6	D	15	67,0	C	12	57,9	D	39
33	Delta Air Lines	61,7	D	NetCarrier	161,0	56,4	D	40	62,4	D	29	61,7	D	25
34	S7 Airlines	61,5	D	NetCarrier	4,6	59,7	D	30	61,2	D	34	65,4	D	11
35	Thomas Cook Airlines	60,8	D	Charter	8,2	61,3	D	27	61,1	D	35	60,2	D	32
36	Philippine Airlines	60,6	D	NetCarrier	9,4	65,6	D	16	62,0	D	32	56,7	D	44
37	Air France	60,5	D	NetCarrier	48,0	59,1	D	32	68,1	C	9	58,3	D	38
38	Continental Airlines	60,3	D	NetCarrier	45,6	56,3	D	41	60,2	D	39	60,7	D	29
39	El Al Israel Airlines	60,1	D	NetCarrier	3,8	67,2	C	12	60,8	D	36	59,3	D	36
40	Air China	60,0	D	NetCarrier	39,8	60,1	D	29	59,7	D	41	60,9	D	28
41	Qantas Airways	59,9	D	NetCarrier	38,4	50,7	E	61	65,0	D	20	57,4	D	40
42	Singapore Airlines	59,5	D	NetCarrier	16,5	28,0	F	107	66,7	D	13	58,6	D	37
43	Austrian Airlines AG	59,4	D	NetCarrier	9,9	58,3	D	34	59,0	D	44	60,2	D	31
44	All Nippon Airways Regional[2]	59,3	D	Regional	1,6	59,3	D	31						
45	Cathay Pacific Airways	59,1	D	NetCarrier	24,6	15,8	G	114	64,3	D	22	56,8	D	42
46	Turkish Airlines	58,8	D	NetCarrier	25,1	63,0	D	22	59,7	D	40	52,7	E	52
47	Air Canada	58,5	D	NetCarrier	30,9	54,8	D	46	56,3	D	50	62,4	D	21
48	United Airlines	58,1	D	NetCarrier	56,1	52,9	E	57	59,4	D	43	57,1	D	41
49	Asiana Airlines	58,0	D	NetCarrier	13,4	50,0	E	63	55,2	D	56	63,7	D	14
50	KLM-Royal Dutch Airlines	57,9	D	NetCarrier	22,3	39,6	E	91	47,1	E	77	62,5	D	20
51	Qatar Airways	57,6	D	NetCarrier	10,2	58,3	D	35	59,6	D	42	56,7	D	45
52	Lufthansa German Airlines	56,6	D	NetCarrier	55,6	44,8	E	79	55,4	D	54	60,5	D	30
53	Ethiopian Airlines	56,5	D	NetCarrier	2,9	62,3	D	25	55,1	D	57	56,7	D	43
53	China Eastern Airlines	56,5	D	NetCarrier	44,0	57,9	D	37	58,0	D	48	42,0	E	73
55	Malaysia Airlines Swings	55,7	D	Regional	1,0	55,7	D	42						
56	Finnair	55,5	D	NetCarrier	7,4	43,8	E	84	58,7	D	46	55,2	D	49
57	TAP Air Portugal	55,1	D	NetCarrier	8,4	52,5	E	58	57,2	D	49	52,3	E	53
58	Transaero	54,5	D	NetCarrier	5,0	53,6	E	51	50,4	E	67	59,3	D	34
59	Iberia Regional Air Nostrum	54,2	D	Regional	0,5	57,2	D	39	48,0	E	74			
60	Thai Airways International	54,0	D	NetCarrier	13,4	60,1	D	28	58,9	D	45	50,7	E	59

* EP: Efficiency points; EC: Efficiency class;
* Pax: passenger figures are from Air Transport Intelligence, a service of ICAO.data.com, IATA WATS and other sources
* Type: the breakdown of airlines into categories was carried out via Air Transport Intelligence and other sources

[1] There is no airline called TAM Regional. This is the fictitious blanket designation used by the AAI for the four airlines which fly the regional routes for TAM Linhas Aéreas: these are NHT Linhas Aéreas, Passaredo Linhas Aéreas, TRIP Linhas Aéreas and Pantanal Linhas Aéreas.
[2] There is no airline called Nippon Airways Regional. This is the fictitious blanket designation used by the AAI for the three airlines which fly the regional routes for All Nippon Airways: these are Air Nippon, Air Next und Air Nippon Network.