



Antonis Mavropoulos
CEO and Founder of D-Waste

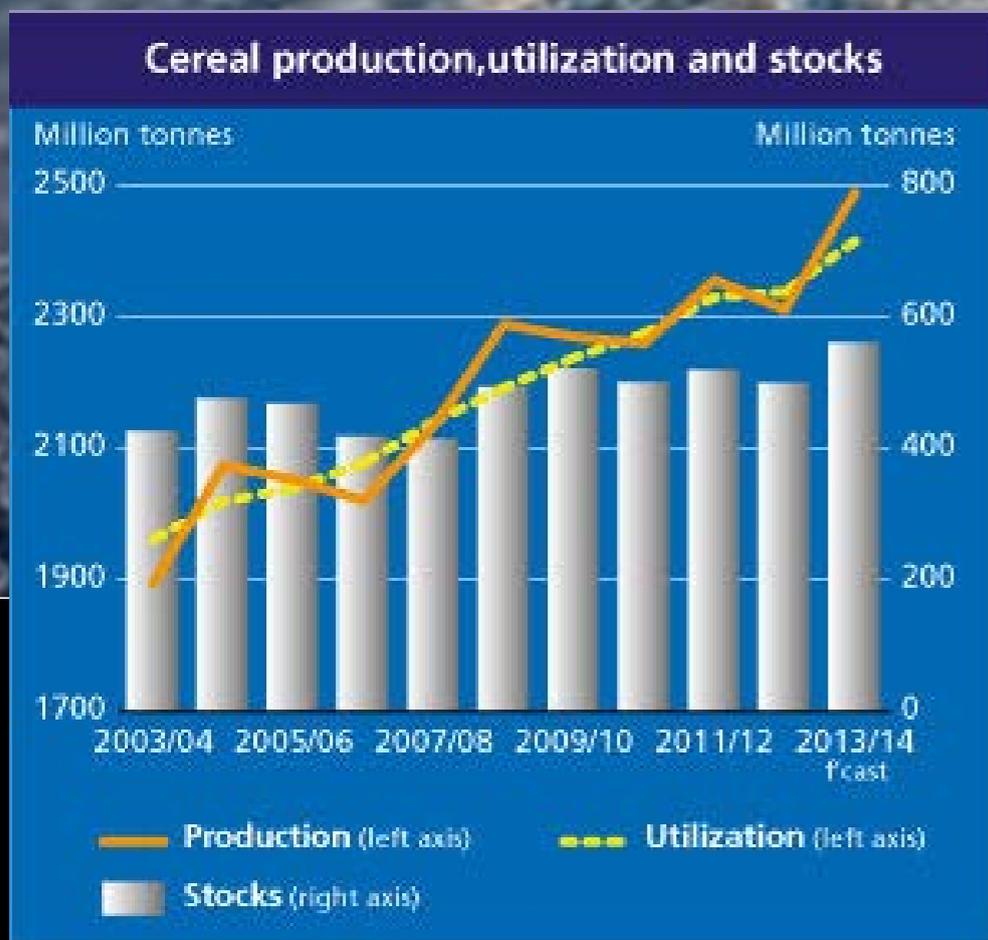
antonis.mavropoulos@d-waste.com

Presentation

This is a presentation of Antonis Mavropoulos, ISWA STC chair, made in ISWA World Congress 2013 at Vienna. The presentation displays global figures of waste management and makes a forecast utilizing the data and graphs provided on Waste Atlas (www.atlas.d-waste.com).

290-316 million tonnes is
the weight of the current
population

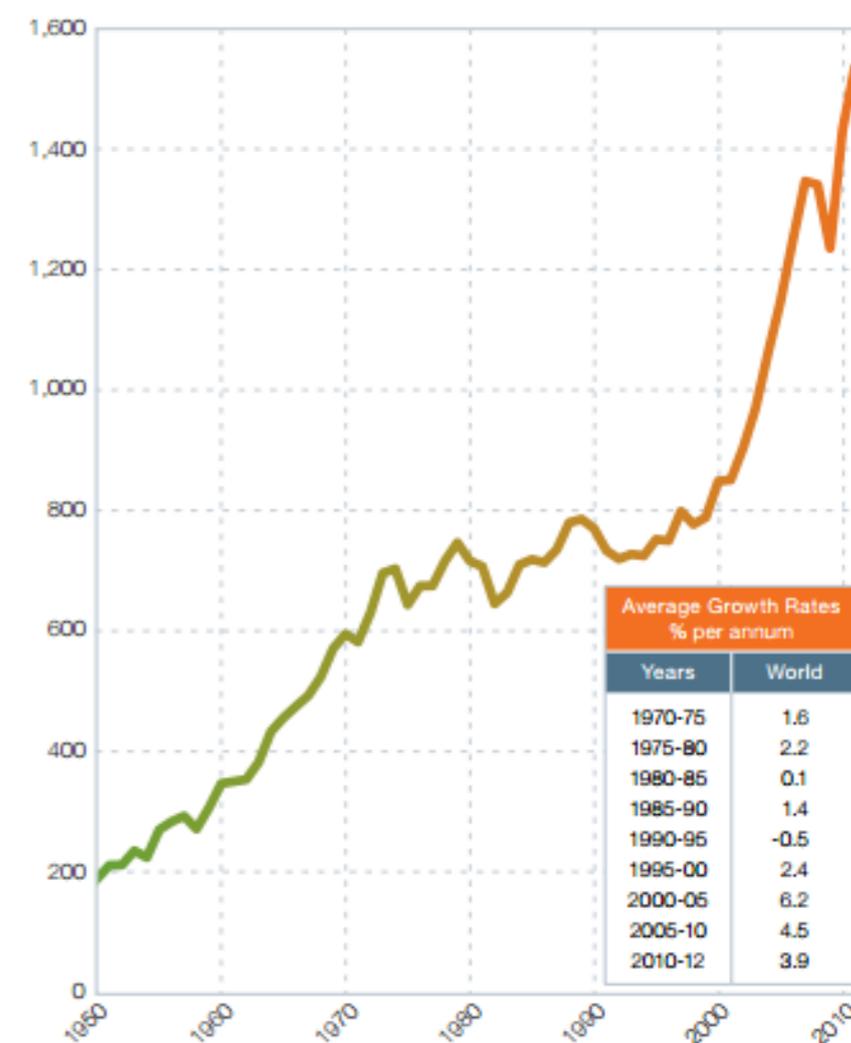
300 million tonnes is
the global annual
meat production



million tonnes

Years	World
1970	595
1975	644
1980	717
1985	719
1990	770
1995	752
1996	750
1997	799
1998	777
1999	789
2000	849
2001	851

Years	World
2002	904
2003	970
2004	1,061
2005	1,147
2006	1,249
2007	1,347
2008	1,341
2009	1,236
2010	1,432
2011	1,536
2012	1,547



It is about...

Waste generation

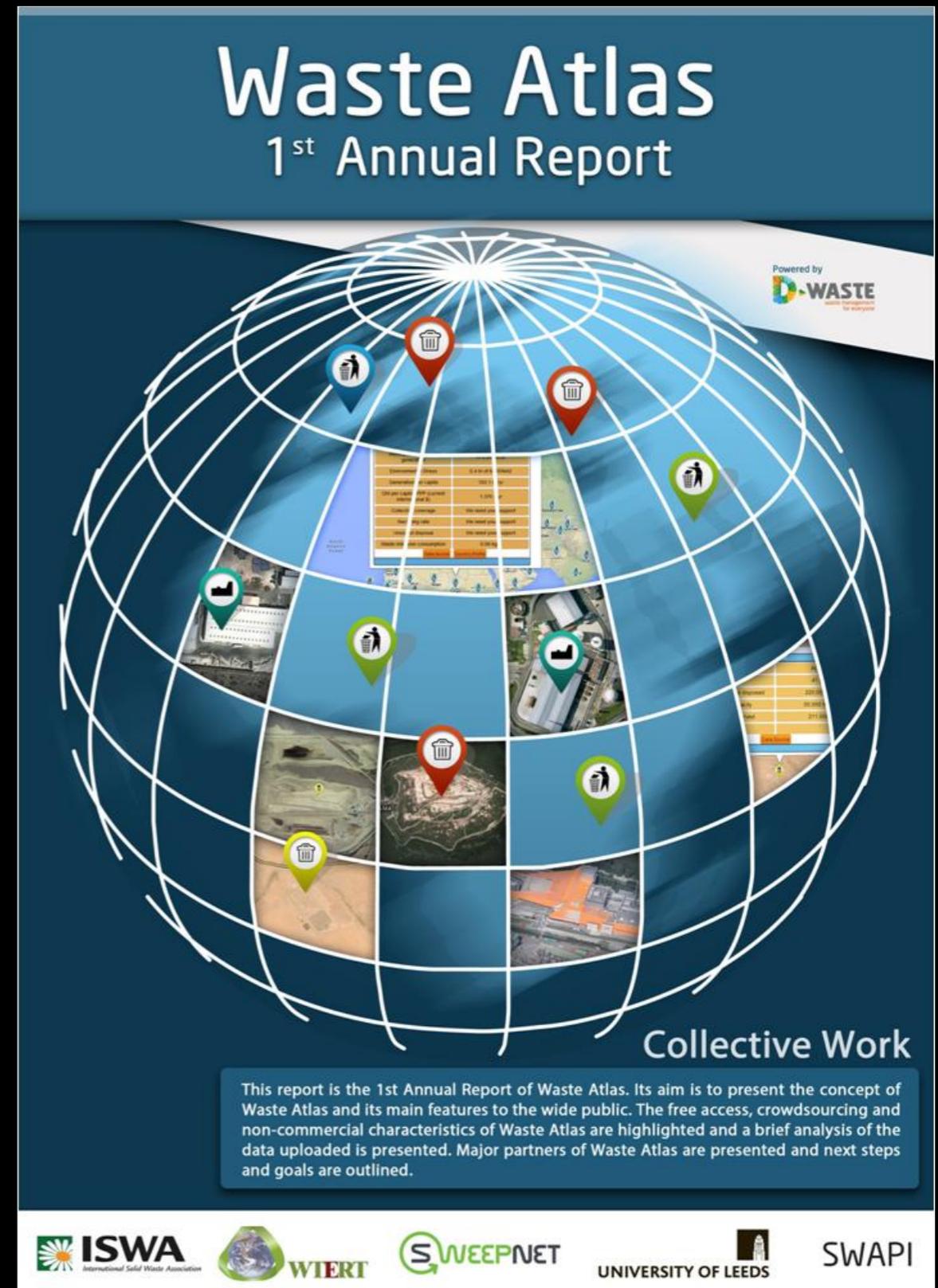
Waste forecast

Waste management

Concluding remarks

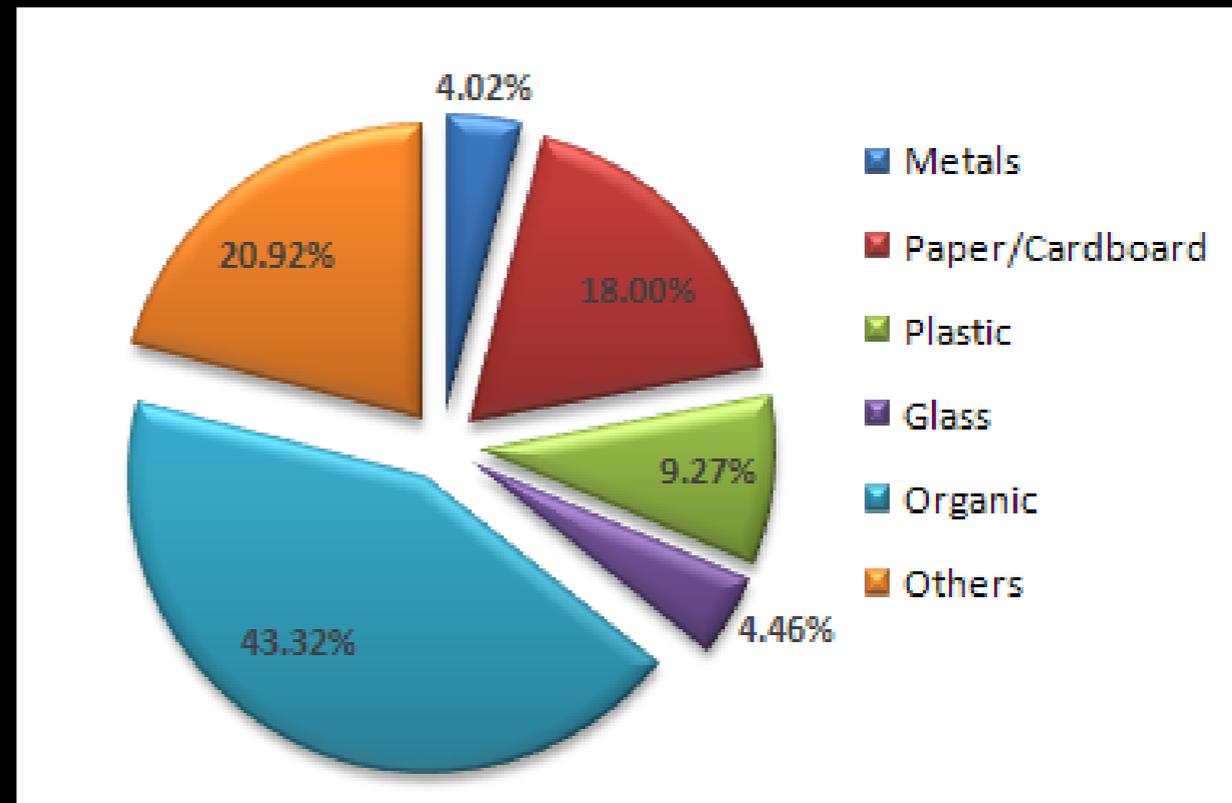
Based on

www.atlas.d-waste.com

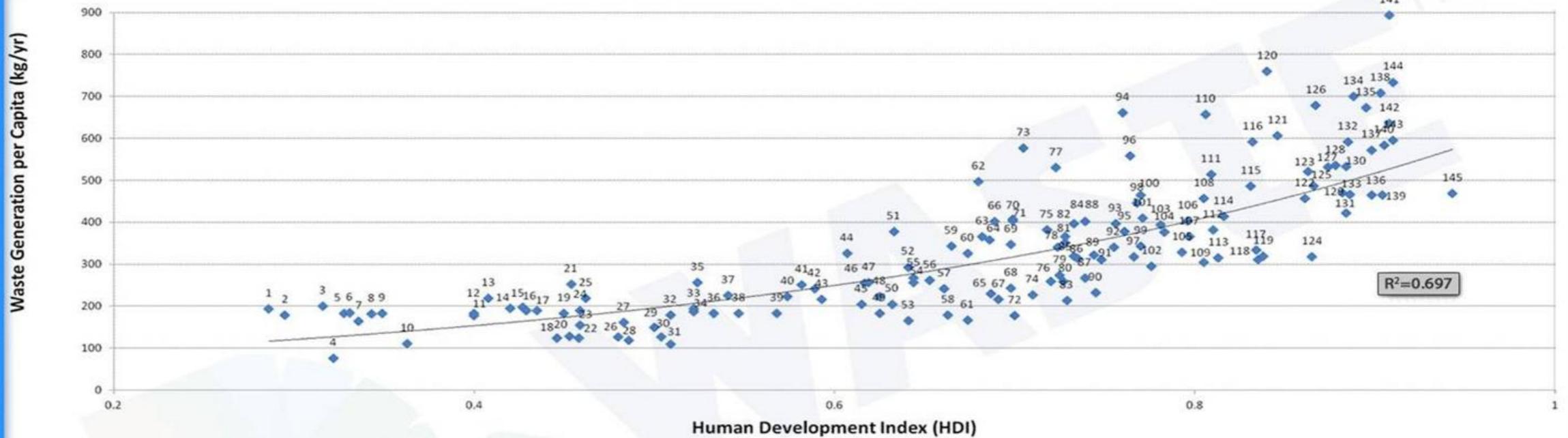


Waste generation

1.9 billion tons MSW
270 kg/ cap/ year
0.047 kg/\$ spent



Waste Generation per Capita vs HDI



1-Congo, Dem. Rep.	10-Ethiopia	19-Lesotho	28-Angola	37-Ghana	46-Indonesia	55-Philippines	64-Turkmenistan	73-Oman	82-Mauritius	91-Grenada	100-Saudi Arabia	109-Latvia	118-Estonia	127-Italy	136-Hong Kong SAR, China
2-Niger	11-Cote d'Ivoire	20-Mauritania	29-Bangladesh	38-India	47-South Africa	56-Mongolia	65-China	74-Colombia	83-Ukraine	92-Russian Federation	101-Bulgaria	110-Bahrain	119-Brunei	128-Spain	137-Iceland
3-Burundi	12-Malawi	21-Haiti	30-Pakistan	39-Cape Verde	48-Honduras	57-Maldives	66-Dominican Republic	75-Brazil	84-Bosnia and Herzegovina	93-Belarus	102-Cuba	111-Portugal	120-Cyprus	129-Finland	138-Switzerland
4-Mozambique	13-Sudan	22-Nepal	31-Kenya	40-Guatemala	49-Namibia	58-Bolivia	67-Sri Lanka	76-Ecuador	85-Georgia	94-Trinidad and Tobago	103-Romania	112-Lithuania	121-United Arab Emirates	130-France	139-Sweden
5-Chad	14-Gambia, The	23-Nigeria	32-Sao Tome and Principe	41-Morocco	50-Syrian Arab Republic	59-Paraguay	68-Algeria	77-St. Lucia	86-Venezuela, RB	95-Malaysia	104-Uruguay	113-Poland	122-Greece	131-Slovenia	140-Germany
6-Burkina Faso	15-Benin	24-Senegal	33-Bhutan	42-Nicaragua	51-Botswana	60-El Salvador	69-Jordan	78-Dominica	87-Albania	96-Antigua and Barbuda	105-Barbados	114-Hungary	123-United Kingdom	132-Austria	141-Canada
7-Sierra Leone	16-Rwanda	25-Yemen, Rep.	34-Swaziland	43-Vietnam	52-Palestine	61-Gabon	70-Belize	79-Peru	88-Lebanon	97-Serbia	106-Croatia	115-Qatar	124-Czech Republic	133-Belgium	142-Ireland
8-Central African Republic	17-Togo	26-Madagascar	35-Lao PDR	44-Tajikistan	53-Uzbekistan	62-Suriname	71-Turkey	80-Jamaica	89-Costa Rica	98-Panama	107-Argentina	116-Malta	125-Singapore	134-Israel	143-Netherlands
9-Eritrea	18-Uganda	27-Myanmar	36-Congo, Rep.	45-Kyrgyz Republic	54-Egypt, Arab Rep.	63-Thailand	72-Azerbaijan	81-FYROM	90-Kazakhstan	99-Mexico	108-Chile	117-Slovak Republic	126-Luxembourg	135-Denmark	144-United States
															145-Norway

Definitions

Waste Generation per capita (kg/yr):

The average amount of Municipal Solid Waste (MSW) generated annually per person.

Human Development Index (HDI)

A composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living.



Waste Generation per Capita VS Household Final Consumption Expenditure per Capita



Household Final Consumption Expenditure per Capita (current US \$/yr)

1-Congo, Dem. Rep.	11-Tanzania	21-Togo	31-Mauritania	41-Ghana	51-China	61-Guyana	71-Guatemala	81-Malaysia	91-Dominica	101-Venezuela, RB	111-Croatia	121-Malta	131-Hong Kong SAR, China	141-Finland
2-Niger	12-Uganda	22-Bangladesh	32-India	42-Algeria	52-Turkmenistan	62-Angola	72-Swaziland	82-Jordan	92-Argentina	102-Mauritius	112-Lithuania	122-Macao SAR, China	132-Iceland	142-Austria
3-Eritrea	13-Benin	23-Gambia, The	33-Kyrgyz Republic	43-Congo, Rep.	53-Ukraine	63-Paraguay	73-Belarus	83-Bulgaria	93-Saudi Arabia	103-Brunei Darussalam	113-Chile	123-Slovenia	133-Italy	143-Japan
4-Burundi	14-Nicaragua	24-Serbia	34-Vietnam	44-Bolivia	54-Morocco	64-Cuba	74-Fiji	84-St. Lucia	94-Grenada	104-Costa Rica	114-Hungary	124-Portugal	134-Netherlands	144-Germany
5-Malawi	15-Mozambique	25-Kenya	35-Senegal	45-Mongolia	55-Egypt, Arab Rep.	65-Cape Verde	75-El Salvador	85-Jamaica	95-Mexico	105-Seychelles	115-Uruguay	125-Cyprus	135-United Arab Emirates	145-Canada
6-Sierra Leone	16-Central African Republic	26-Zimbabwe	36-Lao PDR	46-Sri Lanka	56-Syrian Arab Republic	66-Ecuador	76-Albania	86-Colombia	96-Romania	106-Estonia	116-Czech Republic	126-Kuwait	136-Belgium	146-Denmark
7-Burkina Faso	17-Rwanda	27-Tajikistan	37-Cote d'Ivoire	47-Iran, Islamic Rep.	57-Indonesia	67-Georgia	77-Macedonia, FYR	87-South Africa	97-Russian Federation	107-Poland	117-Slovak Republic	127-Spain	137-France	147-United States
8-Ethiopia	18-Haiti	28-Uzbekistan	38-Yemen, Rep.	48-Philippines	58-Suriname	68-Thailand	78-Gabon	88-Panama	98-Lebanon	108-Brazil	118-Korea, Rep.	128-Singapore	138-Luxembourg	148-Switzerland
9-Mali	19-Chad	29-Cameroon	39-Sudan	49-Azerbaijan	59-Namibia	69-Armenia	79-Peru	89-Dominican Republic	99-Barbados	109-Latvia	119-Qatar	129-Israel	139-Ireland	149-Sweden
10-Madagascar	20-Nepal	30-Pakistan	40-Lesotho	50-Honduras	60-Belize	70-Tunisia	80-Botswana	90-Kazakhstan	100-Oman	110-Turkey	120-Antigua and Barbuda	130-Greece	140-Sweden	

Definitions

Waste Generation per capita (kg/yr):

The average amount of Municipal Solid Waste (MSW) generated annually per person.

Household final consumption expenditure (current US\$)

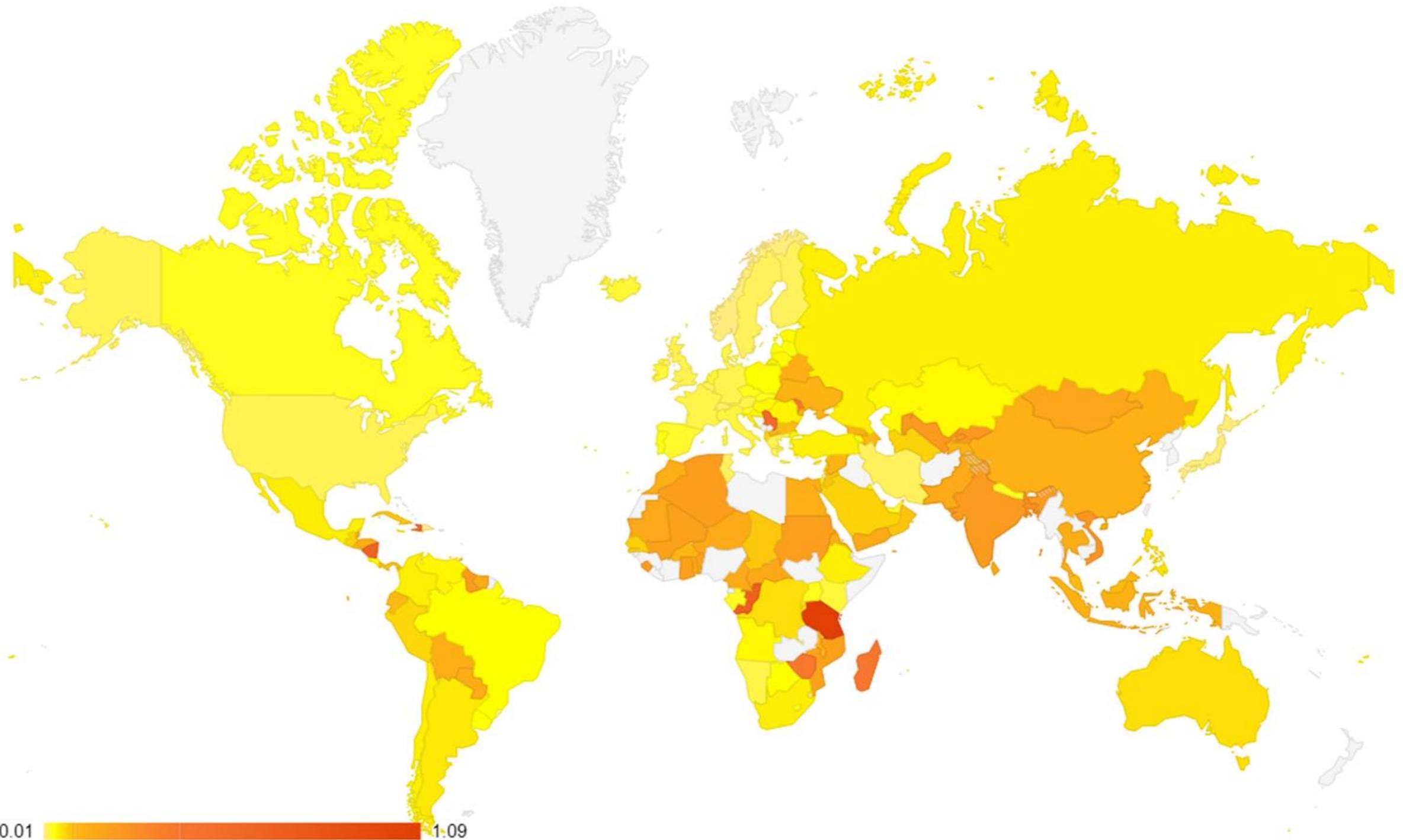
Household final consumption expenditure per capita is an indicator generated by D-Waste by dividing the Household Final Consumption expenditure of each country with its total population. This indicator is used to correlate the waste generation patterns with the consumption patterns. Data for Final Household Consumption Expenditure per Capita are in current U.S. dollars per person.



SWAPI

Waste Intensive Consumption (kg/\$)

The amount of Municipal Solid Waste generated in a country per dollar of household consumption expenditure.



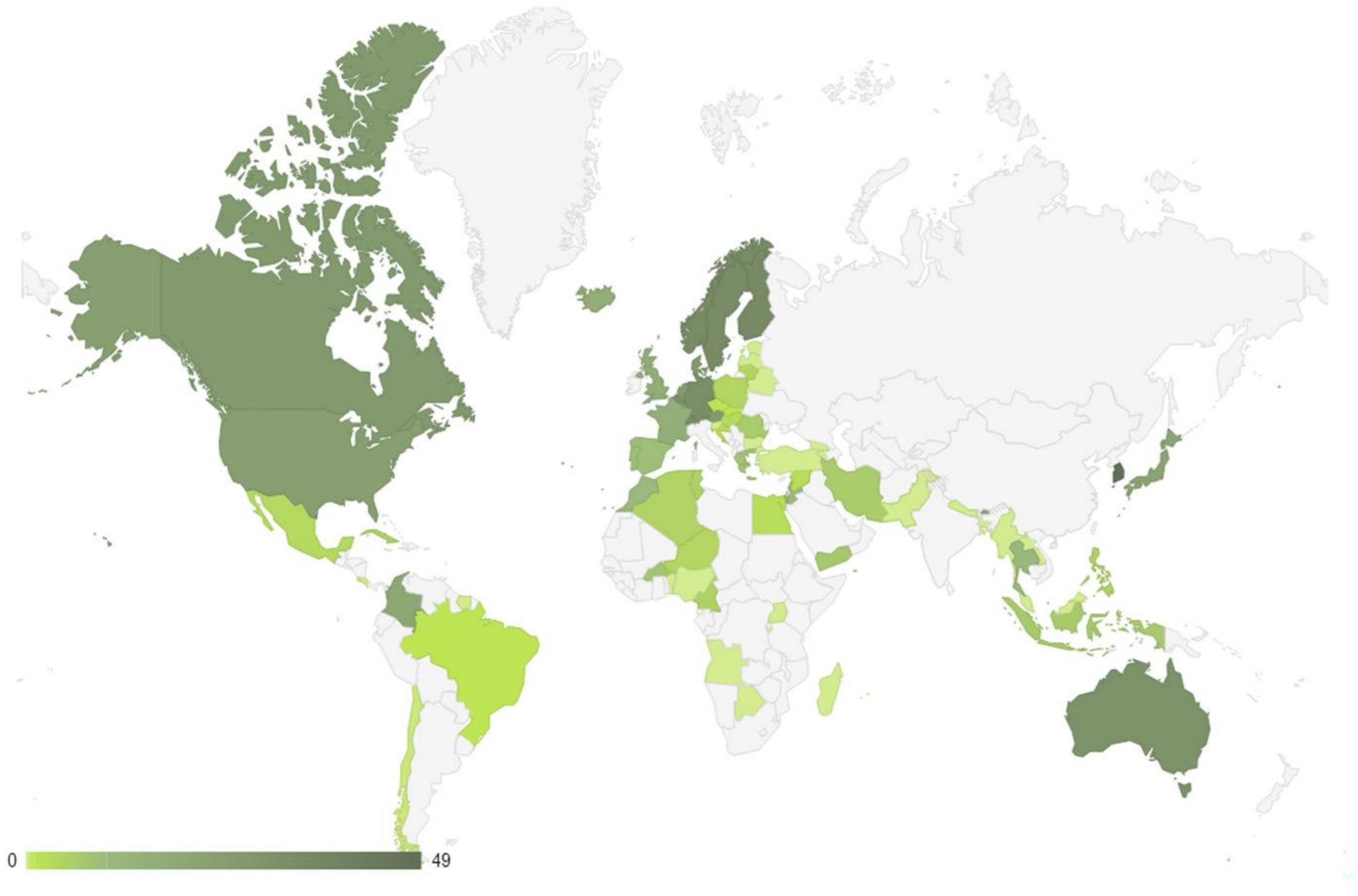
0.01 1.09

Waste management

Indicators	Number of countries counted
Recycling rate 15.42%	91
Unsound disposal rate 37.1%	101
Environmental Stress 14.8 tons/km ²	162
Collection Coverage 50% in population, 70% in waste	112

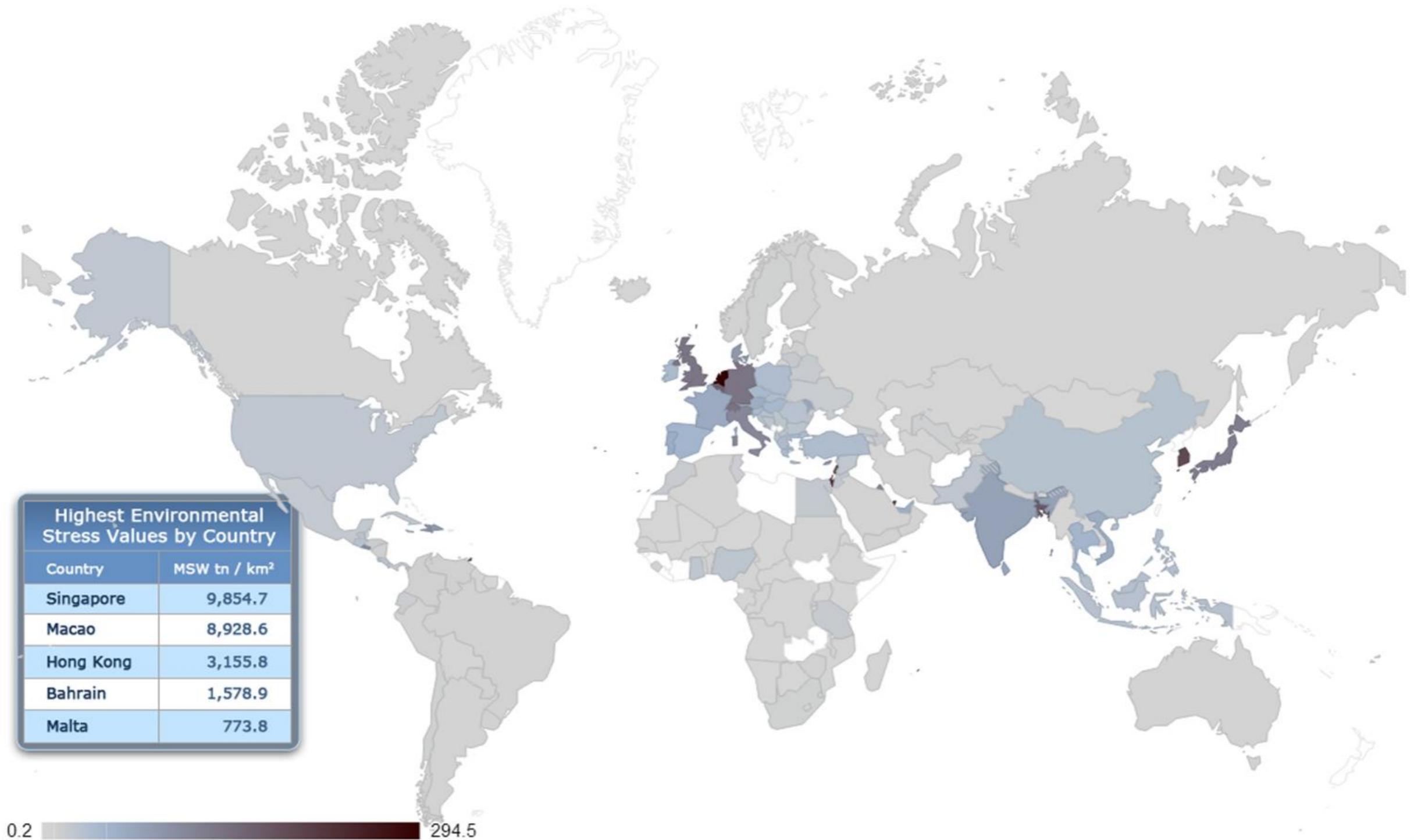
Recycling Rate (%)

The amount of Municipal Solid Waste (MSW) recycled as a proportion of total MSW generated.

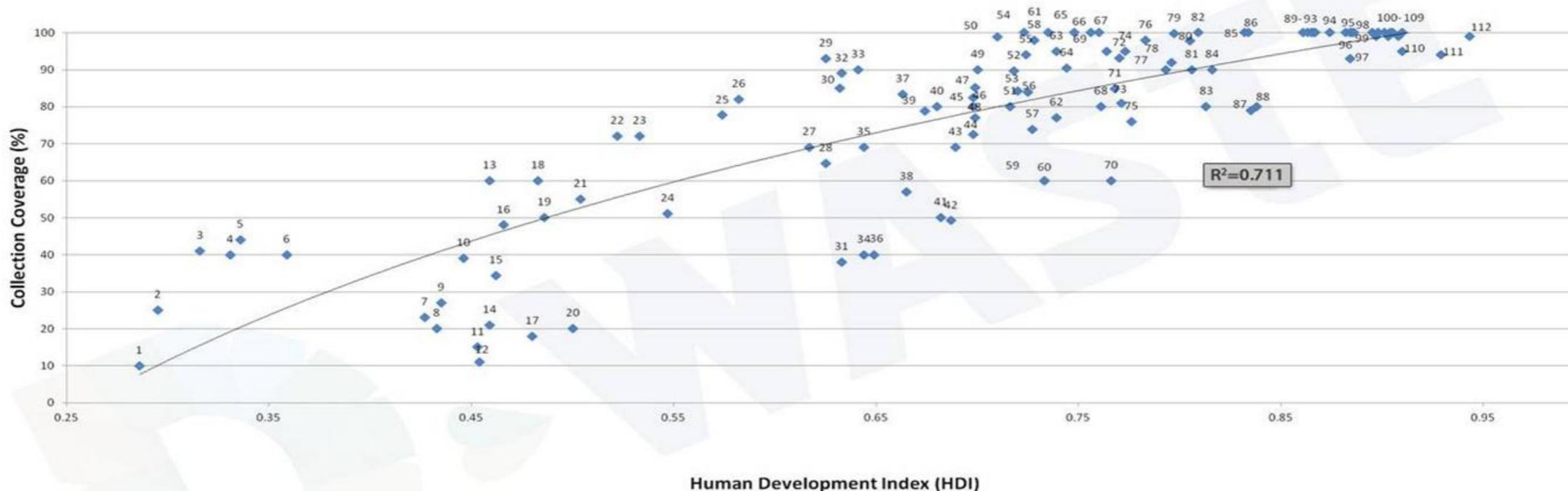


Environmental Stress (tn of MSW/km²)

The amount of the municipal solid waste generated in a country divided by country's area, expressed in tons per square kilometer (tons/km²).



Collection Coverage vs HDI



1-Congo, Dem. Rep.	10-Uganda	19-Angola	28-Honduras	37-China	46-Tunisia	55-Costa Rica	64-Costa Rica	73-Bulgaria	82-Portugal	91-Czech Republic	100-Denmark	109-Netherlands
2-Niger	11-Mauritania	20-Bangladesh	29-Namibia	38-Dominican Republic	47-Belize	56-Grenada	65-Grenada	74-Seychelles	83-Poland	92-Singapore	101-Korea, Rep.	110-United States
3-Burundi	12-Haiti	21-Pakistan	30-Syrian Arab Republic	39-Alg37-Bolivia	48-Turkey	5755-Dominica	66-Belarus	75-Cuba	84-Hungary	93-Luxembourg	102-Hong Kong SAR, China	111-Australia
4-Burkina Faso	13-Nigeria	22-Bhutan	31-Botswana	38-Paraguay	49-Azerbaijan	56-Peru	67-Trinidad and Tobago	76-Uruguay	85-Malta	94-Italy	103-Iceland	112-Norway
5-Sierra Leone	14-Senegal	23-Congo, Rep.	32-Guyana	39-El Salvador	50-Colombia	57-Jamaica	68-Malaysia	77-Barbados	86-Slovak Republic	95-Finland	104-Japan	
6-Mali	15-Yemen, Rep.	24-India	33-Palestine	40-Suriname	51-Armenia	58-Mauritius	69-Antigua and Barbuda	78-Croatia	87-Estonia	96-France	105-Switzerland	
7-Benin	16-Tanzania	25-Guatemala	34-Egypt, Arab Rep.	41-Thailand	52-Brazil	59-Bosnia and Herzegovina	70-Serbia	79-Argentina	88-Brunei Darussalam	97-Slovenia	106-Sweden	
8-Comoros	17-Madagascar	26-Morocco	35-Philippines	42-China	53-Ecuador	60-Georgia	71-Panama	80-Chile	89-Greece	98-Austria	107-Germany	
9-Togo	18-Myanmar	27-Indonesia	36-Moldova	43-Dominican Republic	54-St. Lucia	61-Venezuela, RB	72-Mexico	81-Bahrain	90-United Kingdom	99-Belgium	108-Canada	

Definitions

Collection coverage:

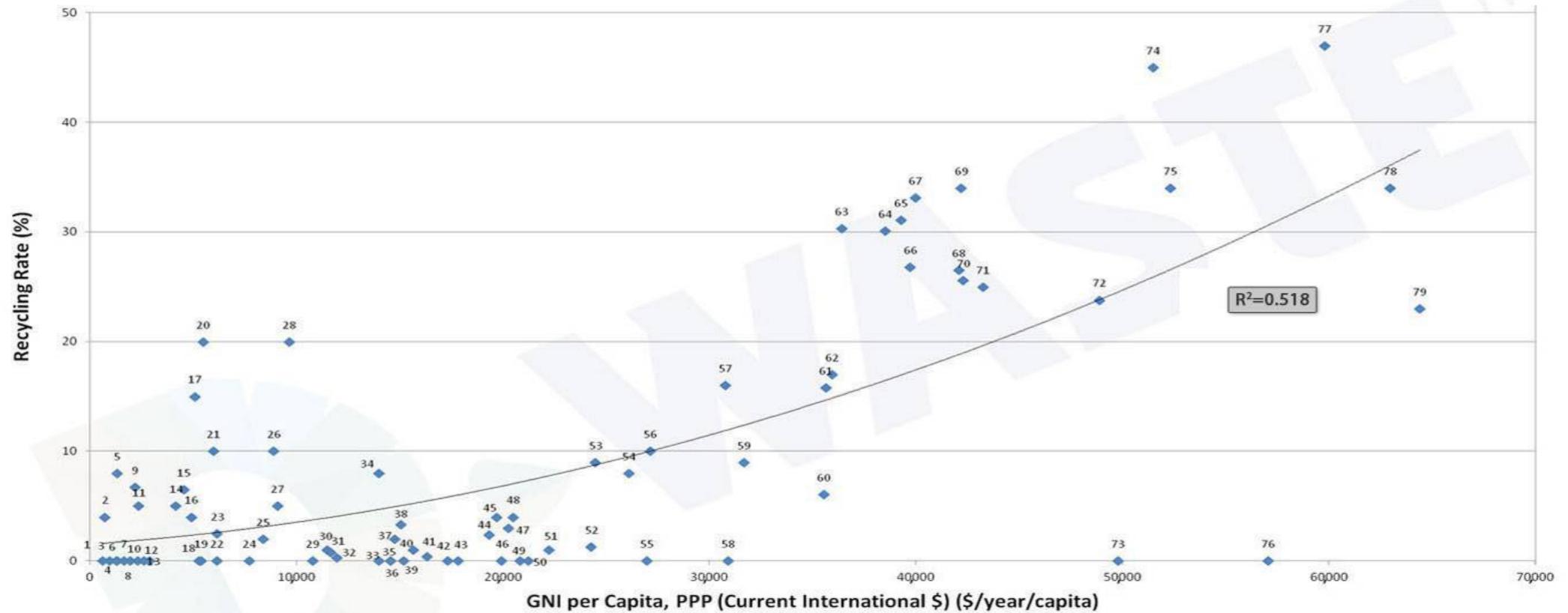
The amount of Municipal Solid Waste (MSW) collected as a proportion of total MSW generated.

Human Development Index (HDI)

A composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living.



Recycling vs GNI per Capita



- | | | | | | | | | |
|----------------|-------------------------|---------------------|-----------------|------------------------|-----------------------|-------------------|------------------|-------------------------|
| 1-Burundi | 10-Nigeria | 19-Georgia | 28-Colombia | 37-Mauritius | 46-Russian Federation | 55-Slovenia | 64-Finland | 73-Brunei Darussalam |
| 2-Niger | 11-Cameroon | 20-Bhutan | 29-South Africa | 38-Mexico | 47-Hungary | 56-Israel | 65-Belgium | 74-Hong Kong SAR, China |
| 3-Madagascar | 12-Lao PDR | 21-Jordan | 30-Brazil | 39-Malaysia | 48-Poland | 57-Iceland | 66-Canada | 75-Switzerland |
| 4-Nepal | 13-Pakistan | 22-Armenia | 31-Serbia | 40-Antigua and Barbuda | 49-Estonia | 58-Cyprus | 67-Germany | 76-Macao SAR, China |
| 5-Burkina Faso | 14-Philippines | 23-Egypt, Arab Rep. | 32-Costa Rica | 41-Chile | 50-Bahrain | 59-Spain | 68-Austria | 77-Singapore |
| 6-Uganda | 15-Indonesia | 24-Suriname | 33-Bulgaria | 42-Turkey | 51-Slovak Republic | 60-Japan | 69-Sweden | 78-Norway |
| 7-Benin | 16-Morocco | 25-Algeria | 34-Lebanon | 43-Latvia | 52-Czech Republic | 61-France | 70-Denmark | 79-Luxembourg |
| 8-Bangladesh | 17-Syrian Arab Republic | 26-Albania | 35-Belarus | 44-Croatia | 53-Portugal | 62-United Kingdom | 71-Netherlands | |
| 9-Yemen, Rep. | 18-Angola | 27-Tunisia | 36-Botswana | 45-Lithuania | 54-Greece | 63-Australia | 72-United States | |

Definitions

Recycling rate:

The amount of Municipal Solid Waste (MSW) recycled as a proportion of total MSW generated

GNI per capita, PPP (current international \$)

GNI per capita based on purchasing power parity (PPP). PPP GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current international dollars.



SWAPI

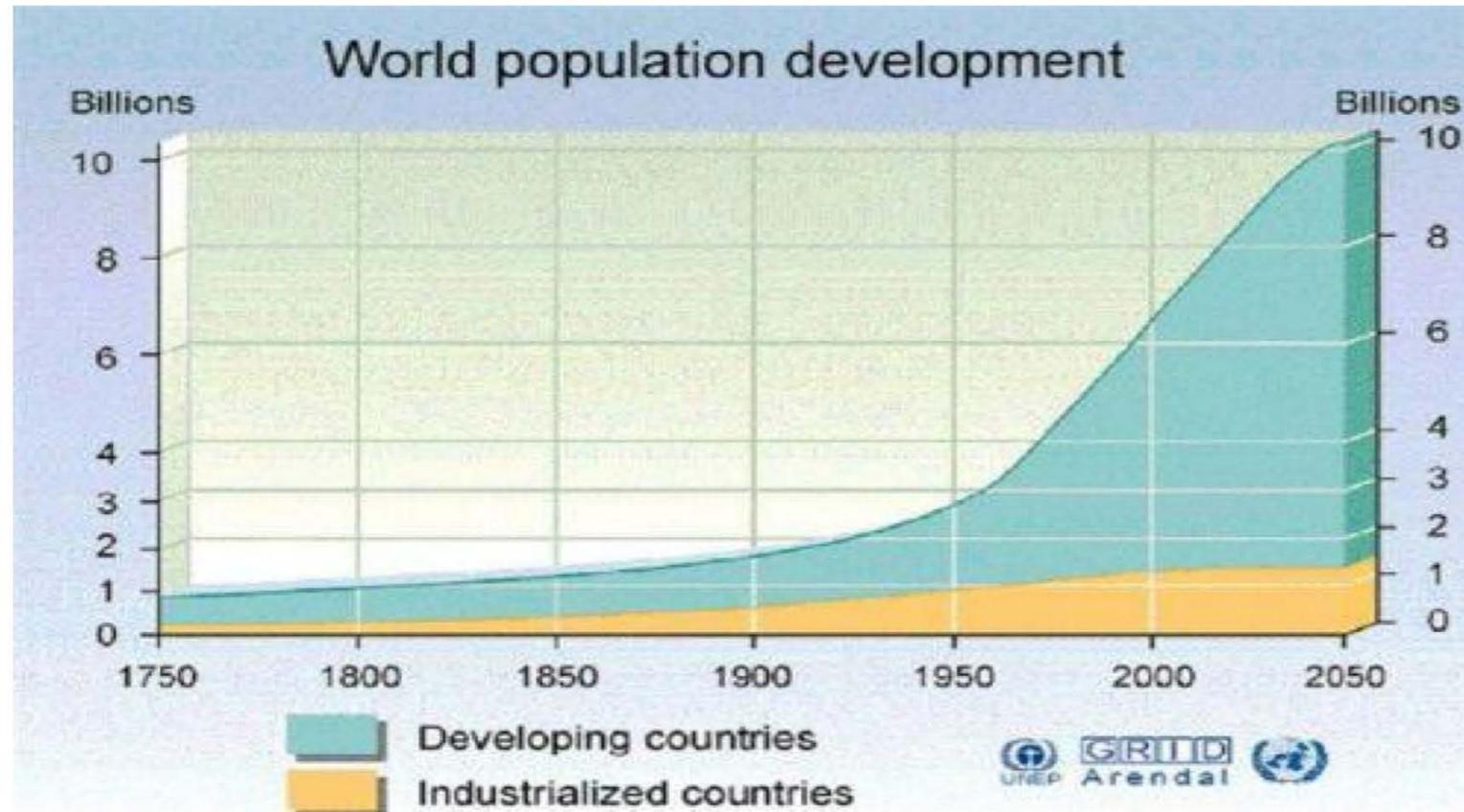
Waste forecast

Population forecast

GDP forecast

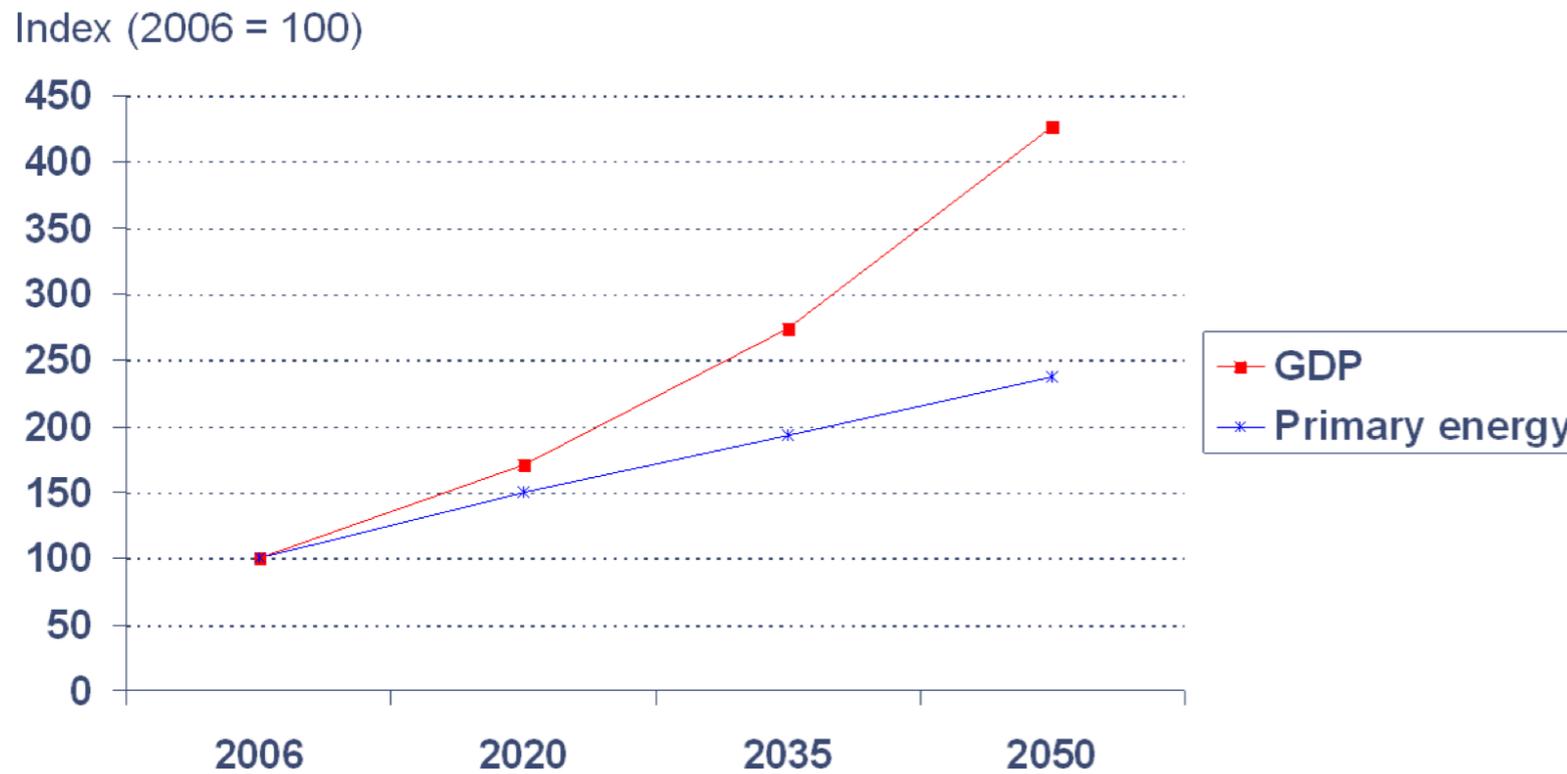
Waste forecast

Population forecast



Population growth almost by 50% (baseline 2006), until 2050

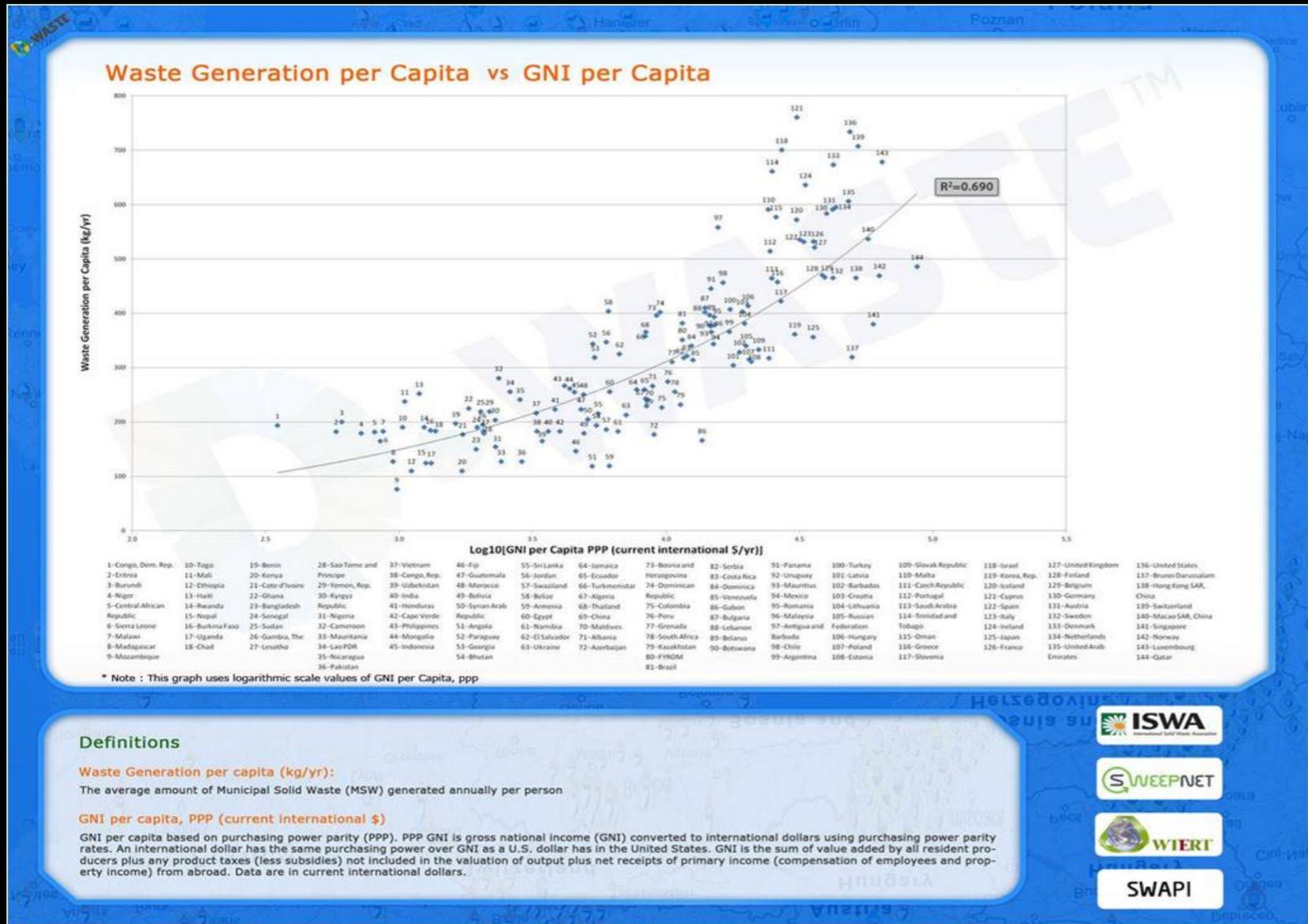
GDP forecast



Source: World Bank and BP data for 2006, PwC model estimates for later years

Global GDP growth almost by 320%, until 2050

Waste forecast
 Population by 1.4
 GDP by 3.2
 2006 GNI/ cap 6,300 \$
 2050 GNI/cap 14-20,000 \$



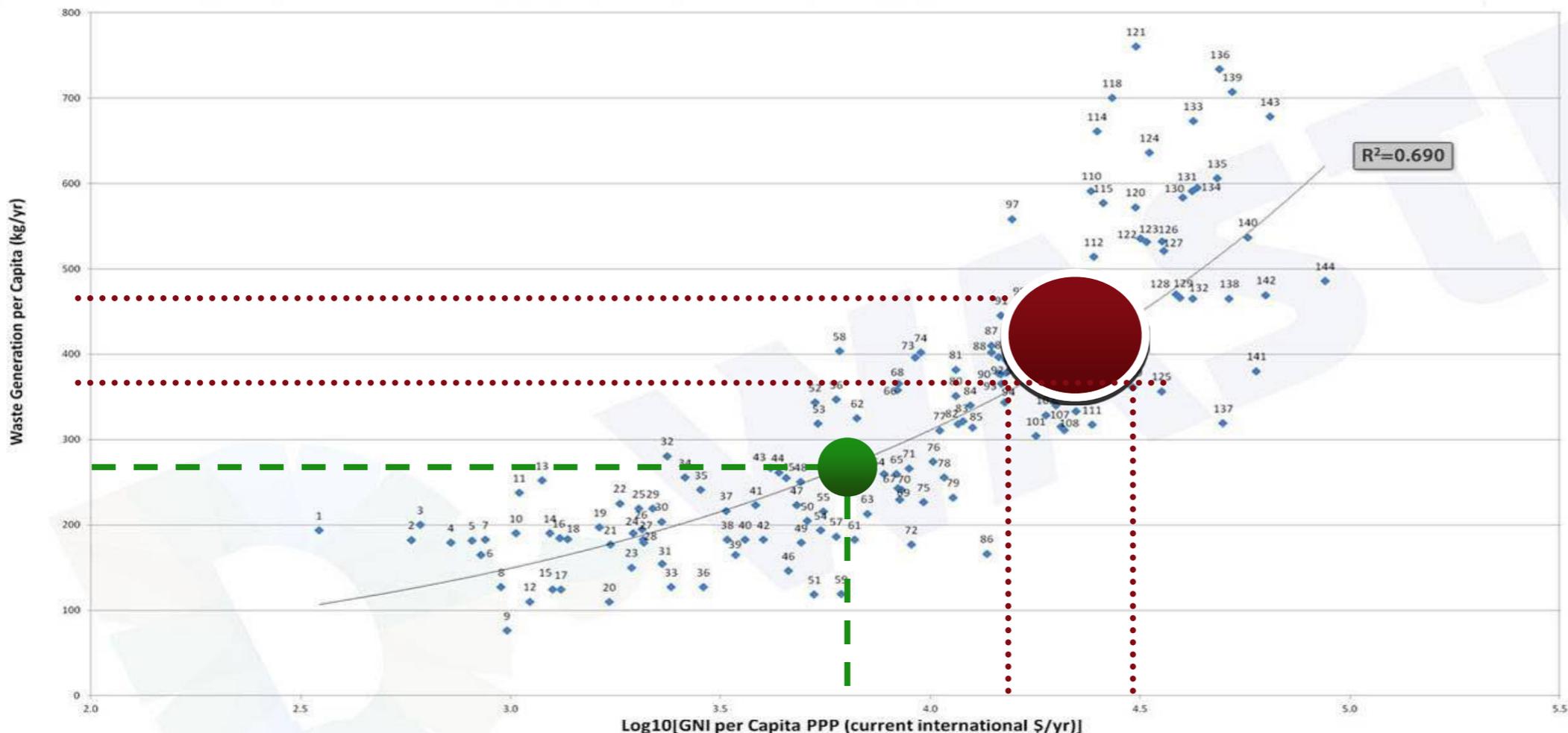
Definitions

Waste Generation per capita (kg/yr):
 The average amount of Municipal Solid Waste (MSW) generated annually per person

GNI per capita, PPP (current international \$)
 GNI per capita based on purchasing power parity (PPP). PPP GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current international dollars.



Waste Generation per Capita vs GNI per Capita



1-Congo, Dem. Rep.	10-Togo	19-Benin	28-Sao Tome and Principe	37-Vietnam	46-Fiji	55-Sri Lanka	64-Jamaica	73-Bosnia and Herzegovina	82-Serbia	91-Panama	100-Turkey	109-Slovak Republic	118-Israel	127-United Kingdom	136-United States
2-Eritrea	11-Mali	20-Kenya	29-Yemen, Rep.	38-Congo, Rep.	47-Guatemala	56-Jordan	65-Ecuador	74-Dominican Republic	83-Costa Rica	92-Uruguay	101-Latvia	110-Malta	119-Korea, Rep.	128-Finland	137-Brunei Darussalam
3-Burundi	12-Ethiopia	21-Cote d'Ivoire	30-Kyrgyz Republic	39-Uzbekistan	48-Morocco	57-Swaziland	66-Turkmenistan	75-Colombia	84-Dominica	93-Mauritius	102-Barbados	111-Czech Republic	120-Iceland	129-Belgium	138-Hong Kong SAR, China
4-Niger	13-Haiti	22-Ghana	31-Nigeria	40-India	49-Bolivia	58-Belize	67-Algeria	76-Peru	85-Venezuela	94-Mexico	103-Croatia	112-Portugal	121-Cyprus	130-Germany	139-Switzerland
5-Central African Republic	14-Rwanda	23-Bangladesh	32-Cameroon	41-Honduras	50-Syrian Arab Republic	59-Armenia	68-Thailand	77-Grenada	86-Gabon	95-Romania	104-Lithuania	113-Saudi Arabia	122-Spain	131-Austria	140-Macao SAR, China
6-Sierra Leone	15-Nepal	24-Senegal	33-Mauritania	42-Cape Verde	51-Angola	60-Egypt	69-China	78-South Africa	87-Bulgaria	96-Malaysia	105-Russian Federation	114-Trinidad and Tobago	123-Italy	132-Sweden	141-Singapore
7-Malawi	16-Burkina Faso	25-Sudan	34-Lao PDR	43-Philippines	52-Paraguay	61-Namibia	70-Maldives	79-Kazakhstan	88-Lebanon	97-Antigua and Barbuda	106-Hungary	115-Oman	124-Ireland	133-Denmark	142-Norway
8-Madagascar	17-Uganda	26-Gambia, The	35-Nicaragua	44-Mongolia	53-Georgia	62-El Salvador	71-Albania	80-FYROM	89-Belarus	98-Chile	107-Poland	116-Greece	125-Japan	134-Netherlands	143-Luxembourg
9-Mozambique	18-Chad	27-Lesotho	36-Pakistan	45-Indonesia	54-Bhutan	63-Ukraine	72-Azerbaijan	81-Brazil	90-Botswana	99-Argentina	108-Estonia	117-Slovenia	126-France	135-United Arab Emirates	144-Qatar

* Note : This graph uses logarithmic scale values of GNI per Capita, ppp

Definitions

Waste Generation per capita (kg/yr):

The average amount of Municipal Solid Waste (MSW) generated annually per person

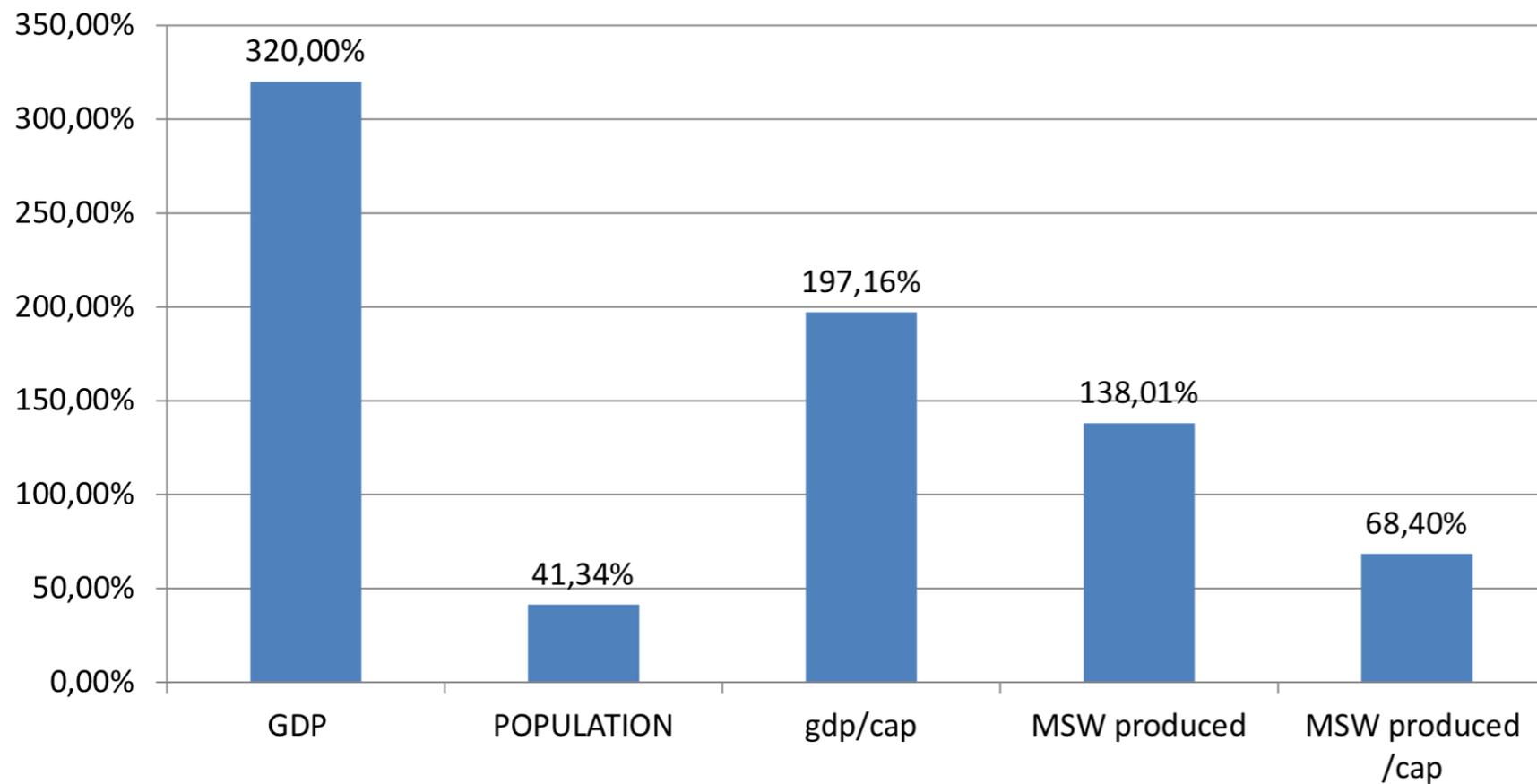
GNI per capita, PPP (current international \$)

GNI per capita based on purchasing power parity (PPP). PPP GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current international dollars.

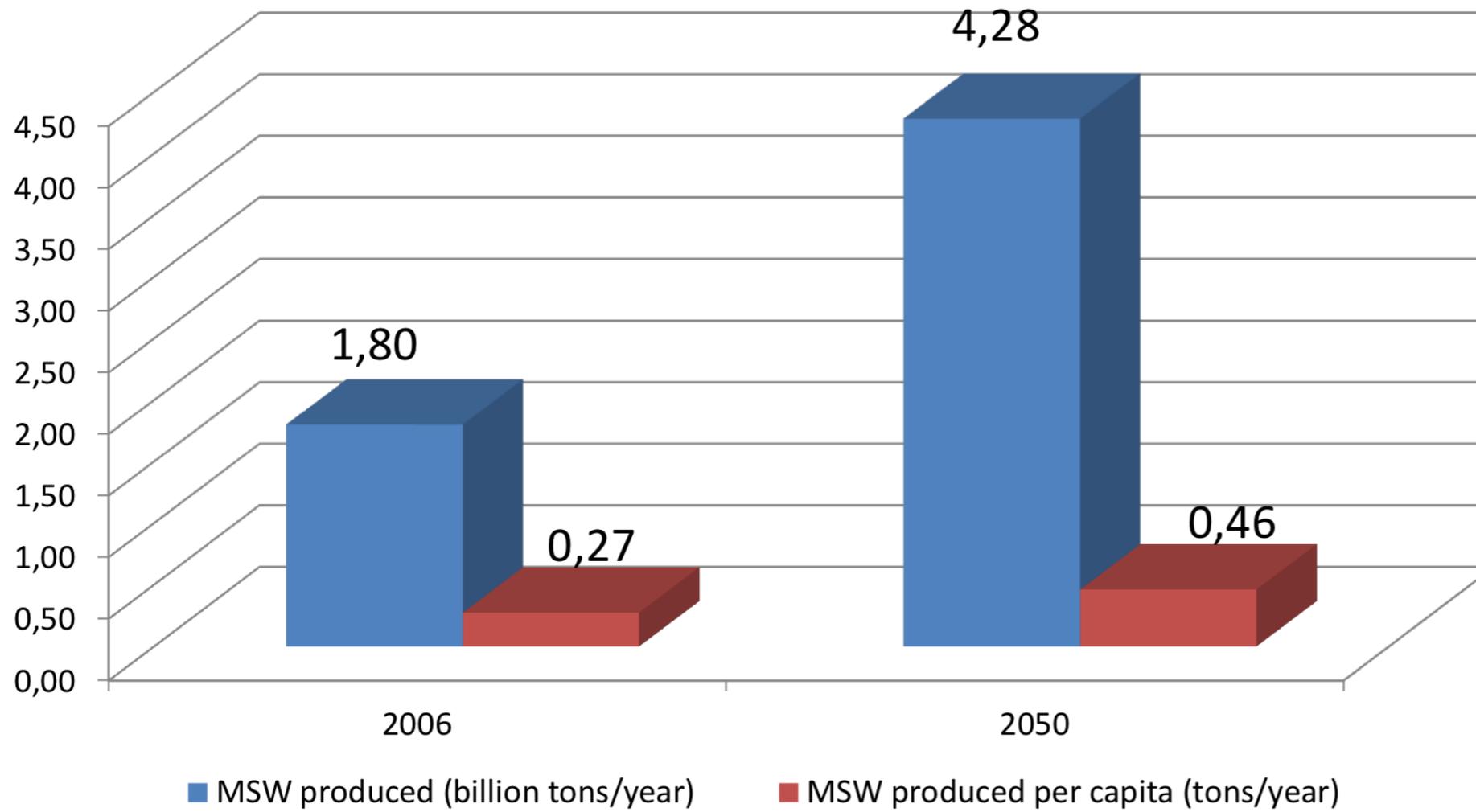


Waste forecast

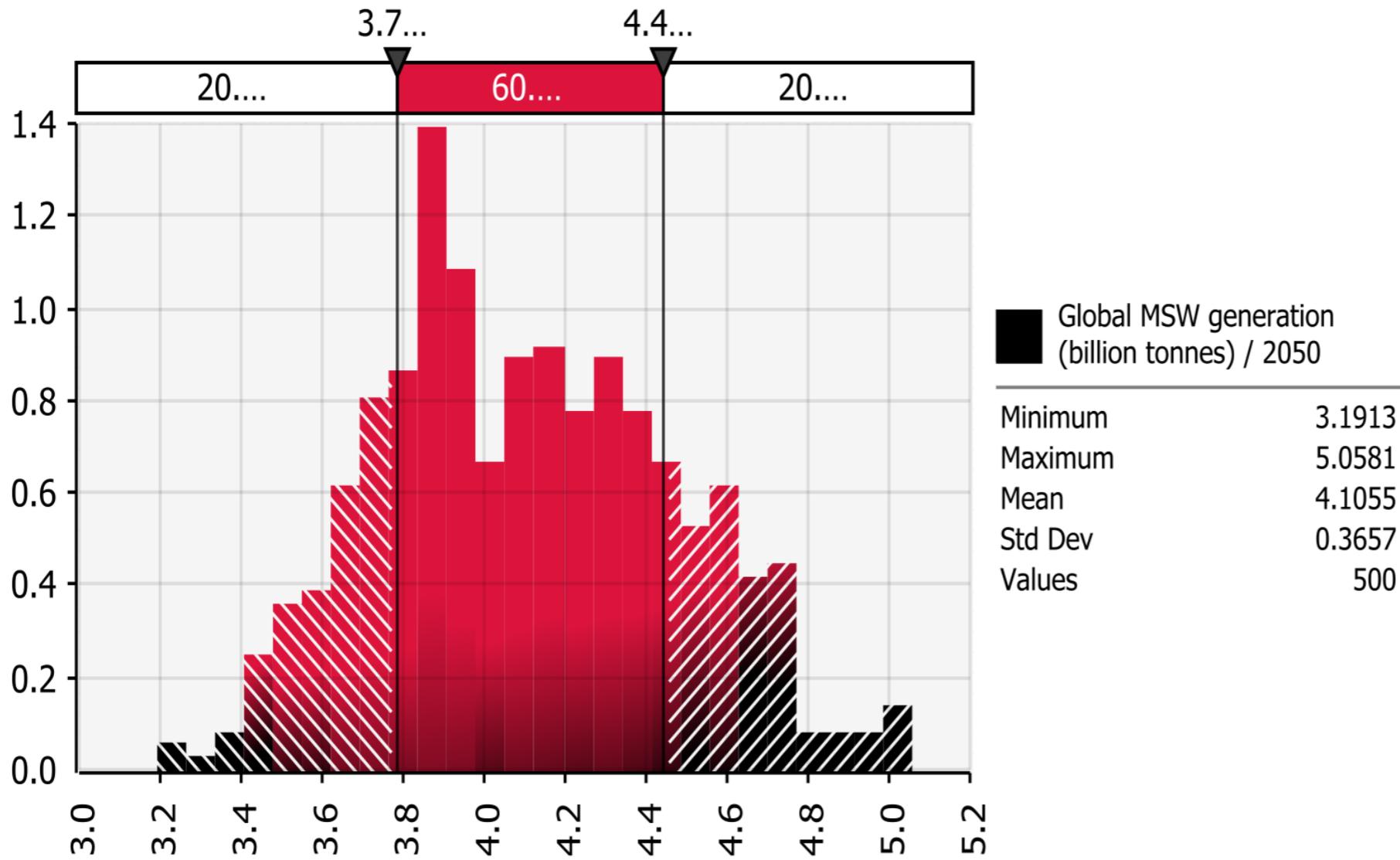
Changes 2006-2050 with BaU scenario



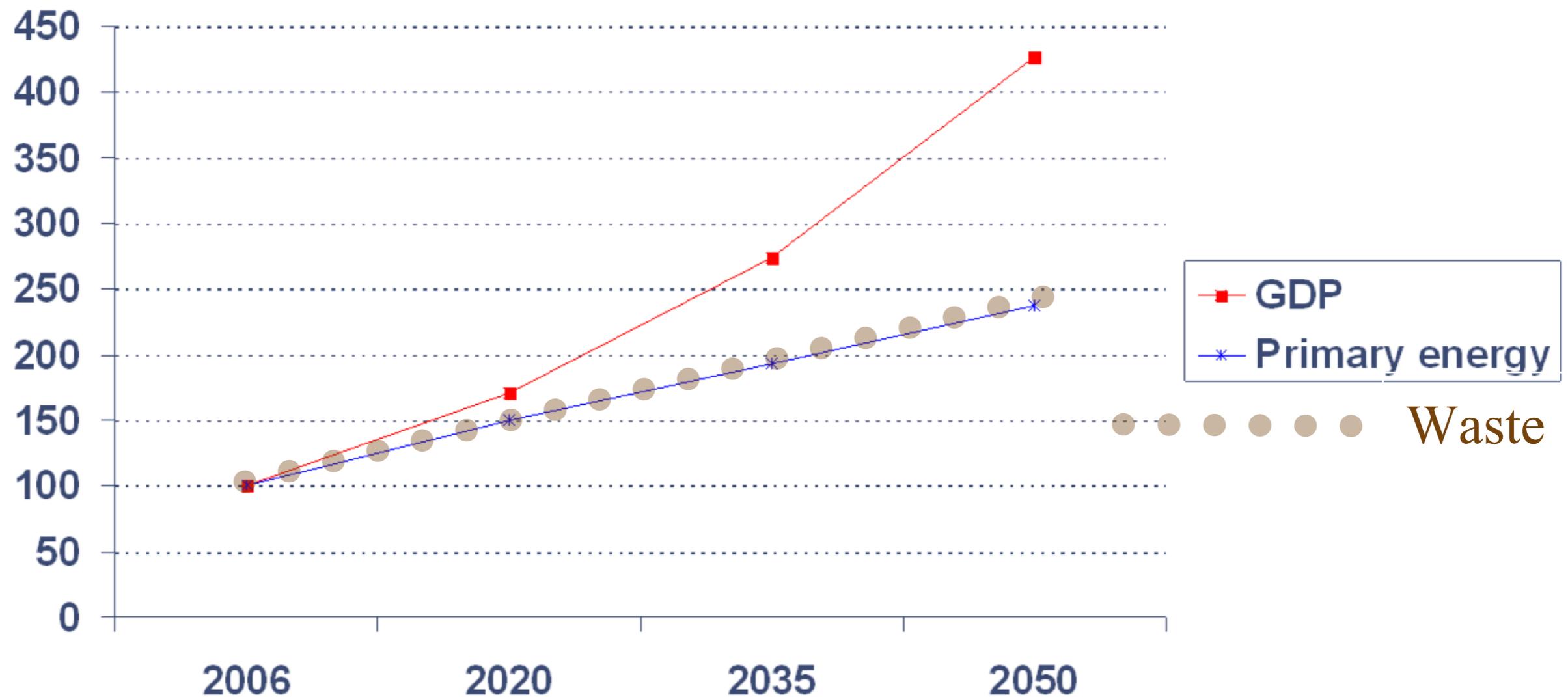
MSW production 2006-2050



Global MSW generation (billion tonnes) / 2...



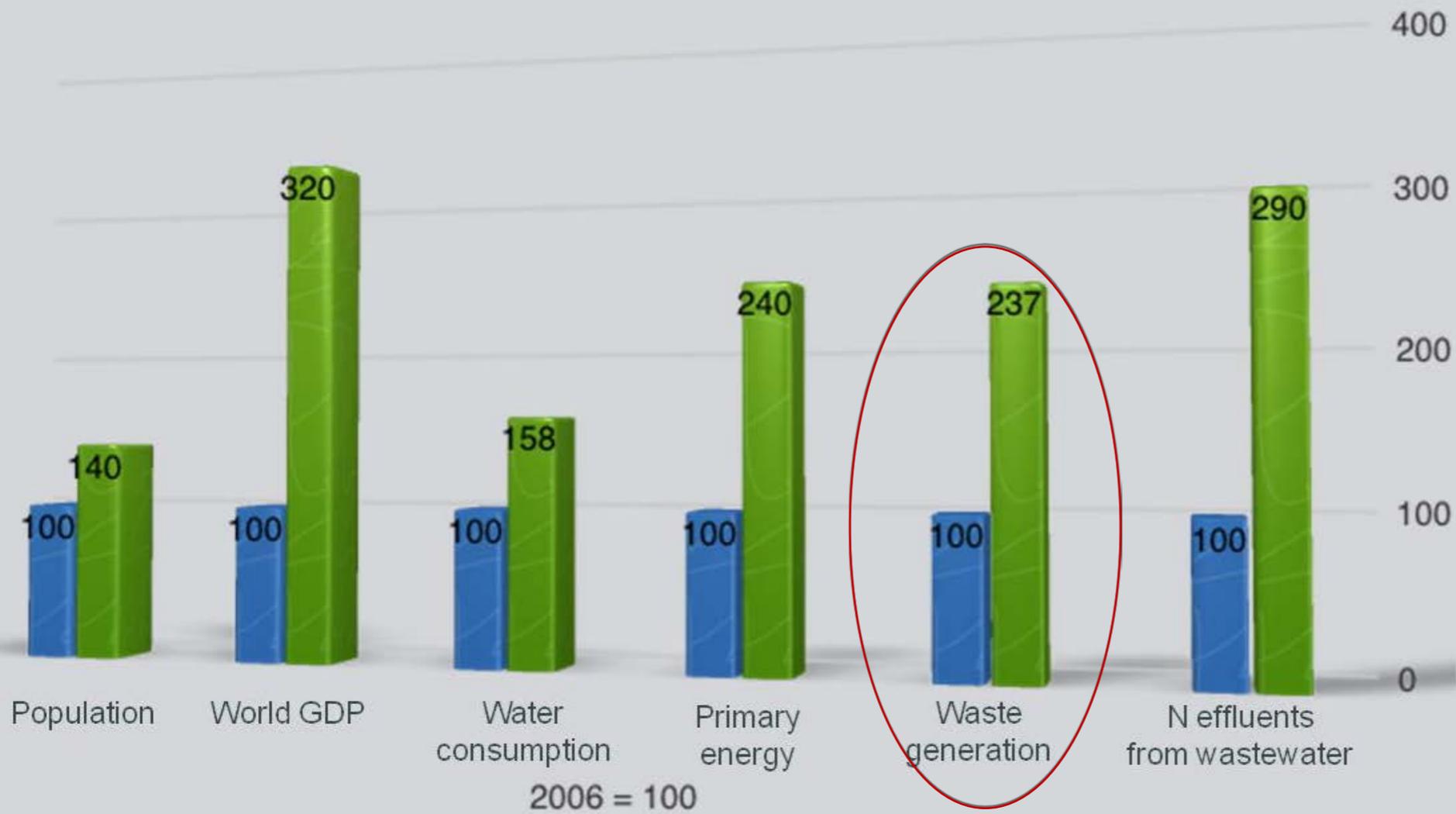
Index (2006 = 100)



Source: World Bank and BP data for 2006, PwC model estimates for later years

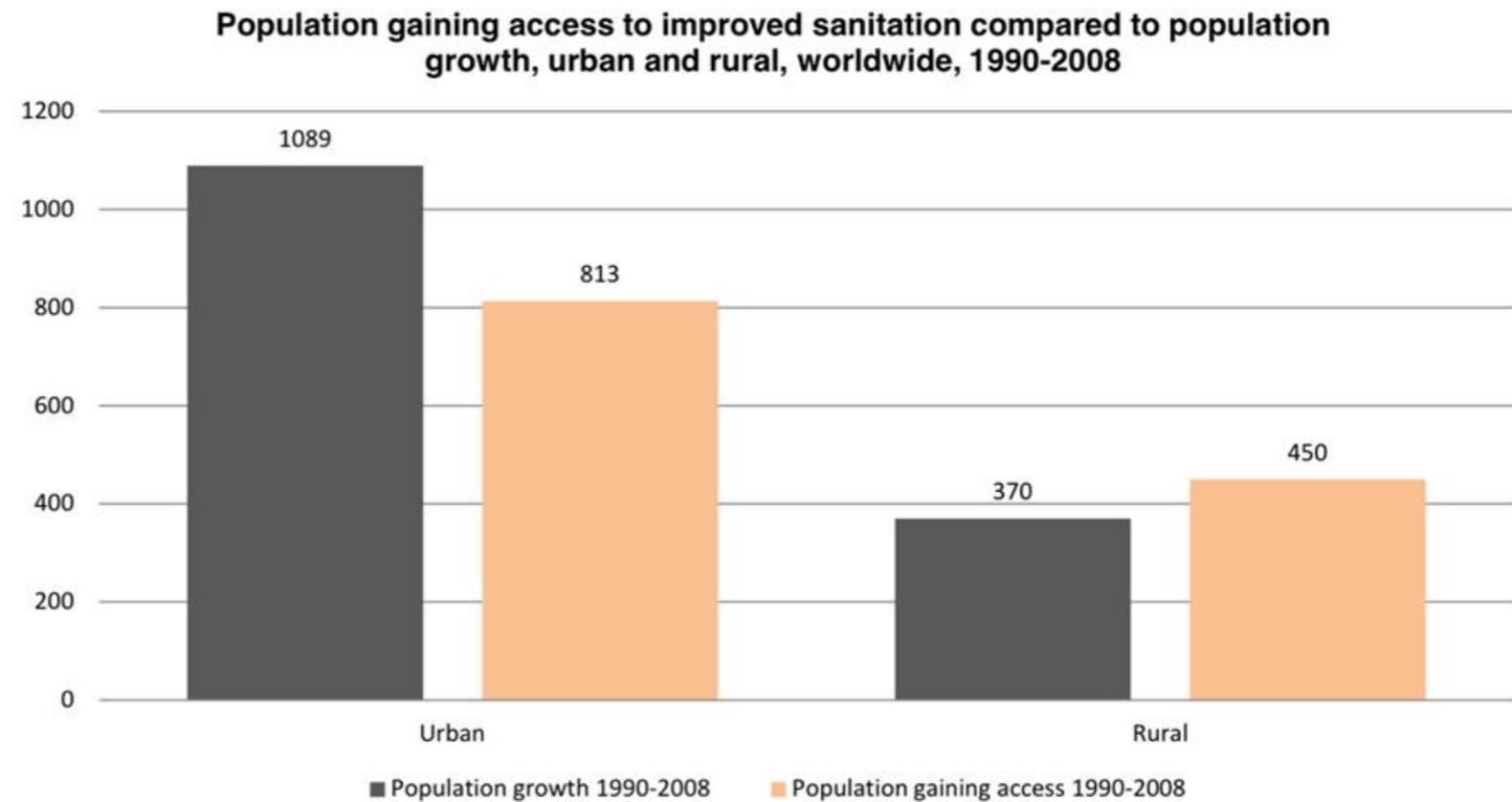
Global GDP growth almost by 320%, until 2050

Major changes 2006-2050



Concluding remarks

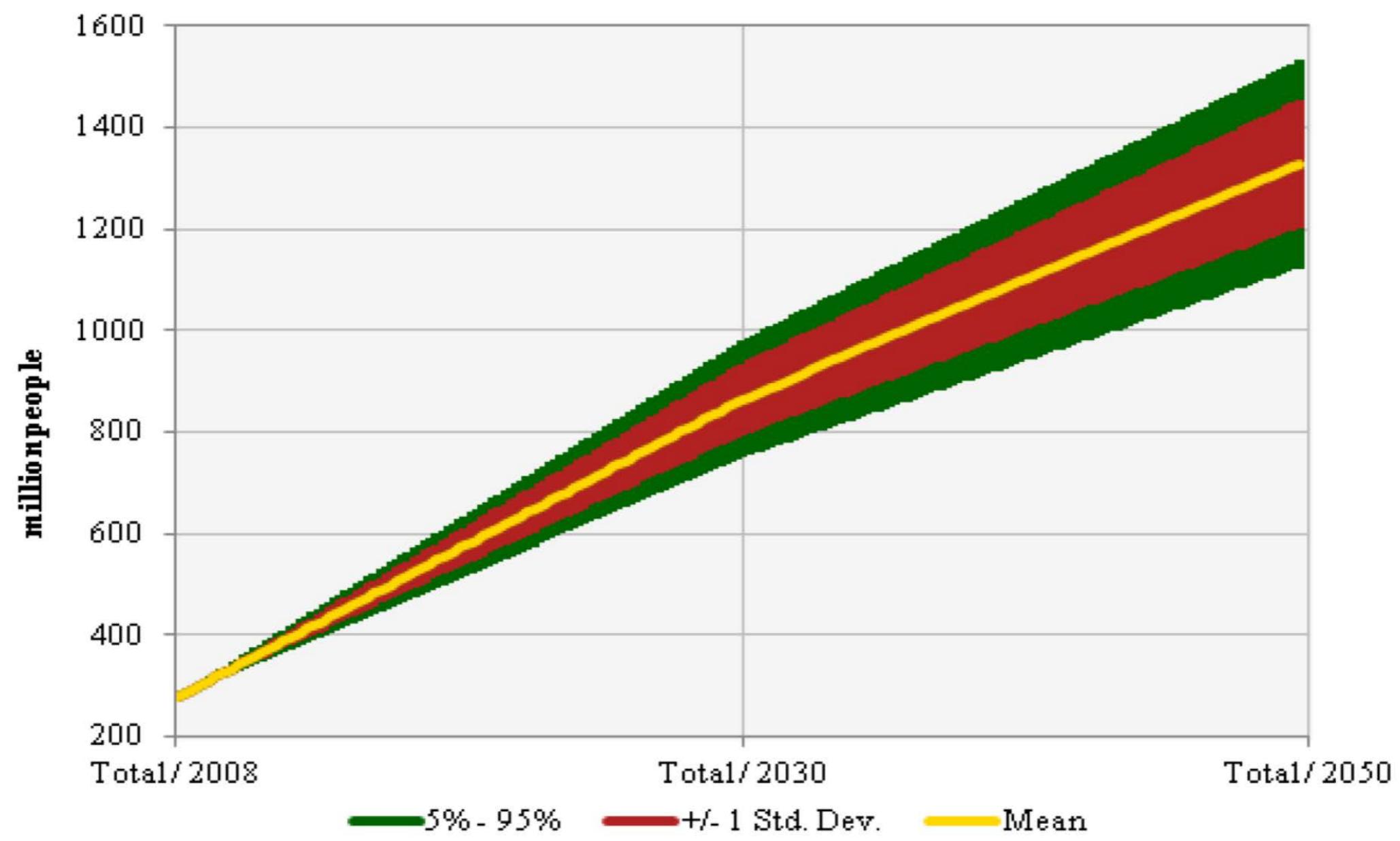
Urbanization is 30% faster than sanitation

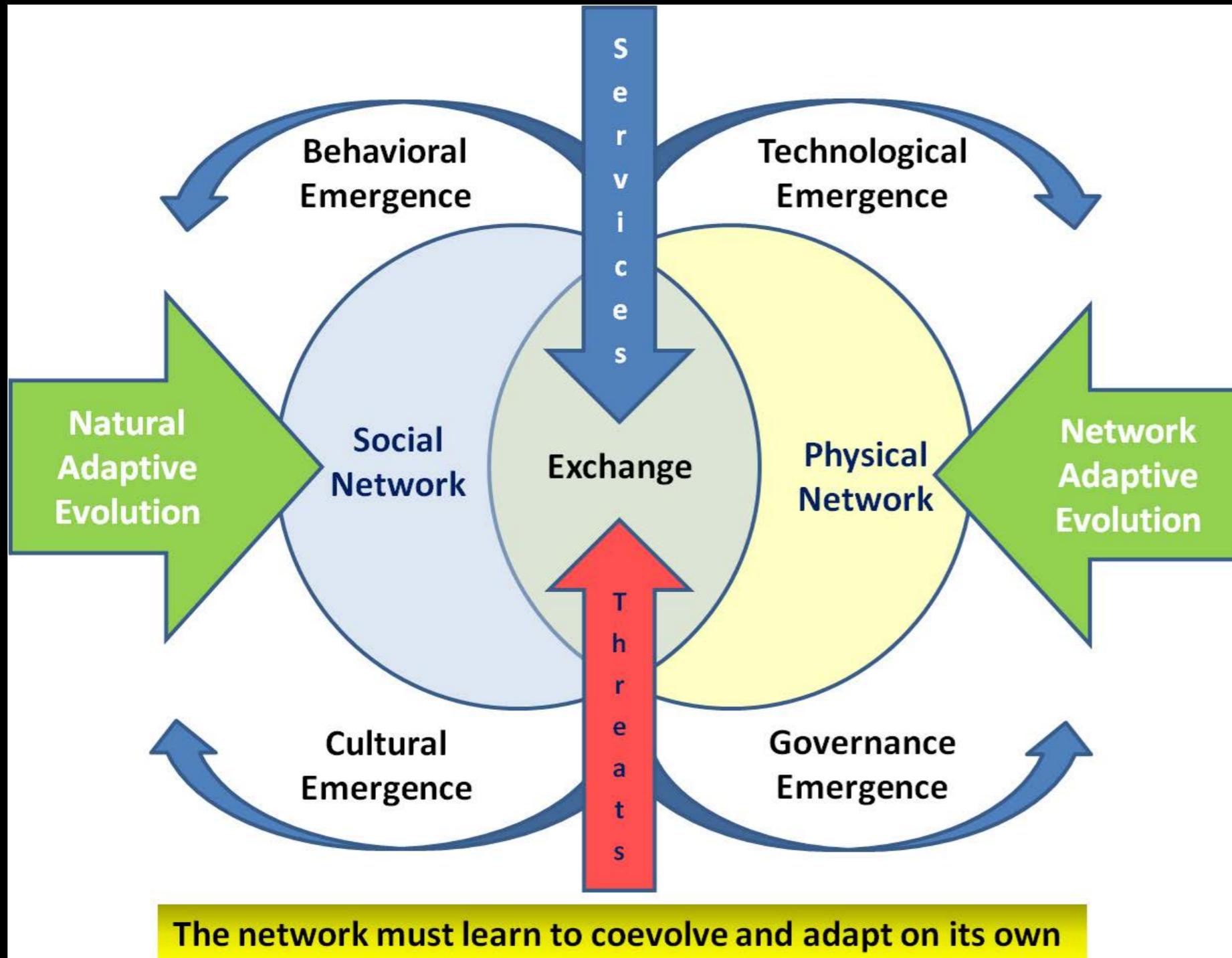


Source: WHO & UNICEF (2010) *Progress on Sanitation & Drinking Water: 2010 Update*, France.
Available: http://whqlibdoc.who.int/publications/2010/9789241563956_eng_full_text.pdf

Urbanization – sanitation gap

Total / 2008 to Total / 2050





Business as usual scenarios are driving to an **environmental purgatory?**

Sound waste management is a human right

Thank you for your attention!!!

antonis.mavropoulos@d-waste.com

Presentation available on:

www.d-waste.com