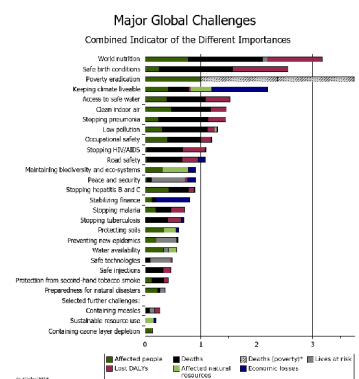


Assessing Priorities for Rio+20

Proposal for the UN Conference on Sustainable Development 2012 in Rio de Janeiro

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1 Introduction and Major Global Challenges

This proposal for the preparation of the Rio+20 conference does not focus on a specific issue. Instead, it provides neutral information to assess the relative significance of major issues, allows for the identification of neglected topics, evaluates the priorities among the topics, and indicates the level of importance of all the major topics considered. Most topics are well-known from the 1992 UN Conference on Environment and Development, the 2000 UN Millennium Declaration and other UN fields. However, the topics are not selected from such links. Instead, topic selection is based exclusively on available data and information that demonstrates their actual essentiality to human life and human needs. This allows for an

independent assessment of relative priorities among these topics. Despite this independent approach, the work of Global2015 is rooted in Agenda 21 and the MDGs, and strongly committed to their progress.

The proposal may assist in determining whether the agenda and possible outcomes of Rio+20 reflect the real urgency of the issues discussed (e.g., the framework for action, or sustainable development goals). For this purpose, data is presented not only on the current state of the most important global challenges, but also on absolute trends, on achievements relative to internationally agreed targets (if given), and on whether the topics are already covered by different UN bodies.

Major Global Challenges

To identify major global challenges and their relevance, a criterion for selection and a set of indicators was used:

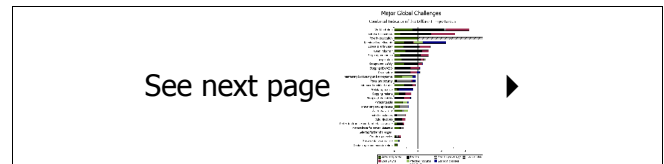
- *A lack of access to vital resources*, such as water, food, or health-care, comprises the criterion for the selection of topics. Problems which are caused and could be solved mainly by the affected people themselves, without large-scale human activities, were excluded.
- The indicators for further selection and for assessing the relative significance of challenges are:
 - *number of affected people*
 - *deaths*
 - *loss of healthy life-years (DALYs*)*
 - *affected natural resources*
 - *economic losses*.

Data on the current situation as well as projections on future developments and risks were included for all indicators. The challenges were differentiated according to the possible actions or means in addressing them, as well as data availability.

All data is taken from UN reports, scientific articles and similar trustworthy sources. Unfortunately, even for the most important topics, the availability and quality of data is often quite poor. Hence, assessing the relative significance of the data should focus on the larger differences be-

tween many global challenges, not on minor differences between topics of a similar relevance. Such minor differences may be smaller than the uncertainty ranges of the available data. This does not apply to the larger differences.

The result of the research is displayed in the according diagram:



The diagram indicates a more than ten-fold difference in the relative severity of the topics considered. It shows a group of four outstanding challenges followed with significant distance by a group of three high-level challenges, each of very similar relevance, and below them a quite constant decline in relevance from topic to topic. The topics listed in the upper half of the graph include all the 'million-killers' among the challenges relating to the lack of access to vital resources. Also, the survey covers core issues of a green economy, such as sustainable management of the climate, chemicals and pollutants, biodiversity, technologies, and raw materials.

Additionally, the Global2015 survey includes issues on capacity building, which may assist in tackling the other challenges:

- cooperation, citizenship, and democracy
- human rights and gender equality
- information and education, research and innovation.

* DALYs: Disability-adjusted life years

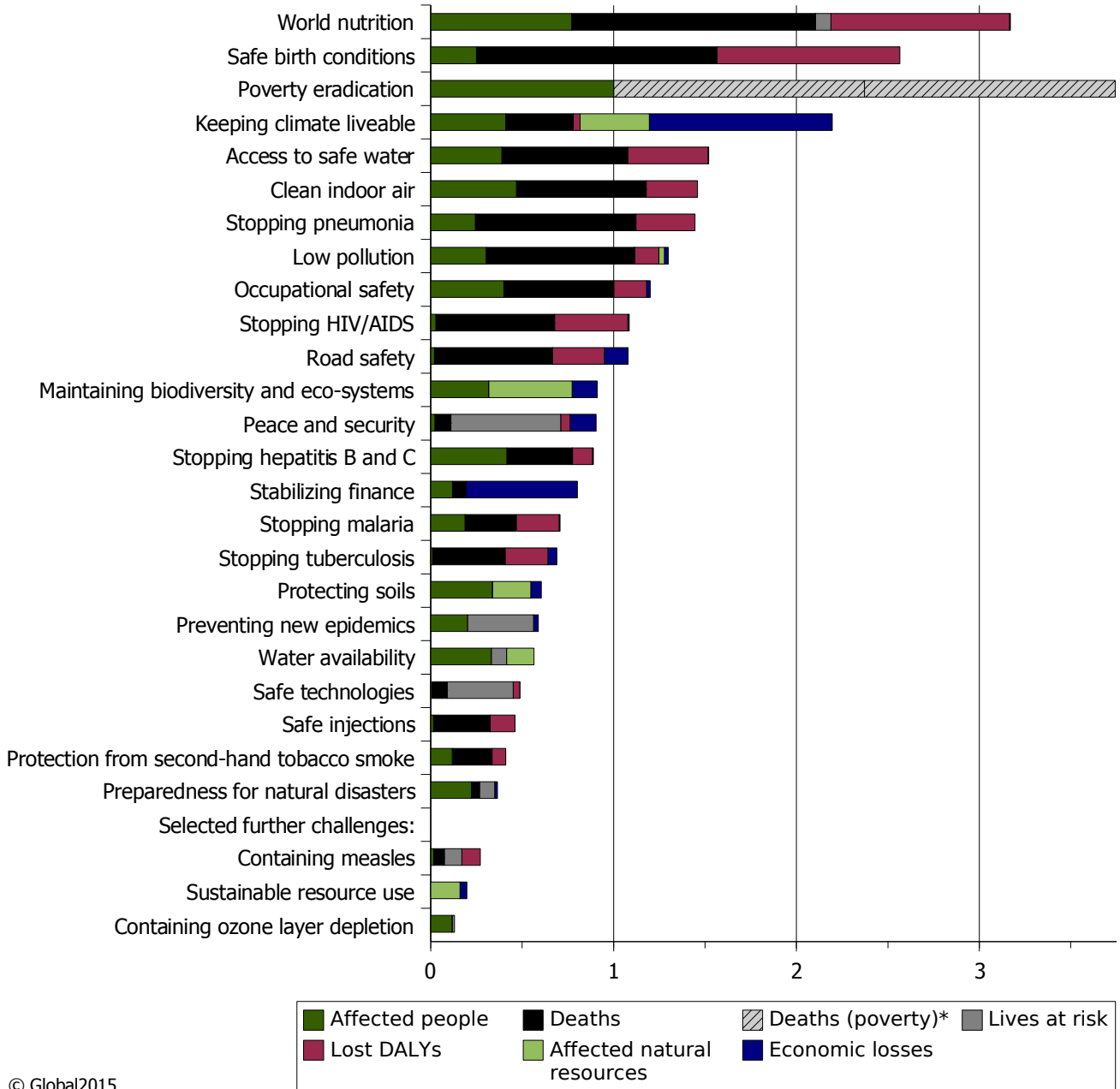
One DALY represents the loss of one year of full health. DALYs are the sum of:

- the years of life lost due to premature mortality (YLL) in the population and
- the years lost due to disability (YLD) for incident cases of the health condition.¹

¹ WHO 2008, p. 3.

Major Global Challenges

Combined Indicator of the Different Importances



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* Not attributable to consumption level or income poverty, but to poverty in a broader sense; deaths in children under the age of five, which largely overlap with other topics shown here (see the description of the poverty topic in Annex II).

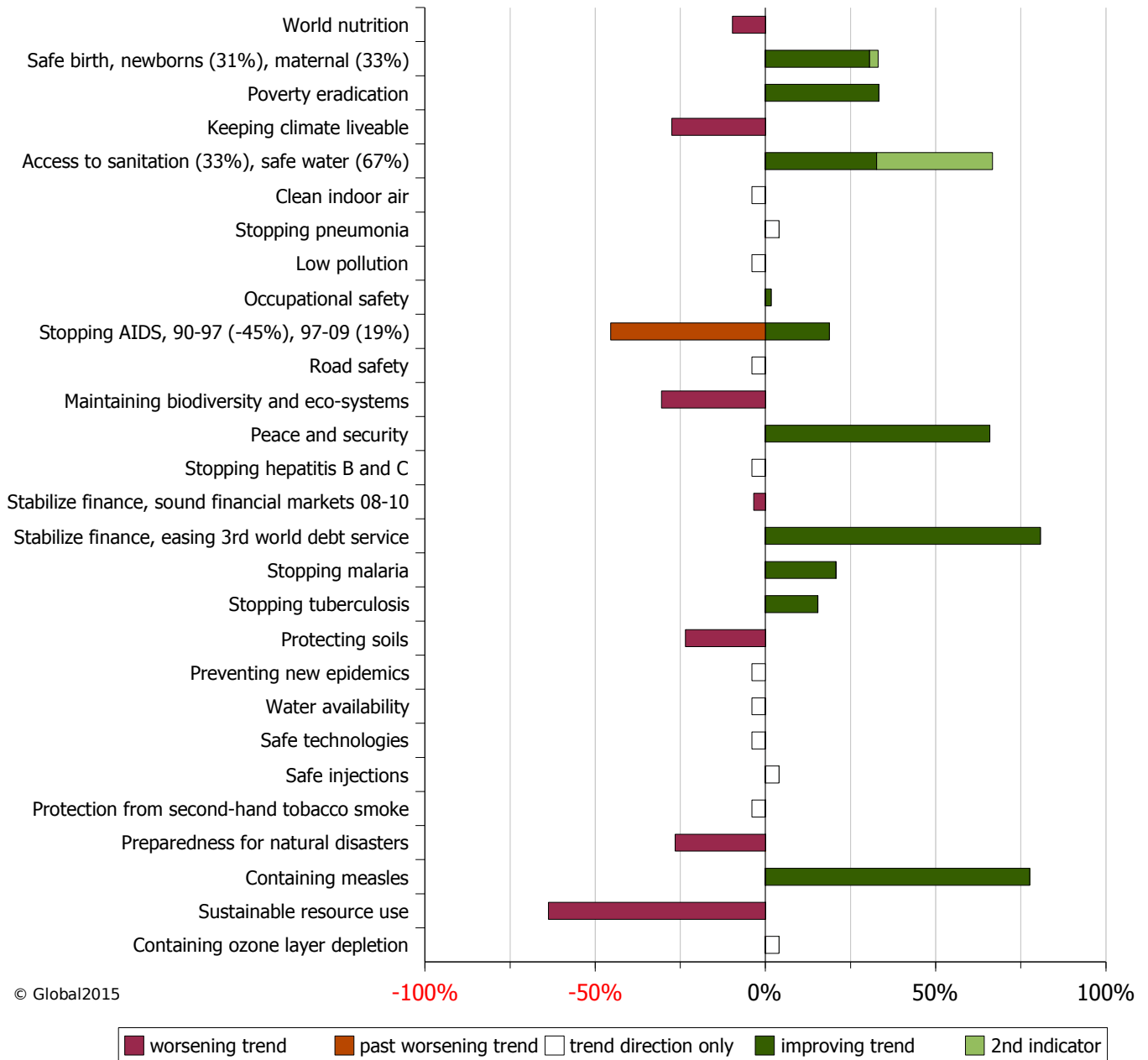
Data sources: UN, WHO, World Bank, etc. – see the topic data in Annex II. For a range of values, the mean of the range is used in the bar diagram. Only topics were included that are caused primarily by a lack of access to vital resources (water, health care, etc.). The last three topics are additional topics. At their according level of relevance no comprehensiveness is claimed.

The bars show a composite indicator. The highest value of each single indicator equals the index level 1 (e.g., 1.2 billion people affected by extreme poverty). The single indicators on affected people, deaths, etc., are simply added to create the combined indicator. Data on mortality was given a weight of 1.333. Likely values for missing data would not be expected make a significant difference, except for some risk topics. For income poverty, see annotation above. See Annex III for methodological details.

2 Trends

Progress on Global Challenges

Change in % from 1990 to 2008-10 (according to data availability)



Data sources: UN, WHO, World Bank, etc. – see Annex II of this report. The diagram shows changes in: the numbers of under-nourished people, neonatal deaths, maternal deaths, extremely poor people, radiative forcing due to greenhouse gases, people lacking access to basic sanitation, people lacking access to safe drinking water, deaths due to work-related diseases and accidents 2001-2008, new HIV infections, species abundance 1970-2006/07, battle-related deaths 1991-2008, outstanding gross market values in the global “over the counter” derivatives market 2008-2010, debt service of less developed countries as a proportion of their exports of goods and services (MDG 8.B, 8.D), malaria deaths, tuberculosis deaths, degraded land 1981-2003, people affected by natural disasters (averages 1991-2000 to 2001-10), measles deaths, and global resource extraction.

The previous diagram shows the improvements and declines of global trends since 1990. It does not refer to any targets; progress and decline are measured in terms of absolute numbers, not in terms of proportions of population (as many targets do). Furthermore, reductions in absolute numbers were considered progress.

Among those topics where sufficient trend data is available, the majority shows progress. However, if these topics for which data only allows to indicate the direction but not the extent of a trend are included, the picture changes: considering all topics, the majority have worsened.

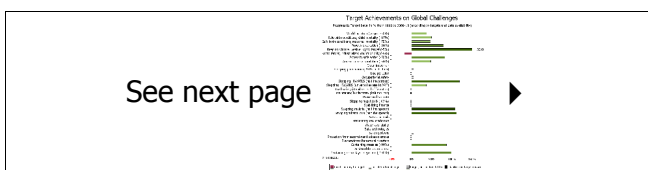
Keeping the relative significance of the different challenges in mind, the largest successes have

been made on safe birth conditions, poverty reduction, and safe water. On the other hand, hunger and climate change posed the most severe retractions. Until the peak of new HIV/AIDS infections in 1997, this epidemic was one of the heaviest setbacks for humanity, but since then progress has been made.

Most topics show a worsening trend, while many others demonstrate slow progress compared to the magnitude of their human impacts. Hence, these challenges should be tackled with stronger measures. Unfortunately, no major challenge of the last two decades has been made history. However, like with the eradication of smallpox, measles could become an exception, as its eradication is now within reach.

3 Target Achievements

Where targets are set, most of them refer to the year 2015. Also, most targets do not refer to absolute numbers of people (as seen in the trend diagram), but rather to proportions of population. The difference between these measurements is illustrated by two targets: the World Food Summit Target is to halve the *number* of undernourished people from 1990 to 2015, and the Millennium Target to halve the *proportion* of hungry people within the same time frame. While the first measurement shows an increase of 10% and thus suggests regression from the target, the second one shows a target achievement level of 38%. As long as world population continues to grow, targets referring to a proportion are easier to achieve.



The diagram shows that half of the most important global challenges lack a target (while for

some topics two targets are displayed). Four of the given targets have been achieved and surpassed. Another four targets have been fulfilled to more than 50% of their goal, five targets to a lesser degree, and one target has been missed (the 2010 biodiversity target). Overall, the target stipulated in the Kyoto Protocol has been the furthest surpassed. However, this achievement is mostly due to the decrease of greenhouse gas emissions from the transitional economies, while the emissions of industrialized countries increased and did not comply with the target to reduce emissions by 5% by 2008-12.

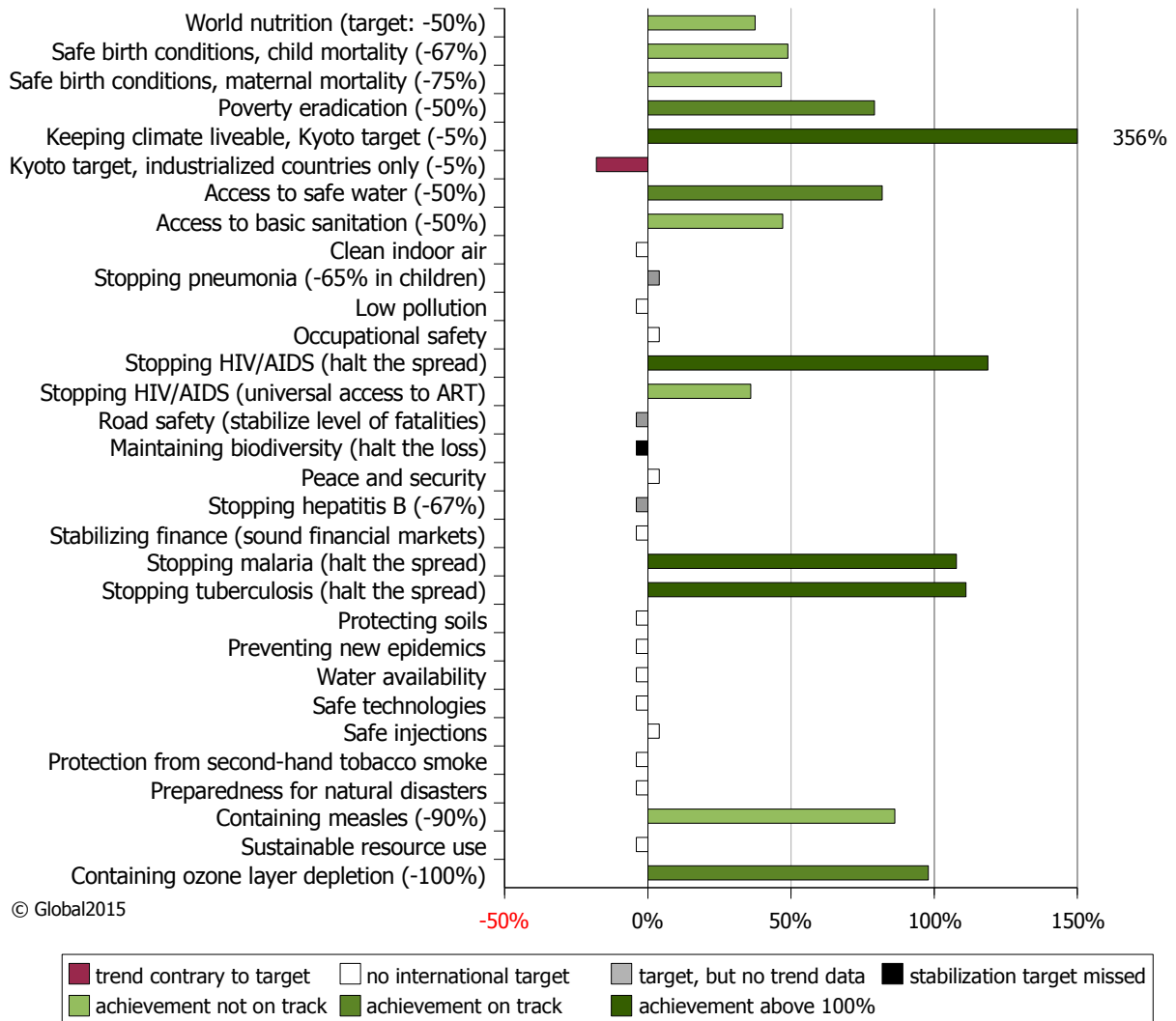
As the Millennium Targets refer to the time frame 1990 to 2015, the targets should have been 72%-80% fulfilled by 2008-10 to be completed on time. The targets currently on track are; halt the spread of HIV/AIDS, malaria and tuberculosis, which have already been achieved (Millennium Targets 6.A and 6.C), halve poverty (Target 1.A) and halve the lack of access to safe drinking water (Target 7.C; the target regarding basic

sanitation was achieved only by 47% in 2008). Also, the Kyoto target and the target to maintain the ozone layer are on track. The target to con-

tain measles was very close to be on track, however there is a risk that measles mortality may increase again (see the diagram and Annex II).

Target Achievements on Global Challenges

Progress to Target Level in % from 1990 to 2008-10 (according to targets and data availability)



For the topics without a target, only the trend direction is indicated.

Data sources: UN 2011a, indicator 1.9 (proportion of undernourished people 1990/92-2005/07); UN 2011a, indicator 4.1; UN 2011a, indicator 5.1; WB 2011a, 14 (1990-2005); UNFCCC 2010b, 8, UNFCCC 2008, 2 (1990-2006); WHO/UNICEF 2010, 7, 6, 52; UNAIDS 2010, 16, 21, 184; UNAIDS 2010, 42; WHO 2010c, 61; WHO 2011a, 13; WHO/UNICEF 2010a, 2; UN 2011, 50 – see also Annex II of this report for the sources and the targets.

Targets and Goals

In this report, an objective is considered a goal if it is *internationally agreed upon by states*.

An objective is considered a target if it is also *outcome-related, quantifiable, and verifiable at any time*.

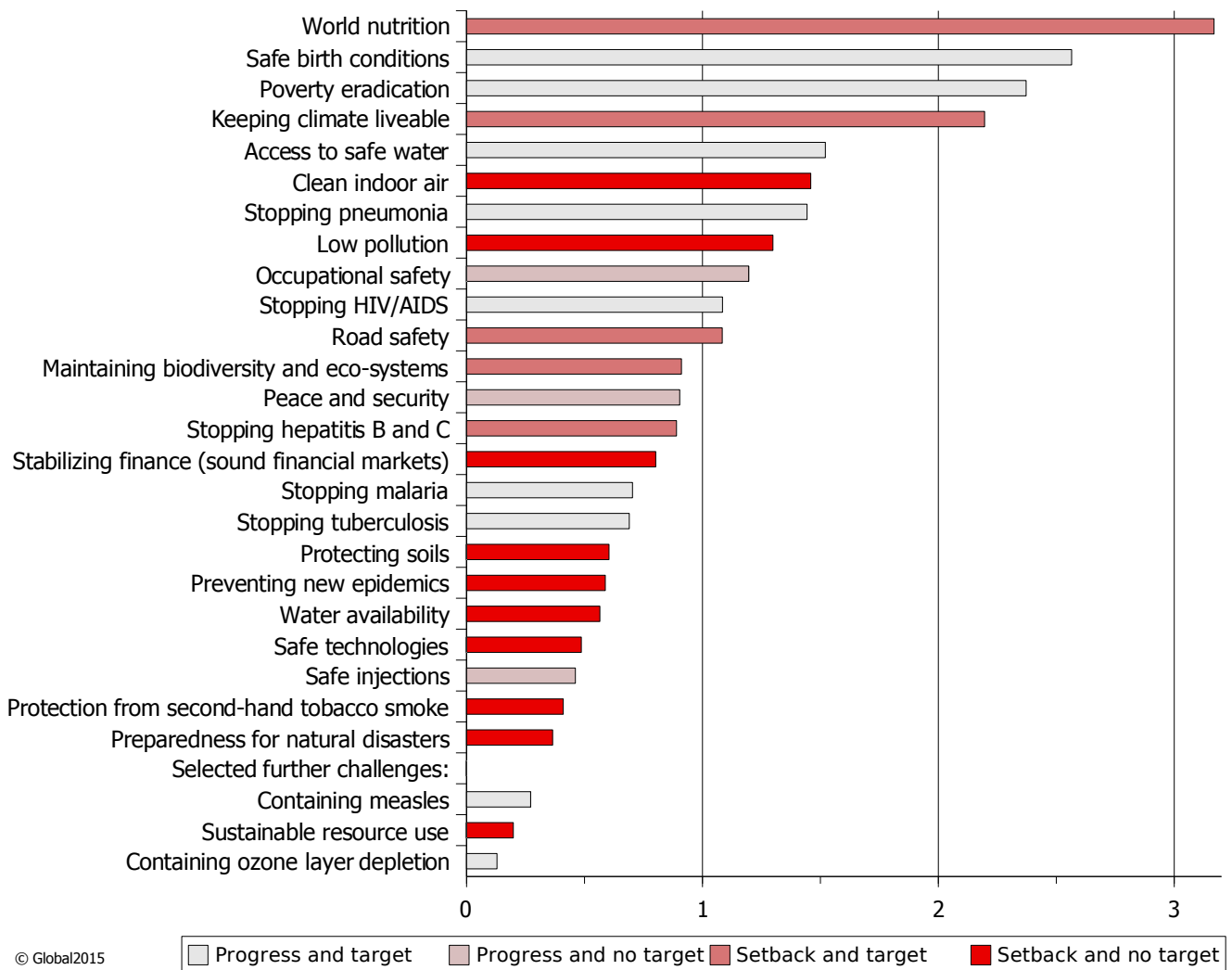
Unfortunately, prospects to meet the outstanding targets within the remaining time limit are quite poor. Nevertheless, the majority of targets are to be found among the more relevant global challenges, and almost all topics with a target have seen significant improvements. Of the challenges that are lacking targets, however, there are many

where available data indicates a lack of progress. This reminds us to worry not only about progress which is not sufficient to meet a given target, but to pay attention at least to the same degree to those topics of similar relevance where there is no progress at all.

4 Progress, Setbacks and Missing Targets

The following diagram shows all major global challenges according to their relevance, in relation to their progress, and whether or not there was a target set.

Progress and Target Lack among Major Global Challenges



Data sources: UN, WHO, World Bank, etc. – see pp. 4, 6 and Annex II of this report. For details on the composite indicator on relevance, see the diagram at page 3 and Annex III.

These major global challenges are also presented in the following matrix, according to their progress and whether or not a target has been set. The left column of the matrix shows areas of progress, whereas the right column shows setbacks. The top row of the matrix shows all major global challenges for which a target has been internationally agreed upon, while the bottom row lists

all topics that lack a target. As in the diagram, the colours indicate the four levels from “progress and target” to “setback and no target”. The respective global relevance of each topic is indicated simply by the order in which it is listed and by highlighting the first two groups of challenges which are shown at the top of the previous diagram.

| | Progress | Setbacks | |
|------------------------|---|---|----|
| Target provided | Safe birth conditions Poverty eradication Access to safe water Stopping pneumonia Stopping HIV/AIDS Stopping malaria Stopping tuberculosis Containing measles Containing ozone layer depletion 9 | World nutrition Keeping climate liveable Road safety Maintaining biodiversity & ecosystems Stopping hepatitis B and C* 5 | 14 |
| Target lacking | Occupational safety Peace and security Stabilizing finance (debt relief) Safe injections 4 | Clean indoor air Low pollution Stabilizing finance (market risk) Protecting soils Preventing new epidemics Water availability Safe technologies Protection from passive smoking Preparedness for natural disasters Sustainable resource use 10 | 14 |
| | 13 | 15 | 28 |

* On hepatitis C, there is no target.

The matrix confirms our earlier findings: firstly that there are more setbacks than progressions being made, and secondly that there is a positive correlation between progress and targets. Among the global challenges where progress was achieved, the vast majority (9 out of 13) have a target, and among the topics with a target the majority

also show progress (9 out of 14). It is the exact opposite case with the worsening topics: most of the challenges experiencing setbacks lack a target (10 out of 15). Furthermore, of the challenges lacking a target, very few show progress (4 out of 14).

This correlation is strongly emphasized by the

fact that two out of the five setbacks among topics with a target refer to targets which were set only a few years ago (road safety and hepatitis B). Therefore any possible impact from these two targets is unlikely to be visible in the available data.

Within the group comprising of the four most relevant global challenges, the cases of progressions and setbacks are equal. In the second group, progress predominates. Most of these particularly grave topics have a target, however, one of them lacks a target and is worsening – clean indoor air.

The ten challenges located in the bottom right cell of the matrix have no set targets and demonstrate worsening trend. With regard to indoor air pollution, the UN Secretary-General, Ban Ki-Moon, has suggested a target to achieve universal access to modern energy services by 2030. For some other topics, a target may not relate to the absolute outcome, but to the outcome per incident, or to certain activities such as the provision of preventive measures.

For the five global challenges which have worsened despite an agreed target, stronger action is required to change direction of trend and to reach their objectives.

As no major challenge has been mastered, all of them need the related activities to be strengthened. Topics that are characterized by setbacks require special attention. They should not continue to constitute the majority of challenges.

Annex I of this proposal suggests the fields in which the existing targets and activities of international bodies could be strengthened or supplemented, and where collaboration could occur to enhance efforts.

The UN Conference on Sustainable Development in 2012 offers a rare opportunity to reach an international agreement among the heads of state and governments, which complements the international set of targets on major global challenges and, more generally, strengthens the effort to reach or extend progress on major issues.

Annex I: Coverage of Challenges

The following table indicates which forums and bodies of the international community cover the major global challenges. This overview focuses on main activities and may be incomplete, but it can provide a picture of focus areas, fields of possible

collaborations, and neglected subjects. The table also indicates where activities could be enhanced, where the lack of targets could be addressed, and where collaborating partners could be found.

| Global challenge | UNCED 1992 and follow-up | Millennium Declaration and follow-up | UN or international bodies |
|--|--|--|---------------------------------------|
| <i>World nutrition</i> | World Food Summit 1996, 2006 | MDG 1 Target 1.C | FAO, WFP, UNICEF, World Bank, G-8 |
| <i>Safe birth conditions</i> | ICPD 1994, World Conference on Women 1995 and its follow-up | MDG 4 Target 4.A, MDG 5 Target 5.A, MDG Summit 2010 | WHO, UNICEF, UNDP, UN SG |
| <i>Poverty eradication</i> | Agenda 21, chapter 3 | MDG 1 Target 1.A | World Bank, UNDP |
| <i>Keeping climate liveable</i> | UNFCCC 1992 and its Kyoto Protocol 1997 | MDG 7 Targets 7.A, 7.B | UNEP, IPCC, WMO, IEA, OECD, G-8 |
| <i>Access to safe water</i> | Agenda 21, chapter 18; Habitat II 1996; WSSD Johannesburg 2002; UN-Water | MDG 7 Target 7.C | WHO, UNDP, UN Habitat |
| <i>Clean indoor air</i> | - | - | AGECC and UN SG, WHO |
| <i>Stopping pneumonia</i> | - | - | WHO, UNICEF |
| <i>Low pollution</i> | Agenda 21, chapter 19; WSSD on safe chemicals | - | UNEP, WHO, Stockholm Convention, etc. |
| <i>Occupational safety</i> | - | - | ILO, WHO |
| <i>Stopping HIV/AIDS</i> | - | MDG 6 Targets 6.A, 6.B, UNGASS 2001, UN GA High-level Meetings | UNAIDS, WHO |
| <i>Road safety</i> | - | - | WHO |
| <i>Maintaining biodiversity and ecosystems</i> | CBD 1992, Cartagena Protocol 2000, Nagoya Protocol 2010, Statement of Forest Principles 1992, UNFF | MDG 7 Target 7.B | UNEP, UNDP |
| <i>Peace and security</i> | - | MD § 8 | UN SC |

| Global challenge | UNCED 1992 and follow-up | Millennium Declaration and follow-up | UN or international bodies |
|--|---|---|---|
| <i>Stopping hepatitis B and C</i> | - | - | WHO |
| <i>Stabilizing finance</i> | - | Debt relief: MDG 8 Targets 8.A, 8.B, 8.D | Financial crisis: G-8, G-20, Financial Stability Board, IMF, World Bank |
| <i>Stopping malaria</i> | - | MDG 6 Target 6.C | WHO |
| <i>Stopping tuberculosis</i> | - | MDG 6 Target 6.C | WHO |
| <i>Protecting soils</i> | UN Convention to Combat Desertification 1992 | - | UNEP, FAO, UNDP-DDC |
| <i>Preventing new epidemics</i> | - | - | WHO |
| <i>Water availability</i> | Agenda 21, chapter 18 | - | UNEP, UN-Water |
| <i>Safe technologies</i> | Agenda 21, chapters 15, 22 and 34 | - | UNEP, IAEA |
| <i>Safe injections</i> | - | - | WHO and SIGN |
| <i>Protection from second-hand tobacco smoke</i> | - | - | WHO |
| <i>Preparedness for natural disasters</i> | - | MD § 23 | UN/ISDR, WMO, WFP |
| <i>Containing measles</i> | - | - | WHO |
| <i>Sustainable resource use</i> | Agenda 21, chapter 4 | MDG 7 Target 7.A | AGECC and UN SG, UNEP, IEA, OECD, WB |
| <i>Containing ozone layer depletion</i> | Agenda 21, chapter 9, WSSD on support | - | Montreal Protocol 1987, UNEP, UNDP |
| <i>Capacity building: cooperation, citizenship, and democracy</i> | Agenda 21, chapters 23 to 32 | MD Section V | UNDEF, Global Compact |
| <i>Capacity building: human rights and gender equality</i> | Agenda 21, chapter 24, ICPD 1994, World Conference on Women 1995, follow-up | MD Section V, MDG 3 Target 3.A | UNIFEM/UN Women, CEDAW, Human Rights Council |
| <i>Capacity building: information and education, research and innovation</i> | Agenda 21, chapters 31, 35 and 36 | MDG 2 Targets 2.A, 8.F | UNESCO, UNDP, WB, OECD, EPO |

Annex II: Data on Major Global Challenges



This section gives an overview of the most urgent global challenges to human needs and life. All these challenges are of vital importance for human life, since they deal with overcoming or reducing large-scale damage that has already been caused and/or reducing risks that affect many people. The challenges addressed are primarily man-made, resulting mainly from large-scale human activities rather than individual action.

The global challenges have been weighed and prioritized as far as available data and risk assessments allow. They are considered with regard to the questions: Are they being given enough attention? Are efforts being made to overcome them? For selecting and weighing the challenges, indicators are used that relate to: damages and risks to life and health, economic and social development, and the natural resources essential for human life. Data, risk assessments, goals, targets and recommended measures are all taken from trusted sources such as scientific institutions, UN organizations, national administrations, and unaffiliated foundations. Due to data quality and availability issues, the order of challenges described below should not be seen as a strict hierarchy. In particular, some challenges character-

ized primarily by risks may be underestimated due to lack of available data.

It should be noted that this survey does not attempt to give a complete description of all global challenges or the state of the world. Instead it identifies only the most important issues. This does not mean that challenges not addressed here are irrelevant or negligible. Furthermore, this survey seeks a global perspective, rather than limiting it to particular countries or groups of countries.

There are a number of interconnections and overlapping components of the identified global challenges. Further details of these links can be found in the individual descriptions of each global challenge, which are available on the Global2015 website (as part of the existing version of the survey, which is currently in the process of being updated).

Although many of these challenges seem too daunting for people to become involved in, progress has already been made, and some other severe problems have already been solved. All progress towards saving human lives, improving health, and protecting other basic requirements for our existence is worth the effort.

For annotations, methodology and sources see Annex III of the document

This section provides relevant data on all challenges covered by the Global2015 survey. The boxes at the beginning of each topic contain the data used for the composite indicator from which the order of topics is derived. (The diagram on page 3 was also produced using these data). Recommended measures to address the challenges, and further information can be found at www.Global2015.net.

World Nutrition

925 million people affected per year (13.5% of world population)¹
 more than 3.5-3.9 million deaths per year²
 16.5-30 million lives at risk from famine³
 141-144 million healthy life-years (DALYs) lost annually⁴

US\$30 billion in damages per year (0.05% of global GDP)⁵



Trend

UN Millennium Target: to halve the proportion of undernourished people, from 1990 to 2015⁶

The number of people who suffer from chronic hunger has decreased in the last year, but it is still higher than it has been in the four decades before.⁷ Between 1990-92 and 2010, the number increased from about 843 million to about 925 million.⁸ Additionally, the renewed surge in food prices and the famine in the Horn of Africa may have increased the number of hungry people.

¹ FAO 2010, 8; USCB 2011, own calculation of percentage.

² The available figures consider children under the age of five years only; Black et al. 2008, 243, 254; WHO 2009, 13, 28.

³ Death toll of the worst famine in human history; Lin/Yang 1998, 127; Devereux 2000, 5.

⁴ Black et al. 2008, 254; WHO 2009, 13.

⁵ FAO 2004, 11.

⁶ UN 2000 (Millennium Declaration, General Assembly resolution), § 19.1.

⁷ FAO 2010, 9.

⁸ FAO 2010, 50, 8.

DALYs: Disability-adjusted life years

One DALY represents the loss of one year of full health. DALYs are the sum of

- the years of life lost due to premature mortality (YLL) in the population and
- the years lost due to disability (YLD) for incident cases of the health condition.¹

¹ WHO 2008, 3.

Safe Birth Conditions

300 million mothers affected (5% of world population)¹
 2.94-4.36 million deaths per year (decreasing)²

126-165 mn healthy life-years (DALYs) lost annually³



Trend

UN Millennium Targets: to reduce the mortality rate of children under the age of 5 by two thirds and the maternal mortality rate by three quarters from 1990 levels by 2015;¹ and to strive for universal

¹ WHO 2005, 10 (women suffering from illnesses brought about by pregnancy or childbirth in unsafe conditions); USCB 2011, own calculation of percentage.

² Infant deaths: see next page, footnote 2; maternal deaths: see next page, footnote 4; own calculation of sums.

³ WHO 2008, 60; own calculation of sum (considering possible overlaps).

¹ UN 2000 (Millennium Declaration, General Assembly resolution), § 19.3.

access to reproductive health and family planning¹

The number of infant deaths occurring in the period around birth is 2.6-4 million.² Newborn deaths within the first month decreased from 4.43 million in 1990 to 3.07 million in 2010.³ The number of maternal deaths decreased from 526 000 in 1980 to 343-361 000 in 2008.⁴

¹ UN 2006a (General Assembly), 6.

² WHO 2011, summary (perinatal conditions); Rajaratnam et al. 2010; UNICEF et al. 2011, 10; IHME 2010, 7; Lawn et al. 2005, 9-10, 12; UNICEF 2008, 1.

³ UNICEF et al. 2011, 16.

⁴ Hogan et al. 2010; WHO 2011, summary.

Poverty Eradication

1.20 billion people affected per year (17.9% of world population)¹
up to 7.61 million deaths per year (child mortality)²



Trend

UN Millennium Target: to halve the proportion of the world population in extreme poverty, between 1990 and 2015³

The number of people living below the extreme poverty line of \$1.25 per day has decreased to 1.20 billion in 2008,¹ but at the end of 2010 about 64 million people had been driven into extreme poverty by the financial crisis,⁴ and in 2010 and 2011, almost 70 million people faced similar fates due to rising food prices.⁵

The data on affected people refers to consumption level or income to minimize overlap with other topics. There is no related data available on mortality, etc.; however, associations with unsafe water, indoor air pollution and malnutrition indicate up to 3.4 million deaths attributable to poverty consumption levels.⁶ According to a broader concept of poverty, the topic can be seen more as a cross-cutting challenge, involving other topics and related data, including larger figures related to poverty, such as the 7.61 million deaths of children under 5,² or preventable deaths from diseases in general.⁷ Including such data leads to large overlaps with other topics and a higher estimation of its relevance; however, this survey takes the middle ground and shows the topic in consideration with the range of values that reflect the different concepts of poverty.

¹ WB 2011; USCB 2011, own calculation of percentage.

² UNICEF et al. 2011, 16.

³ UN 2000 (Millennium Declaration, General Assembly resolution), § 19.1.

⁴ WB 2010, 6, 101, and UN 2010, 7.

⁵ Ivanic [WB] 2011, 11.

⁶ Income poverty below \$2 per day has strong associations with inadequate water and/or sanitation (36%-51%), indoor air pollution (33%-50%), and underweight children (23%-37%; WHO 2002, 51, and Blakely et al. [WHO] 2004, 2068-2069). Referring to current mortality data on these issues, this equals as an approximation up to 3.40 million deaths annually, attributable to consumption level poverty (likely an underestimate due to incompleteness); WHO 2009, 13, 23, 28, 50, 52; Black et al. 2008, 243, 254; own calculations: $0.51 \times 1.91 \text{ million} + 0.50 \times 1.97 \text{ mn} + 0.37 \times 3.9 \text{ mn} = 3.40 \text{ mn}$.

⁷ CMH 2001, 11.

Keeping Climate Liveable

325 million people affected per year (4.8% of world population), 660 million in the future¹
141-315 000 deaths per year, 182 million within the century²

5.40 million healthy life-years (DALYs) lost annually³
0.75 °C global warming since 1850 (38% of the way towards the 2 °C target)⁴
per year \$126 billion up to 23% of global GDP in damages⁵



Trend

UNFCCC goal: to prevent dangerous anthropogenic interference with the climate system⁶

UNFCCC target: to keep the increase in global average temperature less than 2 °C (3.6 °F) above pre-industrial levels⁷

UNFCCC target of 37 industrialized and transitional countries (parties of the Kyoto Protocol): to reduce greenhouse gas emissions by 5% from 1990 levels by 2008-2012⁸ (in total, already achieved)

In 2010, 85 countries (including all major emitters) have pledged to reduce their emissions by 5-40% below levels of 1990, 2000 or 2005, below business as usual, or per unit of GDP by 2020.⁹ Strict implementation of these pledges would mean completion of almost 60% of the way to the 2 °C target.¹⁰

The parties of the Kyoto Protocol reduced their greenhouse gas emissions by 17.8% from 1990 to 2008, although the industrialized member countries increased their emissions by 0.9% from 1990 to 2006.¹¹ Globally, radiative forcing by all long-lived greenhouse gases increased by 27.5% from 1990 to 2009.¹² The global average surface temperature has increased from 1850 (very similar to pre-industrial levels) to 2010 by 0.75 °C; this figure is based on smoothed temperature values, compensating short-term variations by considering a time frame of 21 years for each annual data.⁴

¹ GHF 2009, 9, 12; USCB 2011, own calculation of percentage.

² WHO 2009, 50; GHF 2009, 1, 3, 11, 30, 84-90; Christian Aid 2006, 9.

³ WHO 2009, 52.

⁴ Difference between 2010 and 1850 of the global average surface temperature (land and oceans combined), based on the worldwide temperature dataset HadCRUT3 smoothed, which includes smoothing of annual data by weighed averaging based on a 21-point binomial filter; Met Office Hadley Centre 2011; own calculation of difference and percentage.

⁵ GHF 2009, 92; Nordhaus 2010, 11723; Ackerman et al. 2008, 10; Stern 2006, 143; Kempfert/Schumacher [DIW] 2005, 35, OECD 2008, 281.

⁶ UNFCCC 1992, § 2.

⁷ UNFCCC 2010, § 1 (4).

⁸ UNFCCC 1997, § 3 (1).

⁹ UNFCCC 2011, Appendix I and Appendix II.

¹⁰ UNEP 2010, 10.

¹¹ Excluding emissions from land use, land-use change and forestry; UNFCCC 2010b, 8; UNFCCC 2008, 2.

¹² WMO 2010, 2.

Access To Safe Water

2.6 billion people *endangered* (40% of world population)¹
1.91 million deaths per year²

64.2 million healthy life-years (DALYs) lost annually³

over \$28.4 billion in annual damages (0.05% of global GDP)⁴



Trend

UN Millennium Targets: to halve the proportion of people lacking access to safe drinking water, as well as the proportion of those having no access to basic sanitation between 1990 and 2015⁵

About 884 million people do not have access to safe drinking water (though this is decreasing in the long-term)⁶ and 2.6 billion lack access to basic sanitation.¹ As a result of the financial crisis, it is projected that an additional 100 million people will lack access to clean water by 2015.⁷

¹ WHO/UNICEF 2010, 6; USCB 2011, own calculation of percentage – “endangered” people are exposed to a risk, but they are not always affected by impacts; therefore their numbers received a smaller weight in calculating the composite indicator (about a third of that of affected people). See Annex III for methodological details.

² WHO 2009, 50.

³ WHO 2009, 52.

⁴ WWAP 2009, 8 (economic damages in Africa only).

⁵ UN 2000 (Millennium Declaration), § 19 (1); UN 2002 (World Summit on Sustainable Development), § 24, 7.

⁶ WHO/UNICEF 2010, 7.

⁷ WB 2010, 103.

Clean Indoor Air

3.1 billion people *endangered* (47% of world population) (increasing)¹
1.97 million deaths per year²

41.0 million healthy life-years (DALYs) lost annually³



Trend

No target. The WHO air quality guideline for respirable particulate matter with a diameter less than 10 micrometres (PM₁₀) applies also to indoor air pollution, such as from stoves without a chimney.⁴

The UN Secretary-General, Ban Ki-Moon, has suggested a target to achieve universal access to modern energy services by 2030.⁵

¹ People cooking inside with an open fire, using traditional biomass or coal; IEA 2009, 134, ITDG 2003, WHO 2006a, ix, and WHO 2011d (sum – self calculation); USCB 2011, own calculation of percentage.

² WHO 2009, 50 (deaths from respiratory diseases resulting from indoor air pollution).

³ WHO 2009, 52 (diarrhoeal disease, including rotavirus and cholera, due to a lack of safe water, sanitation and hygiene).

⁴ WHO 2006, 10.

⁵ AGECC 2010; UNDP 2010, 1.

Stopping Pneumonia

156-429 million people affected per year (2.6-6.7% of world population)¹
1.4-3.46 million deaths per year (decreasing)²



Trend

up to 94.5 million healthy life-years (DALYs) lost annually³

WHO/UNICEF targets: to reduce mortality from pneumonia in children less than 5 years of age by 65%, and the incidence of severe pneumonia by 25% in children under 5 (both from 2000 to 2015)⁴

¹ Rudan et al. 2008 (only covering children under 5); WHO 2008, 28 (lower respiratory infections, mainly pneumonia); USCB 2011, own calculation of percentage.

² WHO 2011c (only children under 5); WHO 2011, summary (lower respiratory infections, mainly pneumonia).

³ WHO 2008, 60 (lower respiratory infections, mainly pneumonia).

⁴ WHO/UNICEF 2009, 3.

Low Pollution

1.84 billion people *endangered* per year (30% of world population)¹
1.41 million deaths per year,² over 3.1 million in the future³



Trend

19.4 million healthy life-years (DALYs) lost annually⁴

1.1-5.0% of global land area affected⁵

over \$143 billion in annual damages (0.23% of global GDP)⁶

WHO air quality guideline for respirable particulate matter with a diameter less than 10 micrometres (PM₁₀);⁷ prohibition of Persistent Organic Pollutants (POPs);⁸ objectives to minimize the adverse effects of chemicals by 2020 and to support the safe management of chemicals in the Global South.⁹

¹ Number of people exposed to levels of particulate air pollutants above the WHO guideline for PM₁₀ (particulate matter less than 10 micrometres in diameter); OECD 2008, 183ff, and 2008a, Data, world, above 20 µg/m³ (sum – self calculation); USCB 2011, own calculation of percentage.

² Prüss-Ustün [WHO] et al. 2011, 6, 8-9 (deaths due to urban outdoor air pollution, exposure to lead, asbestos and arsenic); own calculation of sum.

³ OECD 2008, 257 (projected deaths due to airborne particles).

⁴ Prüss-Ustün [WHO] et al. 2011, 6, 8-9 (attributable to urban outdoor air pollution, exposure to lead, asbestos and arsenic); own calculation of sum.

⁵ Bai et al. 2008, 224, table 1: about 1.1% of land is chemically contaminated, and 3.9% is salinized; own calculation of percentages.

⁶ \$74.3 billion in the USA and \$69 billion in China; Scapecchi [OECD] 2008, 40; OECD 2008, 260 (sum – self calculation).

⁷ WHO 2006, 9.

⁸ Stockholm Convention 2009, 1.

⁹ UN 2002 (Plan of implementation of the Johannesburg Summit on Sustainable Development), § 23.

Occupational Safety

477 million people affected per year (7.1% of world population)¹
0.987-2.34 million deaths per year (decreasing)²

25.7 million healthy life-years (DALYs) lost annually³

over \$160 billion in annual damages (0.26% of global GDP)⁴



Trend

No target. The ILO set more than 40 standards dealing with occupational safety and health.⁵

The number of fatal occupational diseases and accidents slightly decreased from 2.38 million in 2001 to 2.34 million in 2008.⁶

¹ 317 million work related accidents annually (ILO 2011, 11), and 160 million people suffering from work-related diseases (ILO 2009, 54); sum by own calculation; USCB 2011, own calculation of percentage.

² WHO 2009, 50 (sum by own calculation); Concha-Barrientos et al. [WHO] 2004, 1652, 1761, 1771; Hämäläinen et al. 2009, 129; ILO 2011, 10.

³ WHO 2009, 52 (sum by own calculation).

⁴ Biddle/Keane [CDC/NIOSH] 2011, 19, for the USA and EU-OSHA 1998, 31, for the EU members (sum by own calculation).

⁵ ILO 2011a.

⁶ ILO 2011, 10.

Stopping HIV/AIDS

34 million people affected (0.50% of world population) (slightly increasing)¹
1.8 million deaths per year (decreasing)²

58.5 million healthy life-years (DALYs) lost annually³

over \$52.3 billion in annual damages (0.09% of global GDP)⁴



Trend

UN Millennium Target: a halt in the spread of HIV/AIDS by 2015⁵ (already achieved)

The numbers of new HIV infections as well as deaths have decreased (after peaking in 1997 and 2004, respectively), while the number of people living with HIV has still slightly increased.⁶ Provision of anti-retroviral therapy has been multiplied and now covers 6.6 million people.⁷

¹ UNAIDS 2011, 105; USCB 2011, own calculation of percentage.

² UNAIDS 2010, 19, 21, 25.

³ WHO 2008, 60.

⁴ Hutchinson et al. 2006, 451, and UNAIDS 2010, 146 (sum – self calculation).

⁵ UN 2000 (Millennium Declaration), § 19.4.

⁶ UNAIDS 2011, 99, 105, UNAIDS 2010, 16, 21, 184, 19, 185, 23.

⁷ UNAIDS 2011, 42.

Road Safety

24.3 million people affected per year (0.38% of world population)¹
1.21 million deaths per year,² in the future 2.4 million³

41.2 million healthy life-years (DALYs) lost annually⁴

1-2% of global GDP in damages⁵



Trend

UN target: to stabilize and then reduce the forecast level of road traffic fatalities by 2020⁶

In most regions of the world road traffic injuries are increasing.⁷

¹ WHO 2008, 28; USCB 2011, own calculation of percentage.

² WHO 2011, summary.

³ WHO 2008, 58, 23.

⁴ WHO 2008, 64.

⁵ WHO 2004a, 15-16, 2009e, 2, and TRL 2000.

⁶ UN 2011a, § 2.

⁷ WHO 2009d, vii, 2.

Maintaining Biodiversity and Ecosystems

1-3 billion people *endangered*^d (16%-48% of world population)

30-31% of species abundance lost (increasing)²
\$402 billion to \$1.5 trillion lost per year (0.66-2.5% of global GDP)³



Trend

UN CBD targets: to significantly reduce the rate of loss of biodiversity by 2010 (not achieved);⁴

to at least halve the rate of loss of all natural habitats (including forests) and bring it close to zero, as well as to significantly reduce degradation and fragmentation by 2020⁵

Only two of the fourteen CBD indicators for biodiversity have shown a positive trend in recent years.⁶ Furthermore, an increasing 85% of fish stocks are fully exploited, over-exploited, depleted or recovering.⁷ The net loss of forests has decreased in recent decades to 5.2 million hectares annually.⁸

¹ UNEP 2007, 180; CBD 2010, 46; CBD 2009, 7; Pimentel et al. 1997, 91; CBD 2008, 2; USCB 2011, own calculation of percentage.

² WWF 2010, 6, 20 (1970-2007); CBD 2010, 24 (1970-2006); for ease of comparison with the other topics, in the composite indicator the according value for loss of species abundance was given a weight of 1.5; the maximum level of this sub-indicator would be much more severe (no abundance of any animals and plants for food, etc.) than the maximum levels of the other sub-indicators on affected natural resources. Using this weight factor also brings the biodiversity sub-indicator more in line with the global warming sub-indicator and the accordingly projected species extinction levels.

³ Economic losses of \$336 billion to \$1.4 trillion per year due to invasive species (Pimentel et al. 2001, 14, CBD 2010, 6), more than \$15 billion per year due to illegal logging (WB 2006a, 1-2), \$50 billion per year in lost services from land-based ecosystems (Braat/ten Brink 2008, 11), and \$51 billion per year due to underperforming fish stocks (WB 2009, 41); own calculation of sum, considering possible overlaps.

⁴ CBD 2002, § 11, UN 2002 (World Summit on Sustainable Development, Plan of Implementation), § 42, and UN 2006a, 6.

⁵ CBD 2010a, §§ 1 and 13 (Aichi Biodiversity Target 5).

⁶ CBD 2010, 22.

⁷ UN 2011, 51, UN 2011a, indicator 7.4.

⁸ UN 2011, 48.

Peace and Security

27.5 million people affected per year (0.4% of world population)¹

172-310 000 deaths per year (decreasing)²

191 million lives lost in a century³

7.38 million healthy life-years (DALYs) lost annually⁴

\$1 trillion, or 1.6% of global GDP in damages per year⁵



Trend

No target. The UN stipulates that the peaceful settlement of disputes is of priority and aims to keep and enforce peace.⁶ UN Millennium goal: to free their peoples from the scourge of war.⁷

The number of direct battle-related deaths decreased from 136 000 in 1991 to 46 400 in 2008.⁸

¹ Internally displaced people, because of armed conflict, situations of general violence or violations of human rights; IDMC; UN 2011, 15; UNHCR 2011; USCB 2011, own calculation of percentage.

² WHO 2011, summary, 2008a, 58, 2004, 124, and 2002, 80, UCDP 2006.

³ WHO 2002a, 21.

⁴ WHO 2008, 64.

⁵ WB 2009a, 16.

⁶ UN 1945 (UN Charter), Art. 2.3, 2.4, 51, 33, 24, 39, and 42.

⁷ UN 2000 (General Assembly, Millennium Declaration), § 8.

⁸ WB 2010b.

Stopping Hepatitis B and C

480-520 million people affected (8% of world population)¹

0.929-1.06 million deaths per year² (increasing)

16.0 million healthy life-years (DALYs) lost annually³

over \$15 billion in damages per year (0.025% of global GDP)⁴



Trend

WHO target (on hepatitis B only): to reduce global childhood morbidity and mortality due to vaccine-preventable diseases by at least two thirds, from 2000 to 2015⁵

¹ IOM 2010, 22 (chronic hepatitis B or C); similar figure: WHO 2010, §10; USCB 2011, own calculation of percentage.

² Perz et al. 2006, 534; sums adapted from: WHO 2010, §1; Wiersma [WHO] 2010, 10, 11.

³ Wiersma [WHO] 2010, 10, 11 (sum – self calculation).

⁴ NYSDOH 2005, 0 (hepatitis C in the USA alone).

⁵ WHO 2005, World Health Assembly, 26, 42, 57 (annex to resolution by WHO member states: WHO 2005, §§ 1 and 2 [2]); similar UN resolution: UN 2002, § 37 (7).

Stabilizing Finance

76-208 million people affected (1-3% of world population)¹
1.465 million deaths over 7 years (2009-2015)²



Trend

7% of global GDP in damages³

G-8 goal: to prevent a re-occurrence of the financial crisis⁴

UN goal: debt relief for less developed countries (which has cumulated to \$90 billion in 2011)⁵

The crisis was expected to leave an additional 64 million people in extreme poverty by the end of 2010.⁶ There was an estimated increase of almost 34 million unemployed since 2007,⁷ and in 2009 alone, an additional 41.6 to 109.5 million workers were in vulnerable employment as a result of the financial crisis.⁸ The losses in economic development due to the crisis are projected to result in the deaths of an additional 265 000 infants and 1.2 million children under the age of 5 between 2009 and 2015.² After the financial crisis the world's economic output is still 7% lower than what would be expected in a no-crisis scenario.³ As an indicator for market risk, the outstanding gross market values in the global "over the counter" derivatives market have increased since the crisis, from \$20.4 trillion in 2008 to \$21.1 trillion in 2010 (equivalent to a third of gross world product).⁹ Global current account imbalances are increasing again.¹⁰ In addition to this, since April 2010, the World Bank's assessments of the global risks to financial stability have increased again, too.¹¹

The debt service of less developed countries has decreased from 18.7% of their exports of goods and services in 1990 to only 3.6% in 2009.¹²

¹ See footnotes 6-8 below; own calculation of sum, considering possible overlaps; USCB 2011, own calculation of percentage.

² WB 2010, 6-7.

³ UN 2010b, 4.

⁴ G-20 2008, § 2.

⁵ UN 2000 (General Assembly resolution), § 15.2; UN 2011a, indicator 8.11.

⁶ UN 2010, 7.

⁷ ILO 2010a, 9.

⁸ ILO 2010a, 18.

⁹ BIS 2008, 5, and 2011, 12.

¹⁰ WB 2011a, 48.

¹¹ IMF 2010, 1, IMF 2011, 2 (considering the risks only).

¹² UN 2011a, indicator 8.12.

Stopping Malaria

225 million people affected per year (decreasing) (3.32% of world population)¹
0.781 million deaths per year (decreasing)²

34.0 million healthy life-years (DALYs) lost annually³

\$12 billion in damages per year (0.02% of global GDP)⁴



Trend

UN Millennium Target: a halt in the spread of malaria by 2015⁵ (already achieved)

Malaria cases peaked in 2005 at 244 million and decreased to 225 million in 2009.⁶

¹ WHO 2010c, 60, 61; USCB 2011, own calculation of percentage.

² WHO 2010c, 60, 61, WHO 2009b, 27, UN 2011, 42.

³ WHO 2008, 60.

⁴ RBMP [WHO] 2008, 27.

⁵ UN 2000 (General Assembly resolution), § 19.4.

⁶ WHO 2010c, 61.

Stopping Tuberculosis

12 million people affected per year (0.18% of world population) (decreasing)¹
1.1 million deaths per year (decreasing)²

34.2 million healthy life-years (DALYs) lost annually³

over \$344 billion in losses per year (0.56% of global GDP)⁴



Trend

UN Millennium Target: a halt in the spread of HIV/AIDS, malaria, and other major infectious diseases by 2015⁵

¹ WHO 2011a, 12, 115 (uncertainty range: 11-14 million); USCB 2011, own calculation of percentage.

² WHO 2011a, 12 (uncertainty range: 0.92-1.2 million).

³ WHO 2008, 60.

⁴ Laxminarayan et al. [WB] 2007, 44, 45 (22 high-burden countries only; own calculation of sum per one year).

⁵ UN 2000, § 19.4.

Protecting Soils

1.54-2.6 billion people *endangered* (23.9-43% of population)¹

9.3-33% of global land area affected (increasing)²
\$400 billion, or 0.65% of global GDP in damages per year³



Trend

No target. UNCCD goal: to combat desertification and mitigate the effects of drought.⁴

¹ Bai et al. 2008, 223, 231; Adams/Eswaran 2000, GEF 2009, 7; USCB 2011, own calculation of percentage.

² See next page, footnotes 5-7.

³ Pimentel et al. 1995, UNCCD 2011, 3.

⁴ UNCCD 1994, Objective 2.

About 9.3% of the global land area was moderately, strongly or extremely degraded by 1988-90.⁵ From 1981 to 2003, a further 23.5% of the land has degraded to some degree, much of which is cumulative.⁶ A further estimate puts the proportion of degraded land at 33% in total.⁷

⁵ Oldeman/Hakkeling/Sombroek 1991, 28 (table I, total land surface) and 32 (table 9, moderate, strong, extreme degradation), 4; own calculation of sum and percentage.

⁶ Bai et al. 2008, 231.

⁷ Adams/Eswaran 2000; GEF 2009, 7.

Preventing New Epidemics

between 500 million people and 33% of the world's population *endangered*¹

over 100 million lives at risk²

3.1% of global GDP at risk³



Trend

No target.

Every year, one new disease appears. This is the highest ratio which humanity has ever had to face.⁴ At present, an event similar to the 1918 Spanish flu pandemic could result in over 100 million deaths⁵ and economic losses of about 3.1% of world gross product.⁶ Measures to constrain the spread of SARS were successful as the outbreak was halted within four months of it being identified as a global health threat.⁷

¹ Taubenberger/Morens 2005 (data on the 1918 flu pandemic).

² MA 2005, 89, and Taubenberger/Morens 2005.

³ Brahmhatt [WB] 2006, 10, and WB 2006.

⁴ WHO 2007; Daszak et al. 2006.

⁵ MA 2005, 89, and Taubenberger/Morens 2005.

⁶ Brahmhatt [WB] 2006, 10, and WB 2006.

⁷ WHO 2007, 40.

Availability of Water

1.6-2.84 billion people *endangered* (24-42% of population) (increasing)¹

16.5-30 million lives at risk from famine²

5-25% of global freshwater is in over-use³



Trend

No target. UN Millennium Goal: to stop the unsustainable exploitation of water resources by developing water management strategies.⁴

¹ Number of people living in areas of physical water scarcity; UNEP 2011, 7; FAO 2007, 135; OECD 2008, 223; USCB 2011, own calculation of percentage.

² Death toll of the worst famine in human history; Lin/Yang 1998, 127; Devereux 2000, 5.

³ MA 2005, 107.

⁴ UN 2000 (General Assembly resolution), § 23 [4]; UN 2002 (World Summit on Sustainable Development), 15.

The frequency of water-related conflicts has more than doubled.⁵

⁵ Pacific Institute 2009.

Safe Technologies

more than 153 000 people affected per year (0.002% of world population)¹

249 000 deaths per year²

over 100 million lives at risk³

5.25 million healthy life-years lost annually⁴

over \$1.66 billion, or 0.02% of global GDP in damages per year⁵



Trend

No target. The UN Agenda 21 addresses the transfer of environmentally sound technologies, as well as technological risks from nuclear waste management. The CBD Cartagena Protocol deals with biosafety.⁶ Improved chemical safety could prevent about 240 000 killings from unintentional poisonings per year, as well as the loss of 5.25 million healthy life-years.⁷ Annually, over the last ten years, disasters with a technological trigger affected 153 000 people,¹ and killed 9 185 people on average,⁸ at a cost of about \$1.66 billion each year.⁵ High risk technologies include: (1) nuclear power, large chemical facilities, and dams (potential for very extensive damage with a very low probability of occurrence), (2) certain genetic engineering applications (potential for very extensive damage but unknown probability), and lastly, (3) any climate damaging technology.⁹ The three most severe accidents caused by these high risk technologies resulted in about 32 500 to 442 500 deaths in total.¹⁰ In 2011, a tsunami triggered a hazard in the Fukushima Dai-ichi nuclear power plant, provisionally determined to be of the highest rating on the International Nuclear Event Scale.¹¹ Genetic engineering could lead to antibiotic resistant bacteria, or the creation of new and/or more harmful germs.¹² A new epidemic similar to the 1918 Spanish flu could nowadays result in over 100 million deaths and severe economic disruption.³ Nano-technologies need ongoing assessment.¹³

¹ IFRC 2011, 216 (ten-year average derived from the ten-year total); USCB 2011, own calculation of percentage.

² See footnote 7 (unintentional poisonings) and 8 (technological disasters); own calculation of sum.

³ MA 2005, 89, and Taubenberger/Morens 2005.

⁴ Prüss-Ustün [WHO] et al. 2011, 5-6; Prüss-Ustün/Corvalán [WHO] 2006, 51; not including occupational poisonings.

⁵ IFRC 2011, 218 (ten-year average derived from the ten-year total).

⁶ UN 1992, chap. 34, 22; CBD 2000.

⁷ Prüss-Ustün [WHO] et al. 2011, 5-6; Prüss-Ustün/Corvalán [WHO] 2006, 51; not including occupational poisonings.

⁸ IFRC 2011, 214 (ten-year average derived from the ten-year total).

⁹ WBGU 1998, 62.

¹⁰ People's Daily Online 2005, Asia Times Online 2003, Chernobyl Forum 2006, 16, Greenpeace 2006, 10, 26, 48, and WBGU 1998, 71.

¹¹ IAEA 2011, 3.

¹² Johnson 1999, 133, ISP 2003, Garcia/Altieri 2005, and Hooftman et al. 2008.

¹³ OECD 2008, 386.

Safe Injections

10-26 million people affected per year (0.16-0.43% of world population) (decreasing)¹
417 000 to 1.3 million deaths per year²



Trend

6.96 million healthy life-years to 26 million life-years lost³

\$535 million, or 0.001% of global GDP in damages per year⁴

No target. WHO goal: to promote total injection safety.⁵

Unsafe injection practices in medical settings, such as reuse of injection equipment without sterilization, led to 8 to 20.6 million new cases of hepatitis B infections, 2.0 to 4.7 million cases of hepatitis C infections and 80 000 to 260 000 cases of HIV infections annually.¹ The trend is improving.⁶

¹ Hauri et al. [WHO] 2004, 1831, and Kane et al. 1999, 803 (sum – self calculation); USCB 2011, own calculation of percentage.

² WHO 2009, 50, 2008, 44, Hauri et al. [WHO] 2004, 1831, WHO 2002, 78, and Miller/Pisani 1999, 808-809.

³ WHO 2009, 52; WHO 2008, 44, and Miller/Pisani 1999, 808-809.

⁴ Miller/Pisani 1999, 809.

⁵ WHO 2010 (resolution of the World Health Assembly).

⁶ SIGN [WHO] 2010.

Protection from Second-hand Tobacco Smoke

more than 700 million people *endangered* (12% of population) (increasing)¹
603 000 deaths per year²



Trend

10.9 million healthy life-years lost annually³

No target. However, the WHO air quality guideline for respirable particulate matter with a diameter less than 10 micrometres (PM₁₀) applies also to indoor air pollution.⁴ The WHO members agreed to provide protection from exposure to tobacco smoke in indoor workplaces, public transport and public places.⁵

¹ WHO 2009a, 20 (the figure covers children only); USCB 2011, own calculation of percentage.

² Öberg et al. 2010, 4-5; similar figure: WHO 2009a, 20.

³ Öberg et al. 2010, 5.

⁴ WHO 2006, 10.

⁵ WHO 2003, Art. 8.

Preparedness for Natural Disasters

267 million people affected per year (4.1% of world population) (increasing)¹
 122 000 deaths on annual average²
 16.5-30 million lives at risk³



Trend

\$106 billion, or 0.17% of global GDP in damages per year⁴

No target. Goal of the UN International Strategy for Disaster Reduction: reducing human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters.⁵

There is already progress in reducing the human impacts per incident.⁶

Above-mentioned figures on affected people, deaths and economic damages are ten-year averages to compensate for the variance of annual natural disasters. Though most figures have decreased in the long-term, there was an increase in trend in the last decade. The average number of people who were affected annually by natural disasters increased from 211 million people in 1991-2000 to 267 million people in 2001-2010.⁷ Significantly, the devastating earthquake in Haiti in 2010 killed over 222 570 people.⁸ With economic losses of around US\$ 265 billion, 2011 is the highest-ever loss year on record: As of the end of June, it already exceeds the total figure for 2005, which was previously the costliest year to date. Most of the losses were caused by the Tohoku earthquake and tsunami in Japan.⁹

¹ IFRC 2011, 216 (ten-year average derived from the ten-year total); USCB 2011, own calculation of percentage.

² IFRC 2011, 214 (ten year average derived from the ten-year total).

³ Death toll of the worst natural disaster in recorded history; CBC 2008; Lin/Yang 1998, 127; Devereux 2000, 5.

⁴ IFRC 2011, 218 (ten year average derived from the ten-year total).

⁵ UN/ISDR 2000.

⁶ WHO 2008, 65.

⁷ IFRC 2001, summary, and 2011, 210.

⁸ IFRC 2011, 209.

⁹ Munich Re Group 2011.

Additional Serious Challenges, and Challenges Nearly Contained

Containing Measles

20 million people affected per year (0.3% of world population)¹
 155-164 000 deaths per year (decreased)²
 1.7 million lives over 4 years at risk³
 14.9 million healthy life-years (DALYs) lost annually⁴



Trend

WHO/UNICEF target: to reduce measles mortality by 90% of the level in 2000, by 2010⁵

From 2000 to 2008, a 78% reduction in measles deaths was achieved.⁶ However, there is renewed fear that a decrease in political and financial commitment to combat the disease could result in an estimated 1.7 million measles-related deaths between 2010-2013.⁷

¹ WHO 2011b; USCB 2011, own calculation of percentage.

² WHO 2011; WHO/UNICEF 2010a, 2; UN 2011, 27; WHO 2011b.

³ UN 2010, 28, WHO/UNICEF 2009a, 2.

⁴ WHO 2008, 60.

⁵ WHO/UNICEF 2005, 8, 26.

⁶ WHO/UNICEF 2009a, 2.

⁷ UN 2010, 28, WHO 2009c, 515.

Sustainable Resource Use

2.6-29% of deposits are already extracted¹
 more than \$4 trillion at risk (0.33-0.65% of annual GDP over 1-2 decades)²



Trend

No target. UN Millennium goal: to reverse the current trend in natural resource degradation as soon as possible.³ UNEP highlighted a long-term reduction of resource consumption by a factor of 10.⁴ UN Secretary-General has recommended a 40% increase in energy efficiency as a target for 2030.⁵

Annual global resource extraction has increased from about 41.6 billion tonnes in 1990 to 68.1 billion

¹ The amount of global resource extraction from 1900 to 2005, compared to the amount of this extraction and the known resources or reserves, respectively; considering fossil fuels, metals and industrial minerals (Krausmann et al. 2011, table on material flow data, Krausmann et al. 2009, UNEP 2011a, 11; RWI/ISI/BGR 2006, 17-23, BGR 2010, 12; own calculation of sums and percentages, assuming for natural gas a density of 0.8 kg/m³, for unconventional gas 0.92 kg/m³, and for lignite 1 tonne = 0.657 t SKE, furthermore, because tailings are included in the data on resource extraction but not in the data on reserves and resources, tailings were excluded from the resource extraction data, by subtracting the tailings' proportion of the sum of metals, tailings and industrial minerals [data for 1900-2005 in Krausmann et al. 2009], which is a proportion of 62.0%, from the aggregated data on metal ores and industrial minerals [provided in Krausmann et al. 2011]).

² DOE 2005, 4, 31, 71.

³ UN 2002 (World Summit on Sustainable Development, Plan of Implementation), § 24; UN 2006, 50 (target 9); UN 2008, Target 7.A.

⁴ UNEP 1999, 2.

⁵ AGECC 2010, 9.

tonnes in 2009.¹ In the same time frame, material intensity decreased from 1.53 to 1.35 kg per \$ in GDP, and energy intensity from 13.2 to 10.2 MJ/\$.² About 2.6% of the global resources (known, but marginal or subeconomic) or 29% of the global reserves (suitable for economic extraction) are already consumed; however, discovering new deposits and developing previously uneconomic deposits may keep pace with resource consumption.³ The situation is highly varied among the resources. With regard to oil, the projected onset of maximum extraction ranges from 2006 to beyond 2035.⁴ Crude oil supply reached its historic high of 70 mb/d (millions of barrels per day) in 2008 and is projected to decline slightly to around 68 mb/d by 2035, assuming gross capacity additions of 47 mb/d – twice current OPEC Middle East production – just to compensate for declining production at existing fields.⁵ Projections for the total oil supply in 2030/35 (including non-conventional oil) range from an increase of 13 mb/d to a decrease of 42 mb/d.⁶ The increase scenario would require \$38 trillion in global investment.⁷ Disruptions in supply due to peak oil could cost the US economy alone around \$4 trillion, triggering international crises and jeopardizing food security in many less developed countries.⁸ In 2010, about 4.9 million barrels of oil spilled in the Gulf of Mexico, affecting 650 miles of coastline and causing economic damages of about \$40 billion.⁹ Furthermore, there is significant potential for conflicts over natural resources to intensify in the coming decades.¹⁰

¹ Krausmann et al. 2011, table on material flow data.

² Krausmann et al. 2011, table on figure 2.c (referring to 1990 international dollars; 1 MJ = 1 megajoule = 0.278 kWh).

³ See previous page, footnote 1 of this topic.

⁴ ASPO 2008, 2010; EWG 2008, 69-70, 2011, 2; BGR 2010, 18; IEA 2004, 2008, 6, 2011, 3, 2011a, 3; Birol 2008; ITPOES 2010 and UKERC 2009, 150-151, 164-165.

⁵ IEA 2011, 3.

⁶ IEA 2011, 3, 2011a, 3; BGR 2010, 18; ASPO 2008, 2010; EWG 2008, 70-71 (81 mb/d minus 39 mb/d), 2011, 2.

⁷ IEA 2011, 1, 2011a, 2.

⁸ DOE 2005, 4, 31, 71.

⁹ USCG et al. 2011, 33; National Commission 2011, 167, 177; Skoloff/Wardell 2010.

¹⁰ UNEP 2009a, 7, 30.

Containing Ozone Layer Depletion

130-150 million people would have been affected in the future (1.5% of world population)¹

More than 6.3 million lives will have been saved²



Trend

Montreal Protocol target: to protect the ozone layer by taking precautionary measures to stop the production and use of ozone depleting substances (CFCs and FCs) and to provide support to less developed countries in their related efforts; 98% of total gas reduction targets were achieved by 2010.³ This is a success story for the application of the precautionary principle. Without this decisive action, a

¹ UN 2010, 54, 55; USCB 2011, own calculation of percentage.

² EPA 1987 and EPA 1999, 64.

³ Montreal Protocol 1987 (with amendments in 2000), 1; UN 2002 (Plan of implementation of the World Summit on Sustainable Development), 22; UN 2011, 50.

tenfold increase in atmospheric levels of ozone-depleting substances by 2050 would result in increased exposure to the sun's ultraviolet radiation (UV) and would likely have added up to 20 million cases of skin cancer and 130 million cases of eye cataracts.¹ Continuation of current spending on reducing the use of ODS is expected to save 6.3 million lives from skin cancer between 1990 and 2165 in the USA.² Although the obligations of both Protocols were fulfilled, the requirements of the Montreal Protocol and its amendments were more successful in limiting total emissions of greenhouse gases than meeting the requirements of the Kyoto Protocol.³ Nevertheless, there are still problems to tackle with regard to some substitutes, CFCs that are produced and traded illegally, and the management of pre-existing stockpiles.⁴

¹ UN 2010, 54, 55.

² EPA 1987 and 1999, 64.

³ UN 2011, 50.

⁴ UN 2007, 25.

Extending Capacities to tackle Global Challenges

Capacity Building through Cooperation, Citizenship, and Democracy



The Agenda 21 and the Millennium Declaration of the United Nations both rely on the principle of cooperation.¹

In order to overcome global challenges, the capacity of individuals and organizations can be reinforced. Building the capacity of communities and individuals can contribute to practical progress. Means to accomplish this include: (1) cooperation in partnerships by persons and/or institutions, enterprises or organizations; (2) civic commitments of people or the "corporate citizenship" of enterprises or institutions; (3) options for democratic participation in public affairs, including transparency and good governance. Partnerships are on the rise, along with the institutional, social and technical possibilities for participation. After a significant increase in the number of parliamentary democracies, a subsequent decrease occurred.² However, the recent "Arab spring" suggests a noteworthy change towards democracy. Good governance has remained constant on average.³ The perceived level of public-sector corruption has decreased,⁴ and the number of companies reporting on their own corporate social responsibility has increased.⁵

¹ UN 1992 (Conference on Environment and Development), 2.1, 23; UN 2000 (General Assembly), § 20.

² Freedom House 2010, 1, Economist 2008, 10, and CSP 2009, 11.

³ Kaufmann et al. [WB] 2009, 37-38, 33-35, 3, 22-24.

⁴ TI 2010.

⁵ CorporateRegister.com 2011, 4.

Capacity Building through Human Rights and Gender Equality



UN Millennium target: to end disparities between boys and girls in all levels of education by 2015¹

There are currently 96 girls for every 100 boys enrolled in primary and secondary schools.² The share of women in parliaments has increased from 12.8% in 1990 to 19.3% in 2011.³ A majority of countries have shown a reduction in the difference of female to male social, political, economical and educational contributions.⁴ Nevertheless, this is far from equality and women are still facing many kinds of discrimination and violence.⁵ Gender equality, rooted in human rights, is a key to many global challenges.

Rules and guarantees that are stipulated in universal, civic, political, economic, social, and cultural human rights facilitate involvement and dedication to improving conditions of life. This kind of empowerment can strengthen activities, too. The share of world population assessed to be living in an environment with a high level of political and civic rights has increased in the long-term.⁶

¹ UN 2000, §§ 19.2, 20.1, 24, 25.

² UN 2011, 20.

³ UN 2011, 22.

⁴ WEF 2010, 7.

⁵ UNIFEM.

⁶ Freedom House 2010.

Capacity Building through Information and Education, Research and Innovation



Agenda 21 and the Millennium Declaration emphasize strengthening education and science along with the role of private business and information technology.¹ UN Millennium Target: by 2015, all children shall be able to complete primary schooling.² Additionally, the Millennium Declaration has maintained that information and communication technologies shall be available to all.³

In 2008, 89.6% of all children were enrolled in primary school, and 88.1% of those who had started primary school completed their schooling (both increasing).⁴ Due to the financial crisis, 350 000 fewer students will complete primary school in 2015.⁵ Today in the Global North, 68% have Internet access, whereas in the Global South the figure is only 15% (both increasing).⁶ Capacity building includes access to information and education. This enables people to understand problems and influence politics and markets on the base of solid information, as well as choose options related to lifestyles and

¹ UN 1992, §§ 30, 35, 36; UN 2000, §§ 19.2, 20.5.

² UN 2000, § 19.2.

³ UN 2000, § 20.5.

⁴ UN 2010a, indicators 2.1 and 2.2.

⁵ WB 2010, 103.

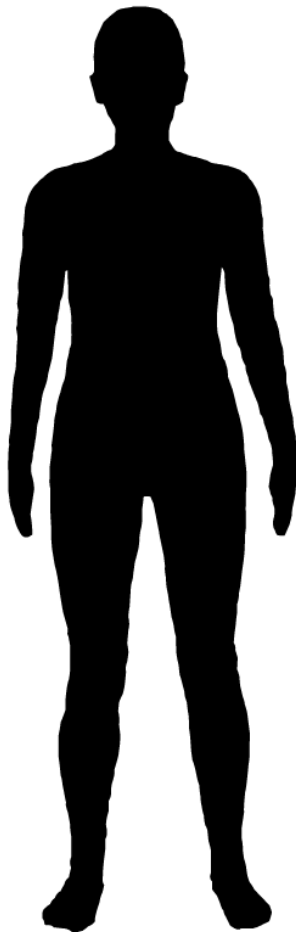
⁶ UN 2010, 72.

consumption patterns. Furthermore, information and education assists in creating and accelerating new solutions in research and development and thereby shaping our paths to the future. Patent activity is rising, too.⁷

⁷ OECD/JPO/EPO 2008, 4, and WIPO 2010, 33.

Global Challenges for Human Needs and Life

Human Needs



- ◀ Food to eat
- ◀ Safe birth
- ◀ Water to drink
- ◀ Air to breathe
- ◀ Being healthy
- ◀ Physical integrity
- ◀ Chances to improve living conditions

Global Challenges

- ◀ **World nutrition**
- ◀ **Safe birth conditions**
- ▼ **Poverty eradication**
- ▼ **Keeping climate liveable**
- ◀ Access to safe water
- ◀ Clean indoor air
- ◀ Stopping pneumonia
- ▼ Low pollution
- ◀ Occupational safety
- ▼ Stopping HIV/AIDS
- ▼ Road safety
- ▼ Maintaining biodiversity and ecosystems
- ▼ Peace and security
- ▼ Stopping hepatitis B and C
- ▼ Stabilizing finance
- ▼ Stopping malaria
- ▼ Stopping tuberculosis
- ▼ Protecting soils
- ▼ Preventing new epidemics
- ▼ Availability of water
- ▼ Safe technologies
- ▼ Safe injections
- ▼ Protection from second-hand tobacco smoke
- ▼ Preparedness for natural disasters
- ▼ Containing measles
- ▼ Sustainable resource use
- ▼ Containing ozone layer depletion
- ◀ *Capacity building*
- ◀ Cooperation, citizenship and democracy
- ◀ Human rights and gender equality
- ◀ Information and education, research and development

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Annex III: Annotations, Methodology and Sources

Annotations

For numeric names the short scale is used:

1 billion = one thousand million = 10^9 = 1 000 000 000

1 trillion = one thousand billion = 10^{12} = 1 000 000 000 000

1 μm = 1 micrometre (micron) = 0.001 mm = 10^{-6} m

All figures in dollars refer to US dollars, unless otherwise stated.

The base year of all target data is 1990, unless otherwise stated.

Trends specified by + or – refer to the current direction of development (improving or getting worse), but not to whether the development is on track to meet a given target.

All percentages of world population are taken from

the referred source, or in substitution to that calculated from data provided in USCB 2011, according to the respective year.

Almost all available data on global conditions is of low precision. Most data on the largest problems facing mankind are only partially taken from actual measurements of specific cases. More often, estimates are based on modeling and extrapolation. As a result, the data base is far from meeting the motto of the WHO Report 2005:

“Make every mother and every child count”.

Methodology

In order to identify the most urgent global challenges, the Global2015 survey uses the following criteria:

- The challenges are of existential importance for life and the needs of many people;
- The factors responsible for the problem are mainly anthropogenic (man-made), respectively there are options available for humans to avoid or minimize the impacts, or to improve the situation; and
- The impacts on people affected are not primarily caused by the affected individuals, nor can they be minimized solely by them, but rather require outside assistance or large-scale changes in human activities.

The challenges are differentiated according to the possible actions or means in addressing them. Weighting the challenges is done by combining data on the extent and the severity of the challenges. This includes:

- number of affected, or endangered people;
- number of deaths;
- lost healthy life-years (DALYs);
- affected natural foundations of life (portion of global resources); and
- economic damages.

In order to keep this study transparent and verifiable, a simple method is used to combine data. To make the data comparable, each indicator is transformed into a percentage. Each value of a percentage indicator is calculated relative to the highest value of the same indicator, which is set to be 100%. After, the percentages are simply summed for each challenge. In doing so, missing values are considered as adding no relevance to a topic. Likely values for missing data would not be expected make a significant difference, except for some risk topics (and poverty, see that topic in Annex II). The global challenges are presented from the highest to lowest priority according to this combined indicator. The calculation process in detail:

Number of affected people as percentage of their highest value (if not available, number of endangered people as percentage of world population) (1)

- + 1.33 x (number of current or future deaths as percentage of their highest value) (2)
 - + 1.33 x (number of lives at risk as percentage of highest deaths value)
 - + number of lost healthy life-years (DALYs) as percentage of their highest value
 - + affected natural foundations of life as real percentage data (3)
 - + amount of current or future economic losses as percentage of their highest value (4)
- = composite indicator

- (1) Being affected by one of the problems covered in the survey is considered to be more severe than only being endangered. According to the data given, the number of people affected is weighted almost three times more heavily than data on people who are only exposed to a problem.
- (2) If figures on current and future deaths are available, the average is used. Because deaths are the most severe human impact, the numbers are weighted 1.33 time.
- (3) Because the affected natural foundations for life do not pose direct impacts, but a risk to humans, or smaller human impacts than the other indicators (health losses, etc.), the relative importance of the available data was not recalculated to reach 100%.
- (4) Data on future economic damages are given as net present values or percentage of gross world

product, and are therefore comparable to data on current economic damages (which are already given as percentage of gross world product, or calculated into a percentage of current gross world product).

Despite all these considerations, it has to be strongly emphasized that due to lack of relevant and reliable data, the resulting order of challenges cannot be considered to be very precise. They are therefore better viewed as groups with high, middle and lower relative priority. Thus, rather than seeing a problem listed as number 5 as definitely more important than one listed in position 6, it is more appropriate to conclude that challenges listed in positions such as 5 and 6 will be more urgent than a challenge listed in position 10. Nevertheless, the real data shows very clear differences between the challenges indicating higher or lower relevance.

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