BRIEFING PAPER

GLOBAL CLIMATE RISK INDEX 2018

Who Suffers Most From Extreme Weather Events? Weather-related Loss Events in 2016 and 1997 to 2016

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GERMANWATCH

Brief Summary

The Global Climate Risk Index 2018 analyses to what extent countries have been affected by the impacts of weather-related loss events (storms, floods, heat waves etc.). The most recent data available – for 2016 and from 1997 to 2016 – were taken into account.

The countries affected most in 2016 were Haiti, Zimbabwe as well as Fiji. For the period from 1997 to 2016 Honduras, Haiti and Myanmar rank highest.

This year's 13th edition of the analysis reconfirms earlier results of the Climate Risk Index: less developed countries are generally more affected than industrialised countries. Regarding future climate change, the Climate Risk Index may serve as a red flag for already existing vulnerability that may further increase in regions where extreme events will become more frequent or more severe due to climate change. While some vulnerable developing countries are frequently hit by extreme events, for others such disasters are a rare occurrence.

It remains to be seen how much progress the Fijian climate summit in Bonn will make to address these challenges: The COP23 aims to continue the development of the 'rule-book' needed for implementing the Paris Agreement, including the global adaptation goal and adaptation communication guidelines. A new 5-year-work plan of the Warsaw International Mechanism on Loss and Damage is to be adopted by the COP. It remains an open question how loss and damage should be taken up under the Paris Agreement.

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Content

Qualifier: How to read the Global Climate Risk Index

The Germanwatch Global Climate Risk Index is an analysis based on one of the most reliable data sets available on the impacts of extreme weather events and associated socio-economic data. The Germanwatch Climate Risk Index 2018 is the 13th edition of the annual analysis. Its aim is to contextualize ongoing climate policy debates – especially the international climate negotiations – with real-world impacts during the last year and the last 20 years.

However, the index must not be mistaken for a comprehensive climate vulnerability[1] scoring. It represents one important piece in the overall puzzle of climate-related impacts and associated vulnerabilities but, for example, does not take into account important aspects such as rising sea-levels, glacier melting or more acidic and warmer seas. It is based on past data and should not be used for a linear projection of future climate impacts. Specifically, not too far reaching conclusions should be drawn for political discussions regarding which country is the most vulnerable to climate change. Also, it is important to note that the occurrence of a single extreme event cannot be easily attributed to anthropogenic climate change. Nevertheless, climate change is an increasingly important factor for changing the likelihood of occurrence and the intensity of these events. There is a growing body of research that is looking into the attribution of the risk[2] of extreme events to the influences of climate change.[3]

The Climate Risk Index (CRI) indicates a level of exposure and vulnerability to extreme events, which countries should understand as warnings in order to be prepared for more frequent and/or

[1] According to IPCC (2014) we define vulnerability as "the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt".

[2] According to IPCC SREX (2012) we define disaster risk as "the likelihood over a specified time period of severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery.

[3] See, for instance: Zhang et al. (2016); Hansen et al. (2016); Haustein et al. (2016); and Committee on Extreme Weather Events and Climate Change Attribution et al. (2016) Stott et al. (2015); Trenberth et al. (2015).

more severe events in the future. Not being mentioned in the CRI does not mean there are no impacts occurring in these countries. Due to the limitations of the available data, particularly long-term comparative data, including socio-economic data, some very small countries, such as certain small island states, are not included in this analysis. Moreover, the data only reflects the *direct* impacts (direct losses and fatalities) of extreme weather events, whereas, for example, heat waves – which are a frequent occurrence in African countries – often lead to much stronger *indirec*t impacts (e. g. as a result of droughts and food scarcity). Finally, the index does not include the total number of affected people (in addition to the fatalities) since the comparability of such data is very limited.

Key Messages

- According to the Germanwatch Global Climate Risk Index, Haiti, Zimbabwe as well as Fiji were at the top of the list of the most affected countries in 2016.
- Between 1997 and 2016, Honduras, Haiti and Myanmar were the countries most affected by extreme weather events.
- Altogether, more than 524 000 people died as a direct result of more than 11 000 extreme weather events; and losses between 1997 and 2016 amounted to around US$ 3.16 trillion (in Purchasing Power Parities).
- This year's COP presidency – the archipelago Republic of Fiji – as well as other Small Island Developing States (SIDS) are severely affected by climatic events. Five SIDS, including Haiti (2nd), the Dominican Republic (10th) and Fiji (13th), rank among the 20 countries world-wide most affected by weather-related catastrophes in the past 20 years. Haiti and Fiji rank first and third in the annual index for 2016.
- Storms and their direct implications – precipitation, floods and landslides – were one major cause of damage in 2016. According to the most recent scientific research, rising sea surface temperatures seem to play a key role in intensifying storms.
- Most of the affected countries in the Bottom 10 of the long-term index have a high ranking due to exceptional catastrophes. Over the last few years another category of countries has been gaining relevance: Countries like Haiti, the Philippines and Pakistan that are recurrently affected by catastrophes continuously rank among the most affected countries both in the long term index and regularly in the index for the respective year.
- Of the ten most affected countries (1997–2016), nine were developing countries in the low income or lower-middle income country group, while only one was classified as an upper-middle income country.
- The climate summit in Bonn is continuing the development of the 'rule-book' needed for the implementation of the Paris Agreement, including the global adaptation goal and adaptation communication guidelines. A new 5-year work-plan of the Warsaw International Mechanism on Loss and Damage is to be adopted by the COP. The question remains as to how loss and damage should be further taken up under the Paris Agreement.

1 Key Results of the Global Climate Risk Index 2018

People all over the world have to face the reality of climate variability – in many parts of the world this has manifested in the increased volatility of extreme weather events. Between 1997 and 2016, more than 524 000 people died worldwide and losses of US$ 3.16 trillion in Purchasing Power Parities (PPP) were incurred as a direct result of more than 11 000 extreme weather events. The UNEP Adaptation Gap Report 2016 warns of the increasing impacts and resulting increases in global adaptation costs by 2030 or 2050 that will likely be much higher than currently expected: "two-to-three times higher than current global estimates by 2030[4], and potentially four-to-five times higher by 2050[5]".[6] These numbers do not include costs resulting from residual risks or unavoidable losses and damage. This indicates that the gap between the necessary financing to deal with climate-induced risks and impacts is even larger. On the other hand, the report highlights the importance of enhanced mitigation action towards limiting the global temperature increase to below 2°C, which could then help to avoid substantive costs and hardships.[7]

The **Global Climate Risk Index (CRI)** developed by Germanwatch analyses the quantifiable impacts of extreme weather events[8] – both in terms of fatalities as well as economic losses that occurred – based on data from the *Munich Re* NatCatSERVICE, which is one of the most reliable and comprehensive databases on this matter worldwide. The CRI examines both absolute and relative impacts to create an average ranking of countries in four indicating categories, with a stronger emphasis on the relative indicators (see chapter "Methodological Remarks" for further details on the calculation). The countries ranking highest (figuring in the "Bottom 10"[9]) are the ones most impacted and should consider the CRI as a warning sign that they are at risk of either frequent events or rare, but extraordinary catastrophes.

The CRI does not provide an all-encompassing analysis of the risks of anthropogenic climate change, but should be seen as just one analysis explaining countries' exposure and vulnerability to climate-related risks based on the most reliable quantified data – along with other analyses.[10] It is based on the current and past climate variability and – to the extent that climate change has already left its footprint on climate variability over the last 20 years – also on climate change.

Countries most affected in 2016

Haiti, Zimbabwe as well as Fiji were the most affected countries in 2016 followed by **Sri Lanka, Vietnam and India**.[11] Table 2 shows the ten most affected countries for last year, with their average weighted ranking (CRI score) and the specific results relating to the four indicators analysed.

[4] US$ 140 billion – US$ 300 billion by 2030
[5] US$ 280 billion – US$ 500 billion by 2050
[6] UNEP (2016): Executive Summary. p. xii
[7] Ibid. (2016): p. 42
[8] Meteorological events such as tropical storms, winter storms, severe weather, hail, tornados, local storms; hydrological events such as storm surges, river floods, flash floods, mass movement (landslide); climatological events such as freezing, wildfires, droughts.
[9] The term "Bottom 10" refers to the 10 most affected countries in the respective time period.
[10] See e.g. analyses of Columbia University (Yohe et al 2006: A Synthetic Assessment of the Global Distribution of Vulnerability to Climate Change from the IPCC Perspective that Reflects Exposure and Adaptive Capacity, http://ciesin.columbia.edu/data/climate/), Maplecroft's Climate Change Vulnerability Index: https://reliefweb.int/sites/reliefweb.int/files/resources/verisk%20index.pdf
[11] The full rankings can be found in the Annexes.

Table 1: The Climate Risk Index for 2016: the 10 most affected countries

Ranking 2016 (2015)	**Country**	**CRI score**	Death toll	Deaths per 100 000 inhabitants	Absolute losses in million US$ (PPP)	Losses per unit GDP in %	Human Development Index 2015[12]
1 (40)	Haiti	2.33	613	5.65	3 332.72	17.224	163
2 (14)	Zimbabwe	7.33	246	1.70	1 205.15	3.721	154
3 (41)	Fiji	10.17	47	5.38	1 076.31	13.144	91
4 (98)	Sri Lanka	11.50	99	0.47	1 623.16	0.621	73
5 (29)	Vietnam	15.33	161	1.17	4 037.70	0.678	115
6 (4)	India	18.33	2 119	0.16	21 482.79	0.247	131
7 (51)	Chinese Taipei	18.50	103	0.44	1 978.55	0.175	Not included
8 (18)	Former Yugoslav Republic of Macedonia	19.00	22	1.06	207.93	0.678	82
9 (37)	Bolivia	19.33	26	0.24	1 051.22	1.334	118
10 (21)	United States	23.17	267	0.08	47 395.51	0.255	10

Haiti was severely hit by the hurricanes Matthew and Nicole in September 2016. Hurricane Matthew, the first category 4 storm to make landfall in Haiti since 1963, has been classified as the worst natural disaster in Haiti since the 2010 earthquake, killing over 500 people (local governments attribute the death of over a thousand people to Hurricane Matthew[13]), leaving over 1.4 million people food insecure and reinforcing cholera outbreaks.[14] According to information by the International Federation of the Red Cross and Red Crescent Societies, over one million people were affected by the severe flooding and winds which reached speeds of up to 145 mph.[15]

In **Zimbabwe**, the year started with extreme droughts associated with the El Niño, which caused record breaking heatwaves and acute agricultural losses.[16] The poor distribution of rainfall through most of the year was followed by massive precipitation triggered by tropical storm Dineo, causing floods in Zimbabwe in November and December 2016 and which continued well into January 2017. The floods reportedly killed around 250 people and left several thousand homeless. At least 10 provinces were listed as severely hit. In these areas, the public infrastructure, especially dams and bridges, were destroyed.[17]

[12] UNDP, 2016b: Human Development Report, p. 193-198. The Human Development Report 2016 indicates the Human Development Index for the year 2015.

[13] Reuters, 2016a, https://www.reuters.com/article/us-storm-matthew-haiti/hurricane-matthew-toll-in-haiti-rises-to-1000-dead-buried-in-mass-graves-idUSKCN12A02W

[14] The Guardian, 2016b, https://www.theguardian.com/world/2016/oct/07/hurricane-matthew-weakens-storm-surge-flooding-fears

[15] The Guardian, 2016a, https://www.theguardian.com/world/2016/oct/07/it-was-like-a-monster-hurricane-matthew-leaves-haiti-in-crisis

[16] Food and Agriculture Organisation of the United Nations, 2016, http://fscluster.org/sites/default/files/documents/wfp_fao_el_nino_overview_by_fsc_-_2016-04-21.pdf
World Meteorological Organisation, 2016, https://library.wmo.int/opac/doc_num.php?explnum_id=3414, p.17

[17] BBC News, 2016a http://www.bbc.com/news/world-africa-39152025

As this year's presidency of the UNFCCC COP23 and as a representative of Small Island Developing States (SIDS), **Fiji** was severely affected by extreme weather in 2016. Cyclone Winston hit Fiji in February as a category 5 storm – making it the strongest cyclone on record for the archipelago. It resulted in major destruction, especially on the island of Viti Levu, leaving over 44 dead and causing around US$1.4 billion in damages.[18] Over 34,000 people were left without homes and infrastructure was severely damaged. Just six weeks after Winston wreaked havoc, Fiji was passed by Hurricane Zena in April with top speeds of 105 mph, forcing the evacuation of 3 500 people and the suspension of aid distribution.[19]

Hurricanes, Cyclones and Typhoons

Relatively high humidity, tropical temperatures and high winds cause a weather disturbance that, if it persists long enough, causes the type of storm that is associated with the terms **hurricane, cyclone and typhoon**. These storms all produce strong winds, high waves and torrential rain and do not differ in qualities – they just have different names depending on where in the world they occur. In the Atlantic and Northeast Pacific, the weather phenomenon is described by the term **hurricane.** A **cyclone** occurs in the South Pacific and Indian Ocean and the name **typhoon** describes the same weather event in the Northwest Pacific.

The term **tropical cyclone** is used to describe any rotating system and arrangement of clouds that originated in a tropical or subtropical environment. If such a system reaches winds of more than 74 mph (119 km/h), it is then classified as a cyclone, hurricane or typhoon – depending on the location in which it occurs.

Sri Lanka was hit by cyclone Roanu in May, after already having experienced severe droughts during the beginning of the year.[20] A depression south east of the Sri Lankan shore caused torrential rain. Floods and landslides took the lives of over 100 people and displaced half a million.[21] The economic damages are estimated at US$ 2 billion, with Roanu also causing damage to India and Bangladesh.

Vietnam's extreme droughts continued well into the year 2016 and were recorded as the worst droughts in the last 100 years. The Mekong decreased to its lowest level since 1926, leading to severe salinization.[22] Several natural disasters in 2016 caused over 160 lives to be lost and destroyed 370 000 homes: in addition to the drought, tropical cyclone Dianmu hit Northern Vietnam in mid-August, causing several fatalities and destroying hundreds of homes.[23] A tropical depression and the storm Aere caused further damage in November, with heavy flooding throughout central and southern Vietnam.[24] The losses caused by Aere amounted to around US$ 112 million as of October 2016, causing 15 fatalities. Additionally, Vietnam was hit by tropical storm Sarika on

[18]NASA, 2016, https://earthobservatory.nasa.gov/NaturalHazards/view.php?id=87562
World Meteorological Organisation, 2016, https://library.wmo.int/opac/doc_num.php?explnum_id=3414, p. 20
[19] Weather, 2016, https://weather.com/storms/hurricane/news/fiji-flooding-tropical-cyclone-zena-april2016
[20]Direct Relief, 2016, https://www.directrelief.org/2016/05/cyclone-roanu/
[21]ABC News, 2016, http://www.abc.net.au/news/2016-05-21/sri-lanka-flood-evacuations/7434068
CNN, 2016a, http://edition.cnn.com/2016/05/22/asia/sri-lanka-flooding-deaths/
[22] Forbes Magazine, 2016a, https://www.forbes.com/sites/timdaiss/2016/05/25/why-vietnam-is-running-dry-worst-drought-in-nearly-100-years/#3937aaa074b3
[23] Flood List, 2016b, http://floodlist.com/asia/floods-vietnam-laos-storm-dianmu-august-2016
[24] Relief Web, 2016b, https://reliefweb.int/disaster/tc-2016-000111-vnm

15th October killing another 15 people.[25] In the Quang Binh and the Ha Tinh province damage was caused to around 95 000 homes.[26]

The heat waves in South Asia persisted until the beginning of summer 2016, breaking a record of 51°C in Rajasthan, **India** in May 2016.[27] Over a thousand people died of hyperthermia or dehydration. In total, 1 800 fatalities were reported, especially in Southeast India.[28] The persisting drought and heat waves affected over 330 million people.[29] They were followed by an extreme monsoon season lasting from June to October in eastern, western and central India. At least 300 people died due to the heavy rainfalls and landslides and millions of people were affected by washed away crops, destroyed roads or disrupted electricity and phone lines.[30] On 12th December 2016, cyclone Vardah, one of the costliest cyclones ever in the North Indian Ocean basin, made landfall in Chennai[31]. Several people died here and infrastructure was severely damaged.

Chinese Taipei suffered due to an abnormally cold winter, with 85 people dying of hypothermia or other cold induced illnesses in January. It also saw six intense typhoons in 2016, with typhoon Meranti bringing severe agricultural damage and leaving over a million households without water supplies or electricity when it made landfall on 14th September.[32] Typhoon Megi caused further destruction upon its arrival on 26th September, killing four people and injuring hundreds.[33] Official sources considered Meranti to be the strongest typhoon of the year so far.[34] It was also the fifth category 5 storm to occur worldwide in 2016.

An untypically cold winter in Eastern Europe also affected the **Former Yugoslav Republic of Macedonia,** with temperatures dropping below -20°C in early 2016. From 6th to 10th August torrential rain caused severe flooding in the Macedonian capital Skopje. The heavy precipitation resulted in flash floods as high as 1.5 metres which killed at least 21 people.[35] In the northern part of Skopje 70% of the houses were damaged due to rainfall.[36]

In late 2016 the **Bolivian** capital La Paz also suffered its worst drought in 25 years, as the government reported.[37] This is partly attributed to the fact that Bolivia's glaciers have receded by over 40% since 1985.[38] Despite the droughts, extreme precipitation and landslides caused several fatalities and destroyed 300 homes in Cochabamba, Santa Cruz and La Paz at the beginning of Decem-

[25] FloodList, 2016c, http://floodlist.com/asia/vietnam-ha-tinh-quang-tri-quang-binh-flood-november-2016
[26] Inhabitat, 2016, https://inhabitat.com/severe-flooding-in-vietnam-leaves-at-least-21-people-dead-and-thousands-of-homes-submerged/
[27] Hindustan Times, 2016 http://www.hindustantimes.com/india-news/over-1-600-killed-due-to-extreme-weather-patterns-in-2016/story-ZXToWjowatrEYk81af2V4H.html
[28] Times of India, 2016, https://timesofindia.indiatimes.com/india/Heatwave-continues-to-sear-India-death-toll-rises-to-1826/articleshow/47461552.cms
[29] CNN, 2017, http://edition.cnn.com/2017/04/24/asia/india-heat-wave-deaths/index.html
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[31] The Hindu, 2016, http://www.thehindu.com/news/cities/chennai/Cyclone-Vardah-brings-Chennai-to-a-standstill/article16798323.ece
[32] CNN, 2016b, http://edition.cnn.com/2016/09/16/asia/typhoon-malakas-taiwan-weather/index.html
The Guardian, 2016c, https://www.theguardian.com/world/2016/sep/14/typhoon-meranti-megastorm-philippine-island-eye-storm-itbayat
[33] Accu Weather, 2016, https://www.accuweather.com/en/weather-news/typhoon-megi-taiwan-china-flooding-wind-mudslides/60335662
[34] Telegraph, 2016, http://www.telegraph.co.uk/news/2016/09/14/typhoon-meranti-worlds-strongest-storm-this-year-hits-taiwan/
[35] CNN, 2016b, http://edition.cnn.com/2016/08/07/europe/macedonia-storms/index.html
[36] Reuters, 2016b, http://www.reuters.com/article/us-macedonia-floods/macedonia-declares-state-of-emergency-after-21-die-in-flash-floods-idUSKCN10I0B0 http://mobile.abc.net.au/news/2016-08-07/storms-torrential-rain-lash-macedonian-capital-of-skopje/7698892
[37] Public Radio International, 2017,https://www.pri.org/stories/2017-01-04/la-paz-short-water-bolivia-s-suffers-its-worst-drought-25-years
[38] Associated Press News, 2016, https://apnews.com/0027d896297a4163ba0161303aff7b91

ber.[39] Across the country, weeks of heavy rain at the end of the year reportedly killed at least 40 people and left 10 000 homeless. The ongoing droughts forced the Bolivian government to declare a state of emergency in early 2017.

The **United States** experienced flash floods and floodwaters in North and South Carolina in April, followed by extreme flooding and torrential rains in Louisiana on 10th August 2016, amounting to US$ 10 billion in damages. In June, an intense heatwave accompanied by wildfires killed several people and destroyed ten thousand acres of land.[40] The unusually dry conditions and hot winds in the South East accounted for severe wildfires in Tennessee, leaving 14 dead and destroying 2 000 homes. The damage was estimated at US$3 billion. Hurricane Matthew arrived at the US shores in October, especially impacting South and North Carolina, Florida and Georgia, accounting for 49 deaths and damage of over US$10 billion.[41] The hurricane was accompanied by further floods.

Countries most affected in the period 1997–2016

Honduras, Haiti and Myanmar were identified as the most affected countries in this 20-year period.[42] They are followed by **Nicaragua, the Philippines, and Bangladesh**. Table 2 shows the ten most affected countries concerning the last two decades with their average weighted ranking (CRI score) and the specific results relating to the four indicators analysed.

Table 2: The Long-Term Climate Risk Index (CRI): the 10 countries most affected from 1997 to 2016 (annual averages)

CRI 1997–2016 (1996–2015)	**Country**	**CRI score**	Death toll	Deaths per 100 000 inhabitants	Total losses in million US$ (PPP)	Losses per unit GDP in %	Number of events (total 1997–2016)
1 (1)	Honduras	12.17	301.65	4.28	561.11	1.968	62
2 (3)	Haiti	13.50	280.40	2.96	418.77	2.730	72
3 (2)	Myanmar	14.00	7 097.75	14.55	1 277.86	0.694	43
4 (4)	Nicaragua	19.33	162.45	2.96	234.60	1.127	44
5 (5)	Philippines	20.17	859.55	0.98	2 893.41	0.611	289
6 (6)	Bangladesh	26.50	641.55	0.44	2 311.07	0.678	187
7 (7)	Pakistan	30.50	523.10	0.33	3 816.82	0.605	141
8 (8)	Vietnam	31.83	312.60	0.37	2 029.80	0.549	216
9 (10)	Thailand	33.83	139.60	0.21	7 696.59	0.967	137
10 (11)	Dominican Republic	34.00	210.90	2.32	243.53	0.262	49

[39] Floodlist, 2016d, http://floodlist.com/america/bolivia-floods-north-central-departments-leave-4-dead
http://floodlist.com/america/bolivia-river-levels-rise-south-flash-floods-la-paz
BBC, 2016, http://www.bbc.com/news/world-latin-america-12592408

[40] NBC News, 2016, https://www.nbcnews.com/news/weather/crews-fighting-southwest-wildfires-prepare-excessive-heat-n595201

[41] NOAA, 2016, https://www.ncdc.noaa.gov/billions/events/US/1980-2017

[42] The full rankings can be found in the Annexes.

There have only been slight changes compared to the analyses presented in the CRI 2017 which covered the period from 1996 to 2015.[43] Almost all countries that made the Bottom 10 last year appear again in this year's edition, with the Dominican Republic entering the list. Haiti, the poorest country of the Western Hemisphere, as well as Honduras and Myanmar have remained the top three most affected countries over the past two decades. These rankings are attributed to the aftermath of exceptionally devastating events such as Hurricane Sandy in Haiti and Hurricane Mitch in Honduras. Likewise, Myanmar was struck hard, most notably by Cyclone Nargis in 2008, which was responsible for an estimated loss of 140 000 lives as well as the property of approximately 2.4 million people.[44]

Particularly in relative terms, poorer developing countries are hit much harder: **Of the ten most affected countries in 1997–2016, nine were developing countries in the low income or lower-middle income country group**, while only one (Thailand) was classified as an upper-middle income country. These results emphasise the particular vulnerability of poor countries to climatic risks, despite the fact that the absolute monetary losses are much higher in richer countries. Loss of life, personal hardship and existential threats are also much more widespread in low-income countries.

Exceptional catastrophes or continuous threats?

The Global Climate Risk Index 1997–2016 is based on average values over a twenty-year period. However, the list of countries featured in the Bottom 10 can be divided into two groups: those that have a high ranking due to exceptional catastrophes and those that are continuously affected by extreme events.

Countries which fall into the first category include Myanmar, where Cyclone Nargis in 2008 caused more than 95% of the damage and fatalities that occurred in the past two decades, and Honduras, where more than 80% of the damage in both categories was caused by Hurricane Mitch in 1998. The latest addition to this group is Thailand, where the floods of 2011 accounted for 87% of the total damage. With new superlatives like Hurricane Patricia in October 2015 being the strongest land-falling pacific hurricane on record, it seems to be just a matter of time until the next exceptional catastrophe occurs.[45] Cyclone Pam, that severely hit Vanuatu in March 2015, and Hurricane Matthew in Haiti 2016 once again showed the vulnerability of LDCs and SIDS to climate risks.[46]

The appearance of some European countries among the Bottom 30 countries can, to a large extent, be attributed to the extraordinary number of fatalities due to the 2003 heat wave, in which more than 70 000 people died across Europe. Although some of these countries are often hit by extreme events, the relative economic losses and the fatalities are usually relatively minor compared to the size of the countries' populations and economic power.

The link between climate change and extreme weather events

As the Fifth Assessment Report of the Intergovernmental Panel on Climate Change from 2014 (IPCC) stresses, climate change-related impacts stemming from extreme events such as heat waves, extreme precipitation and coastal flooding can already be observed.[47] The frequency of heat waves has increased in large parts of Europe, Asia and Australia. Likewise, the number of

[43] See Kreft et al., 2016: Global Climate Risk Index 2017.http://germanwatch.org/de/download/16411.pdf
[44] See OCHA, 2012, http://reliefweb.int/sites/reliefweb.int/files/resources/Myanmar-Natural%20Disasters-2002-2012.pdf
[45] The Weather Channel, 2015, http://www.weather.com/storms/hurricane/news/hurricane-patricia-mexico-coast
[46] BBC 2015a, http://www.bbc.com/news/world-asia-31866783
[47] IPCC, 2014, p.12

heavy precipitation events has increased in most land regions – the intensity of which has especially increased in North America and Europe.[48]

The IPCC has already predicted that risks associated with extreme events will continue to increase as the global mean temperature rises.[49] However, the link between certain weather events and climate change is still a frontier in science. In general, many studies conclude that "the observed frequency, intensity and duration of some extreme weather events have been changing as the climate system has warmed".[50] Nevertheless, it is not easy to investigate the impact of climate change on a single weather event as different regional circumstances need to be taken into account and data might be very limited.[51] Over the past few years more and more research has been conducted on the attribution of extreme events to climate change, i.e. in how far anthropogenic climate change has contributed to the event's likelihood and strength.[52] Due to methodological improvement, "fast track attribution" is now more feasible and can be undertaken within months of the event.[53] Additionally, more knowledge is generated about how the underlying factors which contribute to extreme weather are influenced by global warming. For example, higher temperatures intensify the water cycle, leading to more droughts, as well as floods, due to drier soil and increased humidity.[54] Of course, these approaches can only make statements about the change in probability of a certain event happening.

The countries in the CRI 2018 show how destructive extreme precipitation can be, namely through the floods and landslides which have hit many regions in South and South East Asia, South America and the USA - regions which now feature in the Bottom 10. Extreme precipitation is expected to increase as global warming intensifies the global hydrological cycle. Thereby, single precipitation events are expected to increase at a higher rate than global mean changes in total precipitation, as outlined by Donat et al. 2016. Furthermore, those increases are expected in wet as well as dry regions.[55] A study by Lehmann et al. 2015 strengthens the scientific link between record breaking rainfall events since 1980 and rising temperatures. According to the scientists, the likelihood of a new extreme rainfall event being caused by climate change reached 26% in 2010.[56] . A recent study by Blöschel et al. (2017) concludes that the timing of floods shifts due to climate change. The research focuses on Europe and shows that floods occur earlier in the year, posing timing risks to people and animals. Flooding rivers affect more people worldwide than other natural disasters and account for billions of US-dollars' worth of damage annually.[57] Nevertheless, the study is not fully able to single out human induced global warming as a cause – a problem many researchers on extreme weather attribution are still facing.

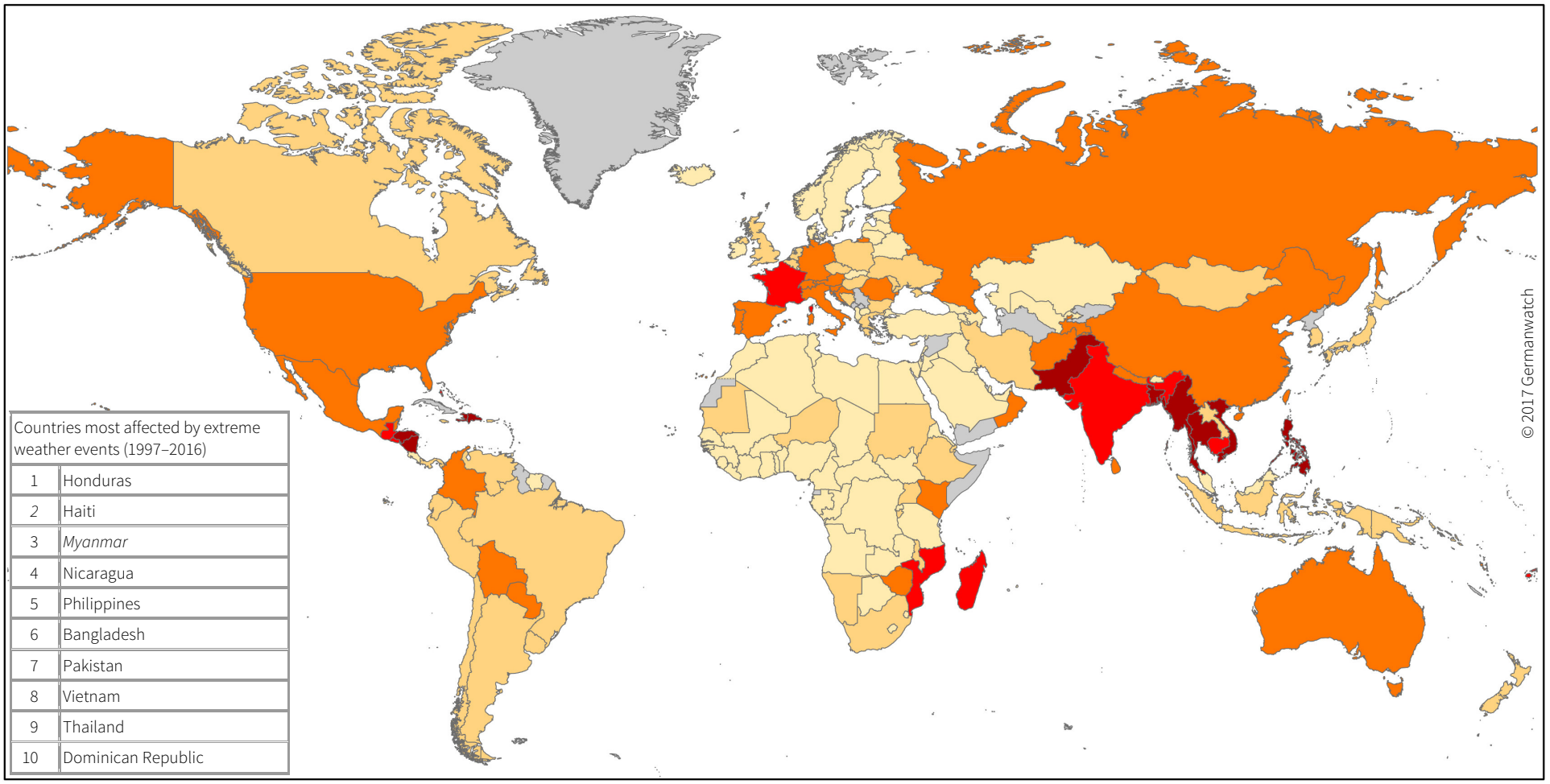
Researchers also conclude that sea surface temperature seems to play a key role in intensifying storms.[58] It is difficult to distinguish between natural variability and human induced extremes, but the rising sea level, which is partly caused by climate change, is responsible for the increased intensity of floods, storms and droughts. For example, a study shows that the 2016 torrential rains in Louisiana, USA, were made almost twice as likely by human-induced climate change. The downpour was so significant due to the fact that the storm was able to absorb abnormal amounts of

[48] IPCC, 2013, p.3
[49] IPCC, 2014, p.12
[50] Committee on Extreme Weather Events and Climate Change Attribution et al., 2016: p. 2
[51] Hansen, G. et al., 2016
[52] Stott et al., 2015
[53] Haustein et al., 2016
[54] World Meteorolocial Organisation, 2017, https://public.wmo.int/en/resources/bulletin/unnatural-disasters-communicating-linkages-between-extreme-events-and-climate
[55] Donat et.al. 2016
[56] Lehmann et al., 2015
[57] Blöschl et al., 2017
[58] Nature, 2016, https://www.nature.com/articles/nclimate2657,Zhang et al., (2016) Bull. Amer. Meteor. Soc., 97 (12), S.131-S.135

tropical moisture on its way to the US coast, releasing three times the precipitation of Hurricane Katrina in 2005.[59] Another example is a regional model used to analyse the occurrence of heat waves in India, finding causalities regarding the 2016 heat wave and climate change. The model indicated that sea surface temperatures influence the likelihood of record breaking heat.[60] Other studies have found similar results. A publication regarding the 2015 southern African droughts also found causalities with regards to sea surface temperatures causing reduced rainfall and increased local air temperatures.[61]

Furthermore, there is increasing evidence on the link between extreme El Niño events and global warming, as a simulation by Cai et al. 2014 showed, the occurrence of such events could double in the future due to climate change.[62]

[59] Climate Central, 2016a, https://wwa.climatecentral.org/analyses/louisiana-downpours-august-2016/
[60] Climate Central, 2016b, https://wwa.climatecentral.org/analyses/india-heat-wave-2016/
[61] Funk et al., 2016
[62] Cai et al., 2014



Italics: Countries where more than 90% of the losses/deaths occurred in one year/event

Figure 1: World Map of the Global Climate Risk Index for 1997–2016

Source: Germanwatch and Munich Re NatCatSERVICE

2 UNFCCC's first "island COP": Extreme weather in Small Island Developing States

This year's climate summit rotates to the Pacific region with Fiji taking on presidency of the Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change (UNFCCC). Due to limited capacities on the island, the conference itself will take place at the premises of the UNFCCC Secretariat in Bonn, Germany.

Fiji and all other Small Island Developing States[63] are highly vulnerable to climate change and are already experiencing its impacts. The island states are particularly affected by rises in sea levels, tropical cyclones, increasing air and sea surface temperatures, as well as changing rainfall patterns.[64] These impacts pose specific risks ranging from the loss of livelihoods, coastal settlements, ecosystem services and economic stability to the decline and possible loss of coral reef ecosystems. For some SIDS their very existence could be threatened by a rise in the sea level.[65]

SIDS in brief

Although sharing similar climate change challenges, the SIDS group is highly diverse and geographically dispersed. Population, per capita emissions and GDP vary significantly among the SIDS.

Population and land area: The combined population is about 65 million (slightly less than 1% of the world's population) and the average land area is about 24 thousand km^2. Cuba is the most populated island (11.3 million inhabitants) whereas Niue is the least populated (1 500 inhabitants).

- **Poverty rate:** In Jamaica, Maldives and Seychelles less than 2% of the population has to live from less than US$ 1.25 a day. In stark contrast to this, in Haiti almost 55% of the population has to live from less than US$1.25 a day.
- **GDP**: Singapore has the highest GDP (US$ 222.7 billion) and Tuvalu the lowest (US$ 31.4 million). Average: US$ 13.7 billion.
- **Per capita emissions:** The SIDS' average CO_2 emissions per capita are 4.9 tonnes. The highest emissions, which inflate average emissions, can be attributed to high-income countries such as Trinidad and Tobago (37.4 t). Emissions are much lower in the least developed countries such as Comoros, Timor-Leste or Guinea Bissau (~ 0.2 t).
- **Important industries:** Varying across countries, the tourism industry has greatly contributed to the development of many SIDS. Other important industries are fisheries and mining. Moreover, agriculture plays a key role for many SIDS (e.g. Papua New Guinea: 36% of GDP in 2012).

[63] The United Nations categorize a group of about 57 low lying island states in the Caribbean, Pacific, and the Atlantic, Indian Ocean and South China Sea (AIMS) as SIDS . They share common environmental and socioeconomic characteristics and therefore facing similar threats when it comes to climate change. SIDS are broken down into three geographic regions: the Caribbean;[2] the Pacific;[3] and Africa, Indian Ocean, Mediterranean and South China Sea (AIMS) Thirteen of them are located in the Pacific, with Fiji being one of them.

[64] IPCC (2014) Climate Change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of working group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Field CB, Barros VR, Dokken DJ et al. (eds) Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

[65] Ibid.

The SIDS' vulnerability is clearly reflected in the CRI. In the past year, SIDS have been heavily struck by weather catastrophes. Haiti and Fiji, ranking first and third in the annual index for 2016 were hit by major cyclones/hurricanes followed by storm surges and catastrophic flooding. Hurricane Matthew caused widespread destruction and catastrophic loss of life during its journey across the Western Atlantic, including parts of Haiti, Cuba and the Dominican Republic. In October 2016 the hurricane hit Haiti, which is still trying to recover from the devastating earthquake in 2010, killing at least 1 000[66] people and leaving 35 000 homeless. In February of the same year, Fiji was hit full-on by cyclone Winston, the strongest tropical cyclone recorded to strike the island nation. With wind speeds of up to 300km/h, 44 people were killed, 40 000 homes were damaged or destroyed causing damage totalling US$ 1.4 billion.[67] An estimated 350 000 people (40 per cent of the nation's population) were either moderately or severely affected by the storm. Winston also caused severe damage in neighbouring SIDS, such as Tonga where agriculture sustained severe damage with up to 95% of the banana crop and most of the vanilla crop being lost.[68]

But also over the past 20 years, five SIDS, including Haiti (2nd), the Dominican Republic (10th) and Fiji (13th) rank among the 20 countries world-wide most affected by weather related catastrophes.

Table 3: The 5 SIDS most affected in 2016

Ranking CRI	Country	CRI score	Death toll	Deaths per 100 000 inhabitants	Absolute losses in million US$ (PPP)	Losses per unit GDP in %
1	Haiti	2.33	613	5.65	3 332.72	17.224
3	Fiji	10.17	47	5.38	1 076.31	13.145
11	Dominican Republic	23.33	32	0.32	463.33	0.286
28	St. Vincent and the Grenadines	41.33	2	1.82	2.88	0.234
46	The Bahamas	53.17	0	0.00	1 241.30	13.766

Table 4: The 5 SIDS most affected in the period 1997–2016 (annual averages)

Ranking CRI	Country	CRI score	Death toll	Deaths per 100 000 inhabitants	Absolute losses in million US$ (PPP)	Losses per unit GDP in %
2	Haiti	13.50	280.40	2.96	418.77	2.7296
10	Dominican Republic	34.00	210.90	2.32	243.53	0.2615
13	Fiji	37.83	8.05	0.97	119.48	1.9740
17	The Bahamas	40.33	2.80	0.85	204.07	2.7403
20	Grenada	41.00	2.00	1.93	78.54	7.4730

[66] See: http://diepresse.com/home/ausland/welt/5099128/Hurrikan-Matthew_Zahl-der-Toten-steigt-in-Haiti-auf-1000
[67] See: https://www.newswire.com.fj/national/tc-winston/2-98-billion-damage-caused-by-tc-winston/
[68] See: http://www.abc.net.au/news/rural/2016-02-25/cyclone-winston-damages-tongan-vanilla-crop/7195042

Sharing a growing concern about the effects that climate change can have on the fragile ecosystems, many SIDS form part of the Alliance of Small Island States (AOSIS), often adopting a common stance in the UNFCCC negotiations. AOSIS is very vocal about the impacts of climate change on its member countries, pushing for a limitation of global warming to 1.5°C and highlighting the need to address the issues of adaptation, loss and damage effectively.

SIDS are also very active in other climate related initiatives on an international level. Fourteen SIDS are members of the Climate Vulnerable Forum (CVF), a global partnership of countries that are disproportionately affected by the consequences of climate change. In their vision, the CVF strives to achieve 100% domestic renewable energy production as rapidly as possible and aims to strengthen participatory local risk governance as well as encourage members to actively engage with the G7 initiative on climate risk insurance.[69]

Moreover, there are ambitious initiatives on how to address the climate risks to be found in SIDS regions. For example, the **"Caribbean Catastrophe Risk Insurance Facility" (CCRIF SPC)** is a regional catastrophe fund for Caribbean governments to limit the financial impact of devastating tropical cyclones, excessive rainfall and earthquakes by quickly providing financial liquidity when a policy is triggered. Following hurricane Matthew, CCRIF SPC paid out over US$ 29 million to the four member countries Haiti, Barbados, Saint Lucia and St. Vincent & the Grenadines.[70] The funds – which were received two weeks after the event and were the first form of financial liquidity to be received – were used to cover the salaries of key emergency personnel. Another example is the **"Pacific Catastrophe Risk Assessment and Financing Initiative" (PCRAFI),** a regional risk pool in the Pacific, aiming to provide disaster risk management and finance solutions to help build the resilience of island states. Countries can insure themselves against tropical cyclones, earthquakes and tsunamis. In parallel, disaster risk management work is conducted under the Pacific Resilience Program, which aims to strengthen early warning systems and preparedness and improve countries' post-disaster response capacities.

While these initiatives are an important step in addressing the particular vulnerability of SIDS and can help to provide the necessary financial backup in case of extreme events, direct access to international climate finance through national entities is fairly limited for SIDS. Although multilateral climate finance delivery channels such as the Green Climate Fund have a particular focus on this group of countries, SIDS need more support in their efforts to tackle the climate crisis.

In this context, COP23 as the first "Island COP" provides a unique opportunity for SIDS to raise awareness of their climate change related challenges and to bring their concerns into the centre of the negotiations. Fijian Prime Minister and incoming President of COP23, Frank Bainimarama stated that "we who are most vulnerable must be heard, whether we come from the Pacific or other Small Island Developing States (…). But together we must speak out for the whole world – every global citizen – because no-one, no matter who they are or where they live, will ultimately escape the impact of climate change". [71]

[69] See: http://www.thecvf.org/wp-content/uploads/2016/11/CVF-Vision-For-Adoption.pdf
[70] See: http://www.ccrif.org/news/ccrif-completes-payments-totalling-us29-million-member-governments-affected-hurricane-matthew
[71] See: https://cop23.com.fj/fijis-vision-cop23/

3 Rulebook for resilience: What's next for international resilience policy?

As the cornerstone of international climate policy, the Paris Climate Agreement equally anchors mitigation and resilience in its main goals, even though this intention is not fully reflected in concrete activities yet. Now, two years after its adoption and one year after coming into force, enabling the agreement's implementation is the core task on the table. Open questions need to be discussed and a way forward defined. Unfortunately, the issues of adaptation, loss and damage are not very prominent on this year's COP negotiations agenda.

A resilience framework: Taking stock of developments in 2017

The great success of international diplomacy with the adoption of the Paris Agreement by all UN member states is also the core part of the international resilience policy. As one of its three key aims, the agreement introduced a Global Goal on Adaptation (GGA) and emphasizes the importance of fostering resilience (Article 7 on adaptation provisions and obligations of conduct for countries and Article 8 on measures to address climate induced loss and damage). A process for how the GGA can be operationalised needs to be established as soon as possible.

The Sustainable Development Goals (SDGs) and the Sendai Framework on Disaster Risk Reduction embed the Paris Agreement in a larger resilience framework. Strong interlinkages are made through the SDGs' sub targets for resilience (Goals: 1. End poverty, 2. End hunger, 9. Sustainable infrastructure, 11. Sustainable Cities and Communities and 13. Fight climate change) and Sendai's international goals to prevent natural catastrophes – through understanding disaster risks, strengthening disaster management governance and investing in risk reduction and resilience building.

Increased adaptation efforts and fostering resilience was also on the agenda of this year's **G20 summit**, hosted by Germany. It resulted in the announcement of a "Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions". It will build upon the 2015 InsuResilience Initiative by the G7 on climate risk insurance but will cover a broader scope, acknowledging additional risk finance strategies in addition to insurance solutions.

Mandated by the COP21 in Paris, the **IPCC** started its work to deliver a special report on 1.5°C by COP24 in 2018. This year, important steps were taken towards the finalization of the report, such as a draft report being distributed to expert reviewers in July 2017. Approval of the final version is expected by October 2018. The special report will deliver valuable scientific insights about climate-induced impacts and damages and will feed into the wider UNFCCC process.

Extreme weather events and slow onset changes have a severe effect on the living conditions of people and communities in vulnerable and disaster-prone regions. Therefore, forced migration and displacement becomes an additional area of concern. The process around the two new **UN Global Compacts on Safe, Orderly and Regular Migration and on Refugees** currently under discussion is of specific importance when integrating climate impacts into migration policy. In consultations, climate change has already been discussed as one of the drivers of human mobility and it would be of great value to see it included in the final Compacts. Both are due to be finalized in 2018. The high level of attention on the issue of human mobility can likely be attributed to the dramatic developments in refugee numbers, culminating in 65.3 million in 2015[72].

[72] http://www.unhcr.org/statistics/unhcrstats/576408cd7/unhcr-global-trends-2015.html

Fiji COP: What's on the agenda for resilience at COP23?

As demonstrated in chapter 2, Small Island Developing States (SIDS) like Fiji are one of the country groups most vulnerable to the impacts of climate change. Therefore, a great opportunity to raise awareness of climate threats, of the need to enhance action on resilience and to raise mitigation ambitions to minimize the scale of impacts is opening up.

The COP23 resilience agenda will deliver on 1) adaptation as part of the "rule-book" for the Paris Agreement's implementation and 2) a new 5-year work-plan for the Executive Committee (ExCom) of the Warsaw International Mechanism on Loss and Damage (WIM). At COP23 negotiations will focus inter alia around how adaptation efforts and needs can be best reported by countries (Art. 7.10, 11). These reports ("adaptation communications") will be part of the transparency framework and shall provide of means of conducting the "global stocktake" of countries' climate outputs (regarding mitigation, adaptation and finance) that will take place every 5 years. It is not expected that the COP in Bonn will deliver a decision but to prepare text for a draft decision for COP24. A central precondition therefore is to define clear guidelines (as part of the "rule-book") at COP23 for adoption at COP24 in 2018.

Significantly scaling-up public resources for adaptation (including new pledges to the Adaptation Fund and Least Developed Countries Fund) and tackling the imbalance between financial support provided for mitigation and adaptation is yet another important task for COP23. Furthermore, the role of the Adaptation Fund under the Paris Agreement needs to be discussed further in Bonn. As a multilateral climate fund focussing especially on concrete small-scale adaptation projects to address the needs of the most vulnerable people and communities in developing countries, the Fund covers an important niche in the adaptation financing landscape. COP22 in Marrakech took the first steps towards providing more clarity and identified key areas where further clarity is needed.

Furthermore, on the issue of loss and damage the WIMs new 5-year rolling work plan, approved by the ExCom in October, is to be adopted by COP23 in Bonn. As it will not be covered in full in the suggested work plan, one outstanding item for the international community is to secure an adequate amount of financing to enable the WIM to conduct its work and implement its respective activities. Apart from the work plan, more clarity is needed on as to how loss and damage will be taken up under the Paris Agreement, inter alia through including the issue in the global stocktake.

4 Methodological Remarks

The presented analyses are based on the worldwide data collection and analysis provided by Munich Re's NatCatSERVICE. "The information collated by MunichRe, the world's leading re-insurance company, can be used to document and perform risk and trend analyses on the extent and intensity of individual natural hazard events in various parts of the world."[73] For the countries of the world, Munich Re collects the number of total losses caused by weather events, the number of deaths, the insured damages and the total economic damages. The last two indicators are stated in million US$ (original values, inflation adjusted).

In the present analysis, only weather related events - storms, floods, as well as temperature extremes and mass movements (heat and cold waves etc.) - are incorporated. Geological incidents like earthquakes, volcanic eruptions or tsunamis, for which data is also available, are not relevant in this context as they do not depend on the weather and therefore are not possibly related to climate change. To enhance the manageability of the large amount of data, the different categories within the weather related events were combined. For single case studies on particularly devastating events, it is stated whether they concern floods, storms or another type of event.

It is important to note that this event-related examination does not allow for an assessment of continuous changes of important climate parameters. For instance, a long-term decline in precipitation that was shown in some African countries as a consequence of climate change cannot be displayed by the CRI. Such parameters nevertheless often substantially influence important development factors like agricultural outputs and the availability of drinking water.

Although certainly an interesting area for analysis, the present data does also not allow for conclusions about the distribution of damages below the national level. The respective data quality would only be sufficient for a limited number of countries.

Analysed indicators

For the examination of the CRI, the following indicators were analysed:

1. Number of deaths,
2. Number of deaths per 100 000 inhabitants,
3. Sum of losses in US$ in purchasing power parity (PPP) as well as
4. Losses per unit of Gross Domestic Product (GDP).

For the indicators 2–4, economic and population data primarily provided by the International Monetary Fund were taken into account. It must be added, however, that especially for small (e.g. Pacific Small Island Developing States) or extremely politically unstable countries (e.g. Somalia), the required data is not always available in sufficient quality for the whole observed time period. Those countries must be omitted from the analyses.

The CRI 2018 is based on the loss-figures from 2016 and 1997–2016. This ranking represents the most affected countries. In each of the four categories ranking is used as normalisation technique. Each country's index score has been derived from a country's average ranking in all four indicating categories, according to the following weighting: death toll, 1/6; deaths per 100 000 inhabitants, 1/3; absolute losses in PPP, 1/6; losses per GDP unit, 1/3.

[73] MunichRe, NatCatSERVICE: Downloadcenter for statistics on natural catastrophes. https://www.munichre.com/en/reinsurance/business/non-life/natcatservice/index.html

Therefore, an analysis of the already observable changes in climate conditions in different regions sends a sign of warning to those most affected countries to better prepare for the future. Although looking at socio-economic variables in comparison to damages and deaths caused by weather extremes – as was done in the present analysis – does not allow for an exact measurement of the vulnerability, it can be seen as at least an indication or pattern of vulnerability. In most cases, already afflicted countries will probably also be especially endangered by possible future changes in climate conditions. Despite the historic analysis, a deterministic projecting of the past to the future is not appropriate. That is, climate change might change past trends in extreme weather events.

For another, new phenomena can occur in states or regions. In 2004, for example, a hurricane was registered in the South Atlantic, off the Brazilian coast, for the first time ever. The cyclone that hit Oman in 2007 or the one that hit Saudi Arabia in 2009 are of similar significance. So the appearance in the Climate Risk Index is an alarm bell for these countries. But the analyses of the Climate Risk Index should not be regarded as the only evidence for which countries are already afflicted or will be affected by global climate change. After all, people can in principle fall back on different adaptation measures. However, to which extent these can be implemented effectively depends on several factors, which altogether determine the degree of vulnerability.

The relative consequences also depend on economic and population growth

Identifying relative values in this index represents an important complement to the otherwise often dominating absolute values because it allows for analysing country specific data on damages in relation to real conditions and capacities in those countries. It is obvious, for example, that for richer countries like the USA or Japan damages of one billion US$ cause much less economic consequences than for one of the world's poorest countries, where damages in many cases constitute a substantial share of the annual GDP. This is being backed up by the relative analysis.

It should be noted that values, and hence the rankings of countries regarding the respective indicators do not only change due to the absolute impacts of extreme weather events, but also due to economic and population growth or decline. If, for example, population increases, which is the case in most of the countries, the same absolute number of deaths leads to a relatively lower assessment in the following year. The same applies to economic growth. However, this does not affect the significance of the relative approach. Society's ability of coping with damages through precaution, mitigation and disaster preparedness, insurances or the improved availability of means for emergency aid, generally grows along with increasing economic strength. Nevertheless, an improved ability does not necessarily imply enhanced implementation of effective preparation and response measures. While absolute numbers tend to overestimate populous or economically capable countries, relative values give more prominence to smaller and poorer countries. In order to take both effects into consideration, the analysis of the CRI is based on absolute (indicators 1 and 3) as well as on relative (indicators 2 and 4) scores. Being double weighted in the average ranking of all indicators generating the CRI Score, more emphasis and therefore higher importance is given to the relative losses.

The indicator "losses in purchasing power parity" allows for a more comprehensive estimation of how different societies are actually affected

The indicator "absolute losses in US$" is identified by purchasing power parity (PPP), because using this figure expresses more appropriately how people are actually affected by the loss of one US$ than by using nominal exchange rates. Purchasing power parity is a currency exchange rate, which permits a comparison of, for instance, national GDPs, by incorporating price differences between countries. Basically this means that a farmer in India can buy more crops with US$ 1 than a farmer in the USA with the same amount of money. Thus, the real consequences of the same

nominal damage are much higher in India. For most of the countries, US$ values according to exchange rates must therefore be multiplied by a factor bigger than one.

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Annexes

CRI = Climate Risk Index; GDP = gross domestic product; PPP = purchasing power parity

Table 6: Climate Risk Index for 2016

CRI Rank	Country	CRI score	Fatalities in 2016		Fatalities per 100 000 inhabitants		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Total	Rank	Total	Rank	Total	Rank	Total	Rank
85	**Albania**	69.83	4	77	0.139	33	3.438	102	0.0101	87
118	**Algeria**	103.50	3	80	0.007	97	0.230	113	0.0000	117
36	**Angola**	46.00	63	22	0.230	21	51.536	66	0.0277	73
120	**Antigua and Barbuda**	109.50	0	99	0.000	99	0.000	120	0.0000	120
33	**Argentina**	44.67	14	53	0.032	69	1 637.931	13	0.1873	32
120	**Armenia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
31	**Australia**	42.17	18	46	0.074	51	1 226.120	19	0.1032	43
56	**Austria**	59.17	3	80	0.034	68	323.149	35	0.0775	52
102	**Azerbaijan**	87.50	1	92	0.011	92	22.056	83	0.0133	83
120	**Bahrain**	109.50	0	99	0.000	99	0.000	120	0.0000	120
13	**Bangladesh**	27.00	222	7	0.137	34	1 104.645	21	0.1754	33
120	**Barbados**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Belarus**	109.50	0	99	0.000	99	0.000	120	0.0000	120
77	**Belgium**	68.00	2	86	0.018	83	250.938	38	0.0493	59
55	**Belize**	58.00	0	99	0.000	99	177.989	43	5.7471	4
120	**Benin**	109.50	0	99	0.000	99	0.000	120	0.0000	120
75	**Bhutan**	67.17	4	77	0.506	8	0.307	110	0.0047	100
9	**Bolivia**	19.33	26	43	0.239	19	1 051.218	23	1.3346	6
120	**Bosnia and Herzegovina**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Botswana**	109.50	0	99	0.000	99	0.000	120	0.0000	120
48	**Brazil**	54.50	49	28	0.024	77	1 316.446	17	0.0419	64
120	**Brunei Darussalam**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Bulgaria**	109.50	0	99	0.000	99	0.000	120	0.0000	120
79	**Burkina Faso**	68.17	15	49	0.081	46	4.079	100	0.0124	84
19	**Burundi**	34.50	33	38	0.342	14	16.308	87	0.2078	27
111	**Cambodia**	95.17	0	99	0.000	99	5.856	98	0.0099	88
114	**Cameroon**	97.83	4	77	0.017	85	0.131	116	0.0002	112
43	**Canada**	51.67	3	80	0.008	95	5 983.721	4	0.3556	18
120	**Cape Verde**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Central African Republic**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Chad**	109.50	0	99	0.000	99	0.000	120	0.0000	120
62	**Chile**	62.00	3	80	0.016	86	443.602	32	0.1012	44
12	**China**	23.83	989	2	0.072	53	82 008.147	1	0.3853	17
7	**Chinese Taipei**	18.50	103	13	0.438	10	1 978.552	10	0.1747	34
83	**Colombia**	69.33	61	23	0.125	37	3.634	101	0.0005	109
120	**Comoros**	109.50	0	99	0.000	99	0.000	120	0.0000	120
25	**Costa Rica**	40.17	10	64	0.204	23	98.576	53	0.1222	39
119	**Cote d'Ivoire**	105.17	1	92	0.004	98	0.123	117	0.0001	113
120	**Croatia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
22	**Cyprus**	38.17	2	86	0.236	20	74.931	59	0.2527	22
97	**Czech Republic**	78.83	0	99	0.000	99	144.930	46	0.0410	65
68	**Democratic Republic of Congo**	64.33	78	17	0.093	42	4.993	99	0.0077	93

CRI Rank	Country	CRI score	Fatalities in 2016		Fatalities per 100 000 inhabitants		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Total	Rank	Total	Rank	Total	Rank	Total	Rank
120	**Democratic Republic of Timor-Leste**	109.50	0	99	0.000	99	0.000	120	0.0000	120
104	**Denmark**	90.33	0	99	0.000	99	31.409	75	0.0114	85
120	**Djibouti**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Dominica**	109.50	0	99	0.000	99	0.000	120	0.0000	120
11	**Dominican Republic**	23.33	32	39	0.318	16	463.334	31	0.2862	19
34	**Ecuador**	45.83	32	39	0.194	26	78.542	58	0.0425	63
88	**Egypt**	73.33	28	41	0.031	72	68.125	61	0.0060	97
110	**El Salvador**	93.67	2	86	0.032	71	0.204	114	0.0004	110
120	**Eritrea**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Estonia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
29	**Ethiopia**	41.67	100	14	0.110	40	134.546	50	0.0758	53
3	**Fiji**	10.17	47	29	5.384	2	1 076.305	22	13.1449	3
120	**Finland**	109.50	0	99	0.000	99	0.000	120	0.0000	120
8	**Former Yugoslav Republic of Macedonia**	19.00	22	44	1.061	5	207.930	42	0.6872	9
52	**France**	56.33	7	68	0.011	91	3 160.550	8	0.1156	40
120	**Gabon**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Georgia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
42	**Germany**	51.50	15	49	0.018	82	3 910.524	6	0.0978	45
101	**Ghana**	86.00	12	60	0.044	63	0.424	108	0.0004	111
65	**Greece**	63.17	7	68	0.065	58	90.971	55	0.0314	70
120	**Grenada**	109.50	0	99	0.000	99	0.000	120	0.0000	120
81	**Guatemala**	68.83	18	46	0.109	41	8.120	93	0.0062	96
113	**Guinea**	97.00	3	80	0.024	78	0.029	118	0.0001	114
120	**Guinea-Bissau**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Guyana**	109.50	0	99	0.000	99	0.000	120	0.0000	120
1	**Haiti**	2.33	613	3	5.651	1	3 332.720	7	17.2242	1
29	**Honduras**	41.67	16	48	0.195	25	46.869	70	0.1086	41
120	**Hungary**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Iceland**	109.50	0	99	0.000	99	0.000	120	0.0000	120
6	**India**	18.33	2 119	1	0.163	30	21 482.785	3	0.2469	23
37	**Indonesia**	46.17	196	8	0.076	50	871.209	25	0.0287	72
120	**Iraq**	109.50	0	99	0.000	99	0.000	120	0.0000	120
117	**Ireland**	101.50	1	92	0.021	80	0.011	119	0.0000	119
24	**Islamic Republic of Afghanistan**	39.33	135	12	0.404	12	31.213	76	0.0468	62
93	**Islamic Republic of Iran**	76.83	14	53	0.017	84	115.958	52	0.0075	94
63	**Israel**	62.17	2	86	0.023	79	274.764	37	0.0913	46
92	**Italy**	76.50	10	64	0.016	87	211.232	41	0.0095	90
100	**Jamaica**	82.83	0	99	0.000	99	14.518	88	0.0573	56
54	**Japan**	57.50	39	35	0.031	73	1 442.985	16	0.0276	74
120	**Jordan**	109.50	0	99	0.000	99	0.000	120	0.0000	120
114	**Kazakhstan**	97.83	0	99	0.000	99	16.876	86	0.0037	102
45	**Kenya**	52.33	72	19	0.158	31	32.867	73	0.0215	80
120	**Kiribati**	109.50	0	99	0.000	99	0.000	120	0.0000	120
60	**Korea. Republic of**	60.83	15	49	0.029	75	616.641	30	0.0319	68
80	**Kosovo**	68.67	1	92	0.055	61	13.747	90	0.0752	54
120	**Kuwait**	109.50	0	99	0.000	99	0.000	120	0.0000	120

CRI Rank	Country	CRI score	Fatalities in 2016		Fatalities per 100 000 inhabitants		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Total	Rank	Total	Rank	Total	Rank	Total	Rank
120	**Kyrgyz Republic**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Lao People's Democratic Republic**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Latvia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Lebanon**	109.50	0	99	0.000	99	0.000	120	0.0000	120
76	**Lesotho**	67.67	0	99	0.000	99	30.901	77	0.4417	16
120	**Liberia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Libya**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Lithuania**	109.50	0	99	0.000	99	0.000	120	0.0000	120
94	**Luxembourg**	77.00	0	99	0.000	99	50.791	67	0.0834	49
58	**Madagascar**	60.17	0	99	0.000	99	224.960	40	0.5999	12
69	**Malawi**	64.50	11	62	0.059	60	11.743	91	0.0556	57
72	**Malaysia**	65.50	13	56	0.041	65	154.597	45	0.0179	81
120	**Maldives**	109.50	0	99	0.000	99	0.000	120	0.0000	120
99	**Mali**	79.50	14	53	0.077	48	0.272	112	0.0007	108
120	**Malta**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Marshall Islands**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Mauritania**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Mauritius**	109.50	0	99	0.000	99	0.000	120	0.0000	120
38	**Mexico**	46.67	93	16	0.076	49	728.678	28	0.0315	69
120	**Micronesia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Moldova**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Mongolia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Montenegro**	109.50	0	99	0.000	99	0.000	120	0.0000	120
108	**Morocco**	93.17	10	64	0.029	76	0.299	111	0.0001	116
21	**Mozambique**	38.00	44	31	0.153	32	59.131	63	0.1686	35
53	**Myanmar**	57.17	40	33	0.077	47	70.677	60	0.0233	78
27	**Namibia**	40.83	2	86	0.086	43	144.915	47	0.5500	13
14	**Nepal**	29.50	179	9	0.620	6	61.144	62	0.0851	47
60	**Netherlands**	60.83	0	99	0.000	99	1 795.927	12	0.2058	28
96	**New Zealand**	78.17	0	99	0.000	99	87.382	56	0.0495	58
49	**Nicaragua**	54.67	7	68	0.114	39	26.782	80	0.0786	51
17	**Niger**	32.00	50	27	0.275	18	40.832	71	0.2002	29
66	**Nigeria**	64.00	77	18	0.042	64	94.104	54	0.0086	92
95	**Norway**	77.17	0	99	0.000	99	172.157	44	0.0472	61
15	**Oman**	29.83	13	56	0.324	15	362.325	33	0.1962	30
40	**Pakistan**	50.83	566	4	0.292	17	47.313	69	0.0048	99
120	**Palau**	109.50	0	99	0.000	99	0.000	120	0.0000	120
70	**Panama**	64.83	8	67	0.198	24	8.408	92	0.0091	91
82	**Papua New Guinea**	69.17	13	56	0.164	29	1.723	105	0.0059	98
103	**Paraguay**	89.17	1	92	0.015	88	7.039	95	0.0109	86
39	**Peru**	47.67	40	33	0.127	36	143.044	49	0.0352	66
16	**Philippines**	31.33	65	21	0.062	59	2 251.251	9	0.2792	20
67	**Poland**	64.17	52	26	0.137	35	23.566	81	0.0022	104
51	**Portugal**	55.50	5	74	0.048	62	249.497	39	0.0836	48
105	**Puerto Rico**	91.00	0	99	0.000	99	18.386	85	0.0143	82
120	**Qatar**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Republic of Congo**	109.50	0	99	0.000	99	0.000	120	0.0000	120
63	**Republic of Yemen**	62.17	60	24	0.206	22	2.962	103	0.0043	101

CRI Rank	Country	CRI score	Fatalities in 2016		Fatalities per 100 000 inhabitants		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Total	Rank	Total	Rank	Total	Rank	Total	Rank
106	**Romania**	92.17	7	68	0.035	67	0.141	115	0.0000	118
59	**Russia**	60.67	44	32	0.031	74	833.032	26	0.0216	79
34	**Rwanda**	45.83	59	25	0.512	7	7.048	94	0.0309	71
120	**Samoa**	109.50	0	99	0.000	99	0.000	120	0.0000	120
84	**Saudi Arabia**	69.67	27	42	0.085	44	29.914	78	0.0017	105
57	**Senegal**	59.67	5	74	0.032	70	48.482	68	0.1223	38
91	**Serbia**	75.67	0	99	0.000	99	80.852	57	0.0795	50
89	**Seychelles**	73.67	0	99	0.000	99	6.273	97	0.2449	24
120	**Sierra Leone**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Singapore**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Slovak Republic**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Slovenia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Solomon Islands**	109.50	0	99	0.000	99	0.000	120	0.0000	120
32	**South Africa**	42.33	39	35	0.070	54	769.758	27	0.1041	42
87	**South Sudan**	73.00	15	49	0.120	38	0.542	107	0.0026	103
44	**Spain**	51.83	19	45	0.041	66	1 033.146	24	0.0613	55
4	**Sri Lanka**	11.50	99	15	0.466	9	1 623.162	14	0.6217	11
120	**St. Kitts and Nevis**	109.50	0	99	0.000	99	0.000	120	0.0000	120
73	**St. Lucia**	66.17	0	99	0.000	99	20.651	84	0.8955	8
28	**St. Vincent and the Grenadines**	41.33	2	86	1.818	3	2.880	104	0.2338	26
23	**Sudan**	38.50	171	10	0.432	11	58.190	65	0.0329	67
120	**Suriname**	109.50	0	99	0.000	99	0.000	120	0.0000	120
70	**Swaziland**	64.83	0	99	0.000	99	58.706	64	0.5283	14
109	**Sweden**	93.50	0	99	0.000	99	32.119	74	0.0065	95
97	**Switzerland**	78.83	1	92	0.012	89	129.247	51	0.0257	76
49	**Tajikistan**	54.67	6	72	0.069	55	33.835	72	0.1300	37
77	**Tanzania**	68.00	35	37	0.072	52	14.350	89	0.0095	89
20	**Thailand**	37.50	46	30	0.067	56	1 803.565	11	0.1549	36
46	**The Bahamas**	53.17	0	99	0.000	99	1 241.299	18	13.7662	2
120	**The Gambia**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Togo**	109.50	0	99	0.000	99	0.000	120	0.0000	120
90	**Tonga**	75.50	0	99	0.000	99	1.356	106	0.2421	25
120	**Trinidad and Tobago**	109.50	0	99	0.000	99	0.000	120	0.0000	120
47	**Tunisia**	54.33	0	99	0.000	99	1 551.338	15	1.1884	7
107	**Turkey**	92.83	6	72	0.008	96	28.873	79	0.0014	107
120	**Tuvalu**	109.50	0	99	0.000	99	0.000	120	0.0000	120
41	**Uganda**	51.00	66	20	0.181	27	22.308	82	0.0268	75
116	**Ukraine**	98.83	5	74	0.012	90	0.416	109	0.0001	115
86	**United Arab Emirates**	72.00	1	92	0.010	93	327.146	34	0.0487	60
74	**United Kingdom**	66.83	13	56	0.020	81	681.605	29	0.0245	77
10	**United States**	23.17	267	5	0.083	45	47 395.510	2	0.2545	21
18	**Uruguay**	32.67	12	60	0.345	13	143.561	48	0.1928	31
120	**Uzbekistan**	109.50	0	99	0.000	99	0.000	120	0.0000	120
120	**Vanuatu**	109.50	0	99	0.000	99	0.000	120	0.0000	120
112	**Venezuela**	96.00	3	80	0.010	94	6.438	96	0.0015	106
5	**Vietnam**	15.33	161	11	0.174	28	4 037.704	5	0.6782	10
26	**Zambia**	40.33	11	62	0.066	57	310.941	36	0.4774	15
2	**Zimbabwe**	7.33	246	6	1.696	4	1 205.150	20	3.7218	5

Table 7: Climate Risk Index for 1997–2016

(Avg. = average figure for the 20-year period. E.g., 32 people died in Albania due to extreme weather events between 1997 and 2016; hence the average death toll per year was 1.60.)

CRI Rank	Country	CRI Score	Fatalities (annual average)		Fatalities per 100 000 inhabitants (annual average)		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Avg.	Rank	Avg.	Rank	Avg.	Rank	Avg.	Rank
139	**Albania**	123.33	1.60	139	0.054	127	19.728	125	0.0817	111
101	**Algeria**	95.00	65.10	37	0.190	72	103.628	83	0.0233	153
105	**Angola**	97.50	34.50	56	0.165	74	59.423	97	0.0390	142
73	**Antigua and Barbuda**	73.67	0.25	162	0.308	52	15.339	134	0.9257	21
87	**Argentina**	82.83	27.45	63	0.070	114	875.759	26	0.1241	90
152	**Armenia**	139.50	0.20	164	0.007	171	17.977	129	0.0979	101
34	**Australia**	52.33	47.85	47	0.227	66	2 234.059	11	0.2475	62
50	**Austria**	60.50	23.90	67	0.289	55	547.073	32	0.1670	77
146	**Azerbaijan**	132.50	2.50	125	0.029	155	68.106	92	0.0527	134
140	**Bahrain**	125.17	2.90	121	0.300	53	0.577	172	0.0013	176
6	**Bangladesh**	26.50	641.55	9	0.443	38	2 311.067	10	0.6776	32
156	**Barbados**	142.67	0.05	173	0.018	161	3.696	155	0.0968	103
151	**Belarus**	137.17	4.95	104	0.051	129	14.519	135	0.0110	163
64	**Belgium**	68.83	106.35	28	0.999	17	162.697	69	0.0408	141
27	**Belize**	46.67	2.35	127	0.779	23	65.835	93	3.1578	7
150	**Benin**	135.83	4.00	113	0.046	132	5.287	152	0.0345	143
103	**Bhutan**	95.50	1.65	137	0.249	60	5.013	154	0.1455	81
25	**Bolivia**	45.67	42.20	51	0.450	36	211.325	59	0.4060	46
69	**Bosnia and Herzegovina**	72.00	2.35	127	0.061	118	392.935	41	1.2383	14
155	**Botswana**	141.17	0.60	152	0.031	150	12.863	137	0.0559	129
90	**Brazil**	84.67	148.35	22	0.079	110	1 696.150	16	0.0618	125
176	**Brunei Darussalam**	168.67	0.10	171	0.027	156	0.345	175	0.0011	177
68	**Bulgaria**	71.50	9.10	86	0.119	93	341.874	45	0.2997	56
107	**Burkina Faso**	98.00	7.75	92	0.054	125	40.167	106	0.2045	70
81	**Burundi**	78.33	9.95	83	0.127	89	25.065	123	0.4325	43
15	**Cambodia**	38.00	54.40	44	0.399	41	242.693	54	0.7982	24
149	**Cameroon**	134.83	7.90	91	0.042	139	11.794	138	0.0242	151
98	**Canada**	94.00	10.95	79	0.033	146	1 670.941	17	0.1299	88
148	**Cape Verde**	134.33	0.25	162	0.052	128	1.856	164	0.0776	112
165	**Central African Republic**	153.33	1.10	144	0.027	157	0.990	170	0.0303	146
109	**Chad**	99.83	4.60	108	0.049	131	49.263	99	0.2394	65
94	**Chile**	89.67	9.30	85	0.056	123	417.826	37	0.1373	85
37	**China**	52.67	1 275.75	4	0.097	101	36 054.958	2	0.3112	54
38	**Chinese Taipei**	53.83	78.75	35	0.345	46	973.916	24	0.1348	86
49	**Colombia**	59.50	107.05	27	0.245	63	609.134	30	0.1305	87
134	**Comoros**	119.33	1.00	147	0.156	78	0.680	171	0.0695	121
101	**Costa Rica**	95.00	6.15	96	0.143	82	50.389	98	0.0940	106
159	**Cote d'Ivoire**	145.83	5.70	99	0.030	153	6.651	148	0.0121	161
33	**Croatia**	52.17	35.35	55	0.809	22	160.279	70	0.1979	72
97	**Cyprus**	91.00	3.40	119	0.444	37	18.840	127	0.0757	113
72	**Czech Republic**	73.17	10.25	82	0.099	100	667.834	29	0.2420	64
145	**Democratic Republic of Congo**	131.00	32.85	58	0.051	130	5.743	150	0.0150	159

CRI Rank	Country	CRI Score	Fatalities (annual average)		Fatalities per 100 000 inhabitants (annual average)		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Avg.	Rank	Avg.	Rank	Avg.	Rank	Avg.	Rank
179	**Democratic Republic of Timor-Leste**	171.50	0.10	171	0.010	170	0.253	176	0.0038	171
130	**Denmark**	116.00	0.75	151	0.014	166	313.724	47	0.1415	83
63	**Djibouti**	68.33	3.50	117	0.453	35	9.747	141	0.4908	41
21	**Dominica**	42.17	1.80	135	2.535	6	45.955	102	7.6148	2
10	**Dominican Republic**	34.00	210.90	19	2.318	7	243.531	53	0.2615	59
55	**Ecuador**	65.33	41.35	52	0.292	54	187.240	64	0.1378	84
157	**Egypt**	143.00	15.60	71	0.021	159	25.267	121	0.0033	174
16	**El Salvador**	38.67	32.45	59	0.535	32	280.011	51	0.6965	29
129	**Eritrea**	114.67	0.15	168	0.003	173	47.950	100	0.5587	37
162	**Estonia**	149.83	0.45	156	0.033	147	7.483	145	0.0239	152
65	**Ethiopia**	69.67	91.30	31	0.120	92	180.610	65	0.2058	69
13	**Fiji**	37.83	8.05	90	0.969	19	119.478	77	1.9740	11
168	**Finland**	156.17	0.20	164	0.004	172	31.909	115	0.0169	157
112	**Former Yugoslav Republic of Macedonia**	102.00	2.55	124	0.125	90	25.409	120	0.1187	94
18	**France**	40.83	1 120.25	5	1.825	10	2 097.797	12	0.0964	104
174	**Gabon**	167.67	0.45	156	0.031	152	0.012	182	0.0000	182
104	**Georgia**	96.33	3.70	114	0.090	104	41.800	104	0.1688	76
23	**Germany**	43.17	474.70	11	0.585	30	3 798.068	6	0.1236	91
115	**Ghana**	103.00	29.65	62	0.135	84	32.131	114	0.0469	137
92	**Greece**	84.83	12.85	73	0.118	94	289.720	50	0.1002	99
20	**Grenada**	41.00	2.00	132	1.930	9	78.537	90	7.4730	3
11	**Guatemala**	34.33	97.60	30	0.717	26	402.883	40	0.4432	42
172	**Guinea**	159.00	1.85	134	0.018	162	1.274	166	0.0085	165
144	**Guinea-Bissau**	128.33	0.45	156	0.033	148	3.100	158	0.1553	80
111	**Guyana**	100.17	0.30	161	0.040	141	33.096	112	0.8128	23
2	**Haiti**	13.50	280.40	15	2.956	5	418.769	36	2.7296	10
1	**Honduras**	12.17	301.65	14	4.277	2	561.112	31	1.9683	12
61	**Hungary**	68.00	34.30	57	0.341	47	215.435	57	0.0998	100
180	**Iceland**	172.33	0.00	174	0.000	174	0.495	174	0.0044	169
12	**India**	37.17	3 570.90	2	0.313	51	12 169.494	3	0.2725	58
70	**Indonesia**	72.33	256.40	17	0.113	96	1 925.018	15	0.0954	105
158	**Iraq**	145.00	4.90	105	0.016	165	38.281	107	0.0086	164
126	**Ireland**	113.50	1.95	133	0.046	133	168.951	68	0.0903	107
24	**Islamic Republic of Afghanistan**	44.17	280.40	15	1.012	16	100.290	84	0.2252	67
79	**Islamic Republic of Iran**	77.17	56.15	41	0.079	109	1 367.988	20	0.1223	92
132	**Israel**	117.00	4.70	107	0.066	115	82.610	87	0.0427	139
30	**Italy**	47.83	1 004.95	6	1.714	11	1 379.092	19	0.0699	120
54	**Jamaica**	63.67	4.35	111	0.162	75	158.220	71	0.7528	25
93	**Japan**	88.17	80.60	34	0.063	117	2 525.210	9	0.0605	126
136	**Jordan**	121.83	2.40	126	0.042	137	44.058	103	0.0751	114
160	**Kazakhstan**	147.00	5.20	102	0.033	149	13.235	136	0.0036	173
43	**Kenya**	56.00	57.40	40	0.161	76	354.698	44	0.3620	50
123	**Kiribati**	112.00	0.00	174	0.000	174	10.607	140	6.5984	5
84	**Korea, Republic of**	79.17	55.70	42	0.114	95	1 097.283	23	0.0877	110
178	**Kuwait**	170.33	0.50	155	0.016	163	0.132	179	0.0001	181

CRI Rank	Country	CRI Score	Fatalities (annual average)		Fatalities per 100 000 inhabitants (annual average)		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Avg.	Rank	Avg.	Rank	Avg.	Rank	Avg.	Rank
121	**Kyrgyz Republic**	111.00	12.80	74	0.240	64	3.366	156	0.0219	154
90	**Lao People's Democratic Republic**	84.67	5.70	99	0.099	99	71.960	91	0.2584	60
113	**Latvia**	102.83	4.55	109	0.206	70	25.230	122	0.0631	123
142	**Lebanon**	127.00	2.25	129	0.057	122	27.269	117	0.0491	136
134	**Lesotho**	119.33	0.20	164	0.011	168	19.238	126	0.4210	45
170	**Liberia**	157.83	0.35	160	0.010	169	1.141	169	0.0408	140
171	**Libya**	158.50	1.05	146	0.018	160	6.030	149	0.0051	168
136	**Lithuania**	121.83	2.60	123	0.080	108	29.912	116	0.0465	138
110	**Luxembourg**	100.00	6.50	95	1.349	14	5.111	153	0.0120	162
13	**Madagascar**	37.83	78.60	36	0.408	39	196.408	61	0.7388	26
83	**Malawi**	78.83	11.35	76	0.078	111	61.802	95	0.4979	40
113	**Malaysia**	102.83	20.15	69	0.075	113	268.768	52	0.0512	135
177	**Maldives**	169.17	0.00	174	0.000	174	0.558	173	0.0140	160
125	**Mali**	113.33	5.90	97	0.043	135	25.746	119	0.1026	97
164	**Malta**	152.17	0.15	168	0.037	144	2.868	159	0.0251	149
124	**Marshall Islands**	112.17	0.00	174	0.000	174	9.018	143	6.6635	4
86	**Mauritania**	80.00	4.35	111	0.141	83	40.556	105	0.3659	49
119	**Mauritius**	107.67	0.95	148	0.078	112	26.632	118	0.1608	78
47	**Mexico**	59.17	142.10	24	0.130	87	2 957.220	7	0.1810	75
40	**Micronesia**	54.83	3.50	117	3.351	3	2.474	162	0.8967	22
74	**Moldova**	74.33	3.05	120	0.085	106	132.775	74	0.9373	20
58	**Mongolia**	66.83	7.50	93	0.285	57	80.215	88	0.3168	53
107	**Morocco**	98.00	17.00	70	0.055	124	172.142	66	0.0975	102
18	**Mozambique**	40.83	103.10	29	0.462	34	108.428	82	0.6174	33
3	**Myanmar**	14.00	7 097.75	1	14.549	1	1 277.860	21	0.6935	30
57	**Namibia**	66.50	11.35	76	0.568	31	32.705	113	0.1903	74
26	**Nepal**	45.83	228.35	18	0.885	20	108.588	81	0.2200	68
74	**Netherlands**	74.33	84.60	32	0.517	33	214.938	58	0.0312	145
89	**New Zealand**	84.33	3.65	115	0.087	105	303.562	49	0.2308	66
4	**Nicaragua**	19.33	162.45	20	2.962	4	234.600	56	1.1265	16
79	**Niger**	77.17	14.90	72	0.110	97	47.016	101	0.3828	48
122	**Nigeria**	111.83	83.15	33	0.058	121	108.748	80	0.0151	158
154	**Norway**	140.33	1.20	141	0.025	158	80.025	89	0.0265	148
28	**Oman**	47.00	9.00	87	0.314	50	835.432	27	0.6130	34
7	**Pakistan**	30.50	523.10	10	0.327	48	3 816.816	5	0.6054	36
173	**Palau**	167.17	0.00	174	0.000	174	0.056	181	0.0247	150
95	**Panama**	89.83	9.65	84	0.280	58	37.514	109	0.0750	115
60	**Papua New Guinea**	67.67	24.00	66	0.390	42	36.831	110	0.1956	73
46	**Paraguay**	58.33	8.65	88	0.146	80	309.586	48	0.7049	27
66	**Peru**	70.50	108.20	26	0.388	43	171.545	67	0.0690	122
5	**Philippines**	20.17	859.55	7	0.979	18	2 893.410	8	0.6113	35
61	**Poland**	68.00	55.00	43	0.144	81	918.640	25	0.1281	89
22	**Portugal**	42.67	143.20	23	1.374	13	371.317	43	0.1432	82
100	**Puerto Rico**	94.33	1.15	143	0.031	151	495.237	33	0.4228	44
182	**Qatar**	175.00	0.00	174	0.000	174	1.151	168	0.0006	180
163	**Republic of Congo**	150.83	2.05	131	0.060	119	0.135	178	0.0006	179
78	**Republic of Yemen**	77.00	41.35	52	0.186	73	113.946	78	0.1205	93
32	**Romania**	52.00	44.85	50	0.212	69	1 225.886	22	0.3362	51

CRI Rank	Country	CRI Score	Fatalities (annual average)		Fatalities per 100 000 inhabitants (annual average)		Losses in million US$ (PPP)		Losses per unit GDP in %	
			Avg.	Rank	Avg.	Rank	Avg.	Rank	Avg.	Rank
31	**Russia**	48.00	2 944.45	3	2.039	8	2 051.364	13	0.0561	128
133	**Rwanda**	118.50	11.30	78	0.125	91	3.258	157	0.0277	147
77	**Samoa**	76.33	0.45	156	0.246	62	8.600	144	1.0032	17
117	**Saudi Arabia**	104.50	25.55	64	0.102	98	235.501	55	0.0188	156
141	**Senegal**	126.67	5.05	103	0.042	138	15.396	133	0.0622	124
81	**Serbia & Montenegro & Kosovo**	78.33	5.80	98	0.059	120	415.685	38	0.4010	47
166	**Seychelles**	153.83	0.00	174	0.000	174	1.151	167	0.0725	117
143	**Sierra Leone**	127.33	8.30	89	0.159	77	0.243	177	0.0036	172
181	**Singapore**	173.00	0.00	174	0.000	174	2.854	160	0.0010	178
106	**Slovak Republic**	97.83	4.55	109	0.084	107	135.264	72	0.1047	96
42	**Slovenia**	55.67	12.05	75	0.597	29	125.033	75	0.2421	63
71	**Solomon Islands**	73.00	1.80	135	0.369	45	5.667	151	0.6798	31
88	**South Africa**	84.17	45.20	49	0.093	103	492.750	34	0.0900	108
126	**South Sudan**	113.50	10.70	80	0.096	102	16.584	131	0.0527	133
34	**Spain**	52.33	696.95	8	1.585	12	828.947	28	0.0605	127
48	**Sri Lanka**	59.33	48.95	46	0.248	61	315.616	46	0.2026	71
52	**St. Kitts and Nevis**	61.17	0.20	164	0.400	40	36.665	111	3.5850	6
51	**St. Lucia**	61.00	1.10	144	0.671	28	17.784	130	0.9836	18
53	**St. Vincent and the Grenadines**	61.50	0.80	150	0.739	25	11.308	139	1.2039	15
98	**Sudan**	94.00	46.80	48	0.134	85	82.755	86	0.0553	130
174	**Suriname**	167.67	0.15	168	0.030	154	0.114	180	0.0017	175
118	**Swaziland**	106.50	0.55	153	0.054	126	23.538	124	0.3080	55
147	**Sweden**	133.50	1.25	140	0.014	167	192.963	63	0.0538	132
39	**Switzerland**	54.67	53.50	45	0.706	27	410.136	39	0.1063	95
36	**Tajikistan**	52.50	20.65	68	0.288	56	112.773	79	0.7028	28
116	**Tanzania**	104.17	25.35	65	0.065	116	61.719	96	0.0745	116
9	**Thailand**	33.83	139.60	25	0.213	68	7 696.587	4	0.9669	19
17	**The Bahamas**	40.33	2.80	122	0.849	21	204.065	60	2.7403	9
76	**The Gambia**	75.50	4.90	105	0.318	49	7.253	146	0.3289	52
161	**Togo**	148.00	2.25	129	0.039	142	1.502	165	0.0198	155
45	**Tonga**	57.33	1.20	141	1.182	15	6.870	147	1.5709	13
167	**Trinidad and Tobago**	155.00	0.55	153	0.042	140	2.310	163	0.0067	167
138	**Tunisia**	122.50	3.65	115	0.036	145	64.145	94	0.0724	118
120	**Turkey**	109.67	31.85	60	0.045	134	389.939	42	0.0321	144
128	**Tuvalu**	114.17	0.00	174	0.000	174	2.630	161	8.5000	1
67	**Uganda**	70.67	36.60	54	0.133	86	122.804	76	0.2540	61
95	**Ukraine**	89.83	59.15	39	0.127	88	195.753	62	0.0538	131
169	**United Arab Emirates**	157.33	0.95	148	0.016	164	18.588	128	0.0040	170
56	**United Kingdom**	65.83	153.25	21	0.250	59	1 475.778	18	0.0712	119
29	**United States**	47.50	442.50	12	0.148	79	40 300.087	1	0.2973	57
85	**Uruguay**	79.83	6.60	94	0.195	71	84.470	85	0.1593	79
153	**Uzbekistan**	140.17	10.30	81	0.038	143	9.288	142	0.0083	166
41	**Vanuatu**	55.50	1.65	137	0.739	24	15.852	132	2.9596	8
59	**Venezuela**	67.17	59.90	38	0.222	67	440.729	35	0.1008	98
8	**Vietnam**	31.83	312.60	13	0.373	44	2 029.799	14	0.5492	38
131	**Zambia**	116.50	5.45	101	0.042	136	38.263	108	0.0882	109
44	**Zimbabwe**	57.00	29.70	61	0.240	65	133.002	73	0.5470	39

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Germanwatch

Following the motto “Observing. Analysing. Acting.”, Germanwatch has been actively promoting global equity and the preservation of livelihoods since 1991. In doing so, we focus on the politics and economics of the North and their worldwide consequences. The situation of marginalised people in the South is the starting point of our work. Together with our members and supporters as well as with other actors in civil society, we intend to represent a strong lobby for sustainable development. We attempt to approach our goals by advocating for the prevention of dangerous climate change, for food security, and compliance of companies with human rights.

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