



ISLAMIC DEVELOPMENT BANK GROUP



# Assessing the Effects of Climate Change on IsDB Member Countries

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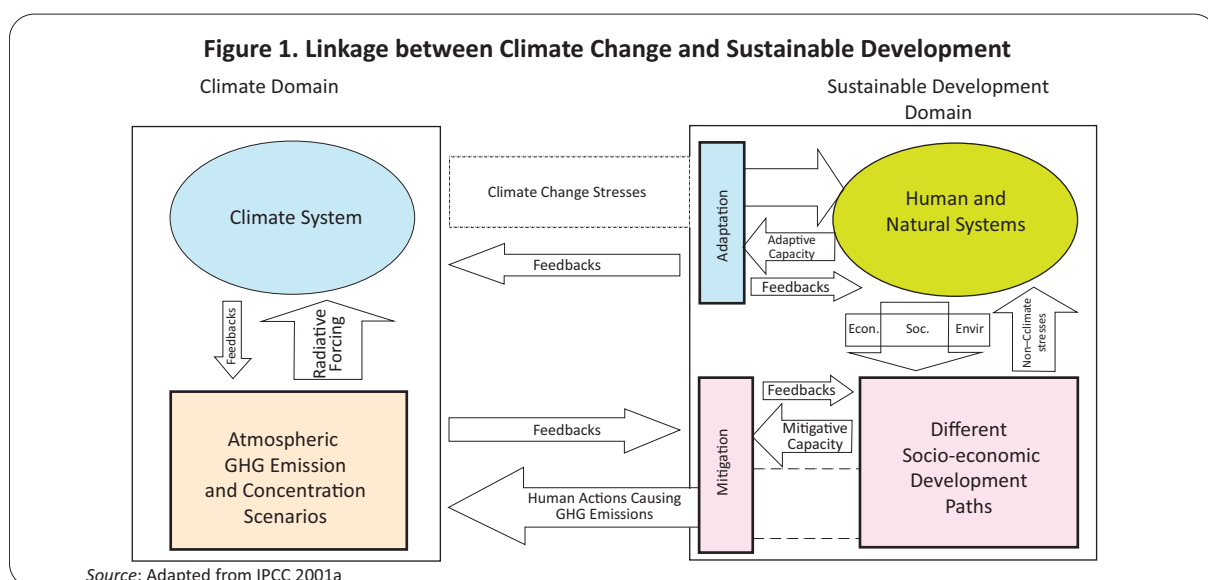
# Assessing the Effects of Climate Change on IDB Member Countries

## 1. Introduction

Climate change refers to “any change in climate over time, whether due to natural variability or as a result of human activity”<sup>1</sup>. It is perhaps the trending topic on the agenda of all major international conferences. The phrase “climate” is simply the “average weather” in a location -- which can be a region, country or as small as a city -- and includes the patterns of temperature, precipitation (rain or snow), humidity, wind

as well as the lives and livelihoods of billions of people in developing countries<sup>2</sup>.

Figure 1 summarizes the full cycle of cause and effect between climate change and sustainable development (IPCC 2001). Each socio-economic development path (driven by the forces of population, economy, technology, and governance) gives rise to different levels of greenhouse gas emissions. Such phenomena have effects on socio-economic development paths.



and seasons that play a fundamental role in shaping natural ecosystems, and the human economies and cultures that depend on them. Climate change is the change in the statistical distribution of these weather patterns when that change lasts for an extended period of time.

The effects of climate change — ranging from higher temperatures, changes in precipitation patterns, rising sea levels, and more frequent weather-related disasters — pose risks to health, agriculture, food, and water supplies. At stake are recent gains in the fight against poverty, hunger, inequality,

Countries need to take timely measures to minimize the impact of climate change on their economies through adaptation and mitigation programs. Adaptation reduces the impact of climate stresses on human and natural systems, while mitigation lowers or prevents greenhouse gas emissions.

## 2. Global Efforts to Address the Climate Change

The 2015 Paris Agreement adopted in Paris on 12 December 2015 marked the latest step in the evolution of the UN climate change efforts, and it built on the work undertaken

<sup>1</sup> [http://www.ipcc.ch/publications\\_and\\_data/ar4/syr/en/mains1.html](http://www.ipcc.ch/publications_and_data/ar4/syr/en/mains1.html)

<sup>2</sup> <http://data.worldbank.org/topic/climate-change>



over the years under the UNFCCC (United Nations Framework Convention on Climate Change). The Paris Agreement charts a new course in the global effort to combat climate change.

The Agreement seeks to accelerate and intensify the actions and investment needed for a sustainable low carbon growth in the future. Its central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. The Agreement also aims to strengthen the ability of countries to deal with the impacts of climate change<sup>3</sup>.

### 3. Economic Impacts of Climate Change

At global level, climate change damage is estimated to cost 0.2% of the world GDP (Mendelson 2009). This cost can vary widely at regional and country levels. Poor countries are hit harder by climate change than rich countries. Climate change causes more damage to agriculture than other economic sectors. A one-degree Celsius rise in temperature is expected to reduce growth by 1.1 percentage points in poor countries, (Dell et al., 2008). In Sub-Saharan Africa, where IDB has 19 member countries, a one-degree Celsius rise in temperature reduces the economic growth rate by 1.9 percentage point. The Table 1 presents the estimates of economic losses from climate change at global levels by various studies.

<b>Study</b>	<b>Warming</b>	<b>Impact (% on GDP)</b>
Mandelson, Schlesinger, Morrison and Andronova (2000)	2.0 Celsius degree by 2060	A cumulative effect of a loss of 0.3% of GDP in 2060
Mendelson, Schlesinger and Williams (2000)	2.5 Celsius degree by 2100	Cumulative market impact costs do not exceed 0.1% of GDP in 2100
Stern (2006)	Baseline scenario of between 2.4 Celsius and 5.8 Celsius degree by 2100	An average loss of 5% of global GDP per annum over the next two centuries
Intergovernmental Panel on Climate Change, Fifth Assessment (2014)	Approximately 2.0 Celsius degree	A loss of 0.2% - 2.0% of GDP per annum

Source: Wade and Jennings (2016), Schroders. <http://www.schroders.com/en/us/institutional/insights/economic-views3/the-impact-of-climate-change-on-the-global-economy/>

The Paris Agreement will enter into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary<sup>4</sup>.

In the next sections, we discuss and highlight some economic impacts of climate change and the situations of IDB member countries with respect to greenhouse gases, environmental performance and climate risk.

Agriculture and environmental resources are the main source of living for the poor, and these resources are the most affected by climate change. Growth in agriculture can fall by 1.8% due to a cumulative 10-year rise in temperature (Dell et al, 2008). Results from studies indicate that climate change could result in global crop yield losses as large as 5 percent in 2030 and 30 percent in 2080, even accounting for adaptive behaviors such as changed agricultural practices and crops, more irrigation, and innovation in higher yield crops (Biewald et al., 2016; Havlík et al.,2016). A study of 15 developing countries in various regions finds that climate-induced price rises

<sup>3</sup>. [http://unfccc.int/paris\\_agreement/items/9485.php](http://unfccc.int/paris_agreement/items/9485.php)

<sup>4</sup>. Ibid

increase extreme poverty by 1.8 percentage points (Hertel, Burke, and Lobell 2010). As for the rural poor if production shocks are accompanied by price rises, agricultural workers and farmers may benefit from higher wages and earnings (Jacoby, Rabassa, and Skoufias 2014).

A report by the World Bank (2015) entitled “Shock Waves: Managing the Impacts of Climate Change on Poverty” provides insights on the relationship between climate change and poverty. The report warned that without action, climate change could result in more than 100 million additional people living in poverty by 2030.

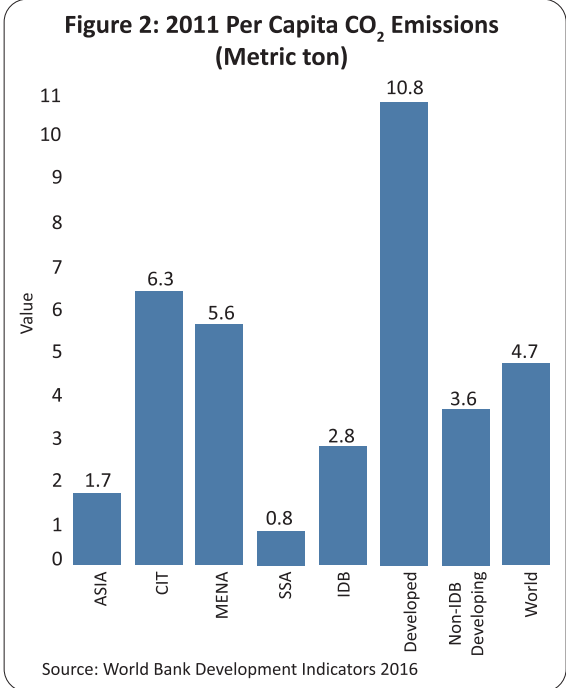
According to WHO (2003), climate impacts could increase the burden of diarrhea by up to 10 percent by 2030 in some regions. An estimated 48,000 additional deaths among children under the age of 15 resulting from diarrheal illness are projected by 2030 (Hales et al. 2014).

**4. Where do Member Countries Stand on Greenhouse Gases**

Greenhouse gases (GHG) carry and trap heat in the atmospheres. Major sources of greenhouse gases are (i) CO<sub>2</sub> emissions, (ii) methane emissions, (iii) nitrous oxide emissions, and other gas emissions known as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF6). According to the USA Environmental Protection Agency<sup>5</sup>, in 2014, CO<sub>2</sub> accounts for 81% of GHG, Methane 11%, Nitrous Oxide 6%, and other gases 1%. CO<sub>2</sub> is further divided into CO<sub>2</sub> from fossil fuels and industrial processes and CO<sub>2</sub> from forestry and other land uses. China and USA are the major emitters of CO<sub>2</sub> from fossil fuel combustion and industrial processes. As shown in Figure 2, developed and non-IDB developing countries account for the largest share of CO<sub>2</sub> emissions per capita. IDB member countries in Sub-Saharan Africa

<sup>5</sup> <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

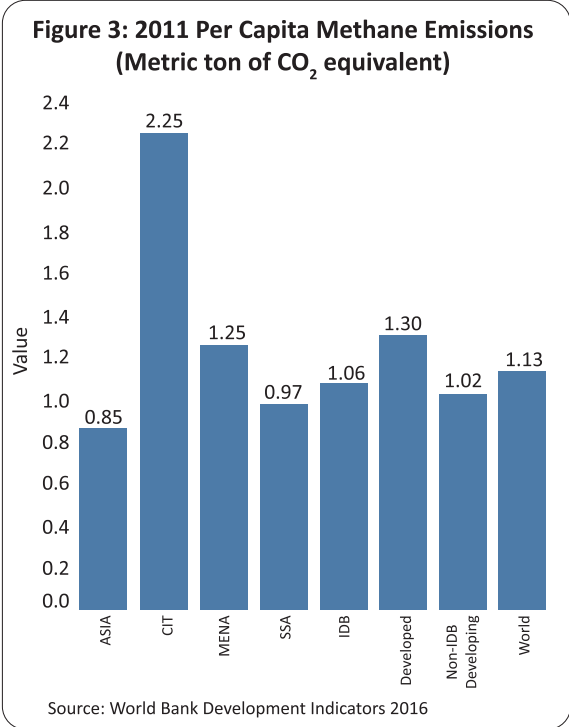
(SSA) have the lowest CO<sub>2</sub> emissions per capita. On average, IDB member countries are low CO<sub>2</sub> emitters accounting for 12% of the world CO<sub>2</sub> emissions.



However, the CO<sub>2</sub> emissions in the 57 member countries continued to rise and nearly tripled from 1,440 thousand kt in 1990 to 4,267 thousand kt in 2011, representing a growth of 196 percent and accounting for 12 percent of world’s CO<sub>2</sub> emissions. In terms of per capita, the CO<sub>2</sub> emissions rose in member countries from an average 1.5 metric tons per capita to 2.7 metric tons. Regionally, Middle East and North Africa (MENA) region accounted for 61 percent of the cumulative CO<sub>2</sub> emissions in MCs (or 7.5 percent of the global CO<sub>2</sub> emissions), followed by ASIAN member countries at 24 percent, Countries in Transition (CIT) member countries at 11 percent and SSA MCs at 3.6 percent.

Methane emissions are industrial methane production and gases stemming from agricultural activities. The cumulative methane emissions in member countries reached 1,474 thousand kt in 2011 from 968 thousand kt in 1990, representing a growth of 52 percent. MENA and Asia were the two largest methane emission regions

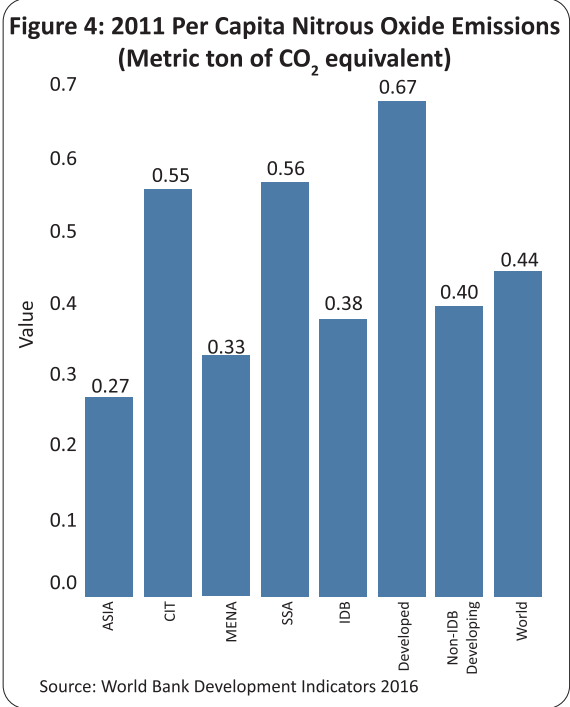
accounting respectively for 7.1 percent and 6.9 percent of the global total in 2011. The IDB's average is far lower than the world average of methane emissions per capita. Member countries in SSA and CIT regions emit lower methane than other regional groups as shown in Figure 3.



Nitrous oxide emissions are emissions arising from agricultural biomass burning, industrial activities, and livestock management. Nitrous oxide molecules stay in the atmosphere for an average of 114 years before being removed by a sink or destroyed through chemical reactions. The impact of 1 pound of N<sub>2</sub>O on warming the atmosphere is almost 300 times that of 1 pound of carbon dioxide<sup>6</sup>. The N<sub>2</sub>O emissions in member countries increased to 490 million metric tons (CO<sub>2</sub> equivalent) in 2011 from 373 million metric tons (CO<sub>2</sub> equivalent) in 1990, representing a growth of 31.2 percent. The total N<sub>2</sub>O emissions of MCs in 2011 represent 17 percent of the global total. With respect to the regions, both Asia and SSA MCs accounted for the largest share of 33 percent each (of the MCs' total), followed by MENA region at 26

<sup>6</sup> <http://www3.epa.gov/climatechange/ghgemissions/gases/n2o.html>

percent, and CIT region 8 percent. Among IDB regions and in per capita emissions, SSA and CIT member countries have the highest emissions, and ASIA member countries have the lowest emissions as shown in figure 4.



The total emissions of the other gases (HFC, PFC, HF6) for the 57 member countries grew by 39 percent from 22 million metric tons in 1990 to 30 million metric tons in 2011. The regions with the highest emissions of HFC, PFC and SF<sub>6</sub> in 2011 were MENA at 22 million metric tons (or 73 percent of the MCs' total), Asia 3.9 million metric tons (or 13 percent of MCs' total), CIT at 2.5 million metric tons (8.2 percent of MCs' total) and SSA at 1.7 million metric tons (5.7 percent of MCs' total).

**5. Environmental Performance and Climate Risk Indices**

In this section, we analyze the situation of member countries with respect to Environmental Performance Index (EPI) and Global Climate Risk Index (GCRI). EPI assesses countries' performance towards protecting environmental health and ecosystem. On the other hand, the global climate risk index was developed by Germanwatch and it assesses the degree of

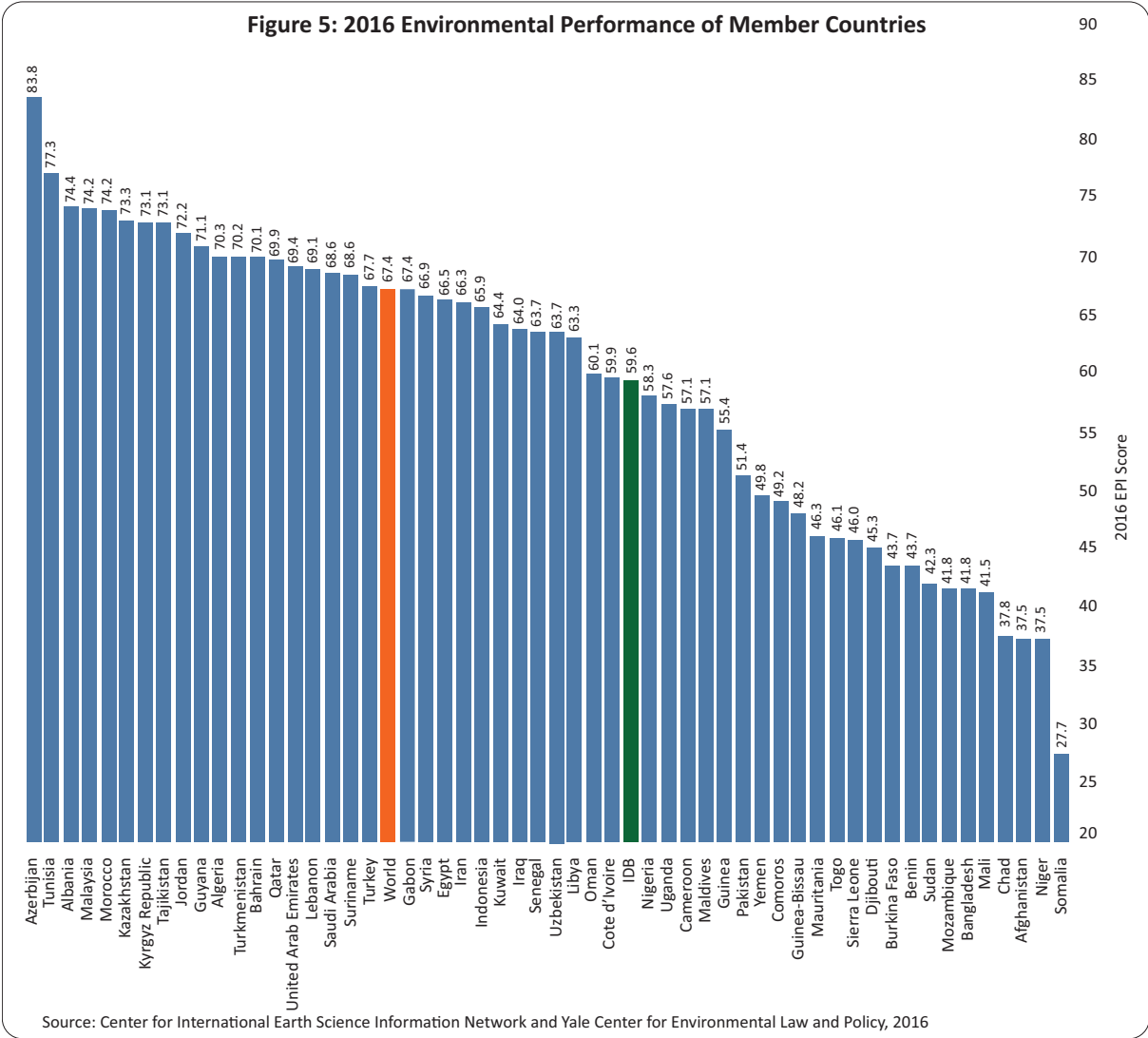
exposures that countries face with respect to extreme weather events.

**5.1 Environmental Performance Index**

The Environmental Performance Index (EPI) ranks countries’ performance on high-priority environmental issues in two areas: protection of human health (also known as environmental health) and protection of ecosystems. These two areas are disaggregated into nine-issue categories. The issue categories of environmental

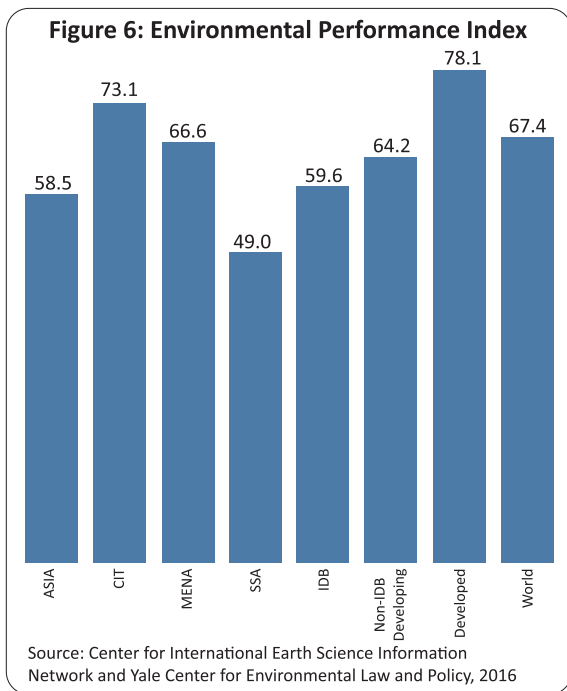
then the EPI scores are computed to reflect the overall performance of countries in these nine categories.

As shown in Figure 5, Azerbaijan, Tunisia, Albania, Malaysia and Morocco are among the best performing MCs on overall environmental performance index. Regionally, CIT outperforms all other regions, followed by MENA, ASIA and SSA. Oil-exporting MCs perform better than Non-oil exporting MCs on the environmental performance index.



health are health impacts, air quality, water and sanitation. The issue categories of ecosystem are water resources, agriculture, forests, fisheries, biodiversity and habitat, and climate and energy. The 20 indicators are used to identify the category score, and

Figure 6 contrasts the IDB member groupings with the world. The IDB members perform lower than both the developed and the non-IDB developing countries. CIT members outperform the world and the Non-IDB developing countries, but are



slightly behind the developed world in terms of human and ecosystem protection. The Asian, MENA and SSA members lag behind the world average. The SSA members need greatest effort to improve their human and ecosystem protection.

## 5.2 Global Climate Risk Index

The global climate risk Index (GCRI) assesses the degree to which a country suffers from weather-related loss-events such as storms, floods and heat waves. It measures the direct damages from extreme weather events and forewarns countries to prepare for more such occurrences in the future. The index, developed by Germanwatch, has been computed by using the following indicators: number of deaths, number of deaths per 100,000 inhabitants, sum of losses in US\$ in purchasing power parity and losses per unit of GDP. the total global damage from extreme weather events amounts to \$2.97 trillion over the period **1995-2014**<sup>7</sup>. Global climate risk index does not account for aspects such as sea-level rise, glacier melting or more acidic and warmer seas. It does not measure climate vulnerability, and it cannot be used for linear projection of future climate impacts of countries.

<sup>7</sup>. Germanwatch, <https://germanwatch.org/fr/download/13503.pdf>

The 2016 Report of Global Climate Risk Index (GCRI) ranks Bangladesh and Pakistan as among the top ten countries that encountered highest relative losses over the period 1995 – 2014. Afghanistan and Pakistan were among the top ten countries that suffered the most from extreme weather related losses. Bangladesh and Pakistan lost 0.9% and 0.7% of their GDP respectively during the period 1995 – 2014 . Regionally, Tajikistan in CIT, Oman in MENA, and Mozambique in SSA face the highest climate risk due to extreme weather events. The degree of exposure to climate change in all member countries is shown in Figure 8 where low scores indicate high climate risk.

On the global stage, the exposure to extreme weather events in IDB member countries is less than the world average as well as those of non-IDB developing and developed countries. The MENA and CIT member countries in general have the lowest exposure to extreme weather while ASIA member countries have the highest exposure as shown in Figure 7.

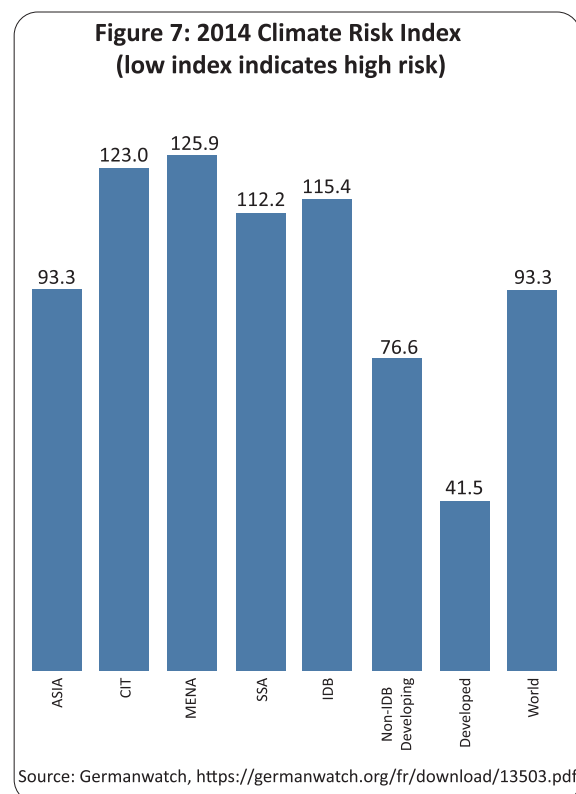
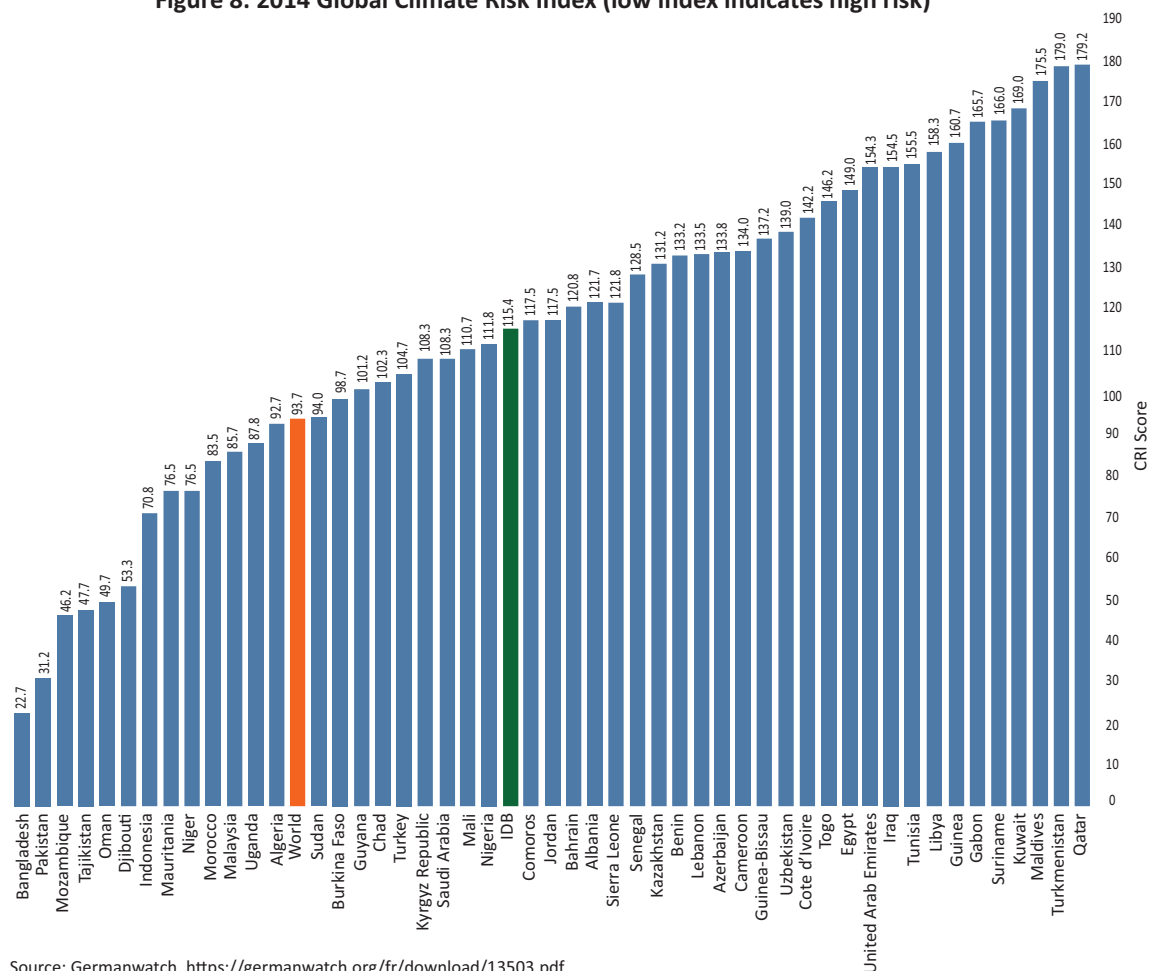


Figure 8: 2014 Global Climate Risk Index (low index indicates high risk)



Source: Germanwatch, <https://germanwatch.org/fr/download/13503.pdf>

## 6. Moving Forward

Climate change is a reality that manifests itself in various forms including frequent heat waves, natural disasters, floods, drought; vector borne diseases, low agriculture yields, and food insecurity. These phenomena have potential of reversing gains made over the years in reducing poverty and addressing socio-economic challenges facing member countries. The historic Paris Agreement, which brought all countries into a common cause based on their past, current, and future responsibilities opens a new era in combating climate change and mobilizing investment towards a low carbon, resilient and sustainable future. The international community has agreed to limit global temperature rise well below 2 degrees Celsius above pre-industrial levels, a timely move toward a safer growth trajectory.

In 2015, countries have developed their post-2020 climate actions to reduce global greenhouse gas emissions known as Intended Nationally Determined Contributions (INDCs) under the new international agreement. Implementing the INDCs requires huge financial resources. Although there are multiple sources for climate change financing including global funds, private sector participation and multilateral development banks (MDBs), the resource gap remains to be addressed. The role of MDBs is very critical and they are responding to ever-increasing demands of their member countries on climate change issues by mobilizing new financial resources and enhancing their technical assistance facilities in this context. Moreover, climate change agenda as sealed in historic COP21 in Paris requires unprecedented global cooperation among all stakeholders, and



the record speed of Paris Agreement's becoming effective in less than a year is indeed a very promising positive signal in this respect. A similar trend in regard to provision of US\$100 billion per year by developed countries as reflected in the decisions of the Paris Agreement will constitute a critical leverage in addressing climate change issues in a timely manner.

Given its many years of experience and services in the area of promoting Islamic financial industry, the IDB Group -- a pioneer in Islamic finance since 1975 -- can contribute significantly to addressing climate change through its various programs and initiatives including sukuk (for raising funds from international markets) and Reverse Linkage program (for capacity development). Through promoting green sukuk, for instance, the Bank can encourage mobilization of additional resources to finance climate change and in turn advance socially responsible investment, which has gained traction across the globe in recent years from diverse investors.

Using its other proven Islamic modes of finance, IDB Group will work closely with its partner institutions to support its member countries in implementing their climate action plans especially in strategic areas of financing mitigation and adaptation activities aimed at reducing the threat of climate change on their economies. As recently as 2014, the Bank, for instance, launched its renewable energy for poverty reduction initiative as well as adopted a new energy policy, which calls for investment in renewable energy. The Bank's partnership engagement with the Government of Morocco on Adaptation of African Agriculture (AAA) illustrates its desire to scale up its investment in adaptation of agriculture to climate change.

The per capita greenhouse gas emissions of IDB member countries is lower than the rest of the world but unfortunately this has not translated into lower exposure to

the threat of climate change, forcing many of these countries to bear more burden of managing the impact of climate change on their economies and the wellbeing of their citizens. As evident in the performance of member countries on two indices -- Environmental Performance Index and Global Climate Risk Index -- there are regional differences in terms of protecting environmental health and ecosystem as well as in the degree of exposure to extreme weather events. Therefore, it is important to identify best practices from successful member countries that can be replicated in other members. That is where the Reverse Linkage Program of the Bank (a tripartite cooperation mechanism) comes handy for knowledge transfer and catalyzing capacity development for member countries in all areas including innovative climate change solutions.

## Corporate profile of the Islamic Development Bank

### Establishment

The Islamic Development Bank (IDB) is an international financial institution established pursuant to Articles of Agreement done at the city of Jeddah, Kingdom of Saudi Arabia, on 21 Rajab 1394H corresponding to 12 August 1974. The Inaugural Meeting of the Board of Governors took place in Rajab 1395H (July 1975) and the IDB formally began operations on 15 Shawwal 1395H (20 October 1975).

### Vision

By the year 1440H, the Islamic Development Bank will have become a world-class development bank, inspired by Islamic principles, that has helped significantly transform the landscape of comprehensive human development in the Muslim world and helped restore its dignity.

### Mission

To promote comprehensive human development, with a focus on the priority areas of alleviating poverty, improving health, promoting education, improving governance and prospering the people.

### Membership

The IDB has 57 member countries across various regions. The prime conditions for membership are that the prospective country should be a member of the Organization of the Islamic Cooperation (OIC), that it pays the first instalment of its minimum subscription to the Capital Stock of IDB, and that it accepts any terms and conditions that may be decided upon by the Board of Governors.

### Capital

At its 38<sup>th</sup> Annual Meeting, the IDB's Board of Governors approved the 5<sup>th</sup> General Capital Increase whereby the Authorized Capital was increased to ID100 billion and the Subscribed Capital (available for subscription) was increased to ID50 billion. By the same Resolution, the Board of Governors agreed to the calling in of the callable (in cash) portion of the 4<sup>th</sup> General Capital Increase. As at the end of 1436H, the subscribed capital of the IDB stood at ID49.92 billion.

### Islamic Development Bank Group

The IDB Group comprises five entities: the Islamic Development Bank (IDB), the Islamic Research and Training Institute (IRTI), the Islamic Corporation for the Development of the Private Sector (ICD), the Islamic Corporation for the Insurance of Investment and Export Credit (ICIEC), and the International Islamic Trade Finance Corporation (ITFC).

### Head Office, Regional and Country Offices

Headquartered in Jeddah, the Kingdom of Saudi Arabia, the IDB has four regional offices in Rabat, Morocco; Kuala Lumpur, Malaysia; Almaty, Kazakhstan; and in Dakar, Senegal and Country Gateway offices in Turkey (Ankara and Istanbul), Indonesia, and Nigeria.

### Financial Year

The IDB's financial year used to be the lunar Hijra Year (H). However, starting from 1 January 2016, the financial year will be Solar Hijra year starting from 11 of Capricorn, (corresponding to 1 January) and ends on the 10 of Capricorn (corresponding to 31 December of every year).

### Accounting Unit

The accounting unit of the IDB is the Islamic Dinar (ID), which is equivalent to one Special Drawing Right (SDR) of the International Monetary Fund.

### Language

The official language of IDB is Arabic, but English and French are also used as working languages.



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