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An Economist's short visit to Environmental Problems. By Dr. Zeki Fattah*

The global target for climate warming has been set, this paper briefly discusses what caused global warming, gives samples of its major impacts, and how the world's nations are dealing with them.

The year 2019, is the year I became interested in environmental problems, and it is the year when COVID-19 broke out. For a moment, I thought the two problems were alike; they were both global, and people all over the world were keen to get rid of them. However, as I went deeper, I could see the similarity was purely superficial.

While everybody, including those who object to lockdowns and wearing masks, is keen to rid themselves of the corona virus, not everybody is so anxious about environmental problems. Indeed, some even think they are fictitious and don't exist. Also, while getting rid of corona virus is now a relatively simple matter, (well-funded scientific research finds a solution which is readily applied to stop the virus spreading), environmental problems, on the other hand, are numerous, more complicated, and have consequences that need to be addressed before they can be surmounted.

There are some who believe there are interlinks between Climate warming and COVID-19. They claim that COVI-19 was triggered by climate warming. As examples of this interlink; (1) according to UNEP (press release-16 September-2021) lockdowns offered a short-term reduction of CO2 emissions when in 2020 carbon emissions fell by 5.4%. (1) And (2) Governments, through economic stimulus, encouraged companies to invest in green technology.

On the down side, alcohol related deaths spiked during the pandemic. 'Alcohol related deaths in the USA, for example, went up during the pandemic from 3.6 percent (between 2018-2019) to 25 percent in 2020. (2). {Economically, the pandemic had a negative impact on the world economy; in most countries, it raised the public debt by pushing public expenditure on health and education up, and making allocation on cutting emissions more difficult}



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Environmental problems go much further.

Environmental change (climate change, global warming), refers to a rise in the temperature of the atmosphere near earth caused by the accumulation in the atmosphere of green-house gasses. The most significant green-house gas is carbon dioxide CO₂. Nearly 80% of the rise is caused by burning fossil fuels, with the rest caused mainly by deforestation, and agricultural activities, particularly raising cattle for milk and meat.

The main reason why we have problems tackling environmental change is because a clean environment has no ownership; people, or governments, do not need 'property rights' to use it, or rather, misuse it; the apparent cost of emitting pollution is zero. Environmental change, also, has a second unfortunate distinction: often the people who suffer from environmental degradation are not the same as those who benefit from the activity that created the pollution; this makes reaching agreement on solutions for environmental problems rather difficult.

The Industrial Revolution in the 18th century brought forward the discovery and increasing use of readily available energy sources. Coal was cheap, and (in the case of England) easily accessible. From then on, fossil fuels played a crucial role in the development of world industry, agriculture, and transportation. These activities transformed the human condition and helped to meet the world's unprecedented rise in economic growth, population growth and material wealth. Increasingly, however, using fossil fuels has become an integral part of the quest for growth and development. In addition to meeting the demand from an increasing world population and economic growth, it was also fueled by the drive to minimize cost and maximize profits. New methods were devised which intensified the use of fossil fuels. For example, the rules of WTO (1995) for free trade, do not discriminate between traded products that use greener production methods and those trading in carbon-intensive products. (EU has been championing attempts with just this object in mind).

Also, there is the convention, that we measure economic progress by the growth of GDP, exports, employment and investment, with no provision for how much natural capital is depleted in achieving that growth. Costly environmental degradation, carbon emission and air pollution are routinely discounted in measuring economic



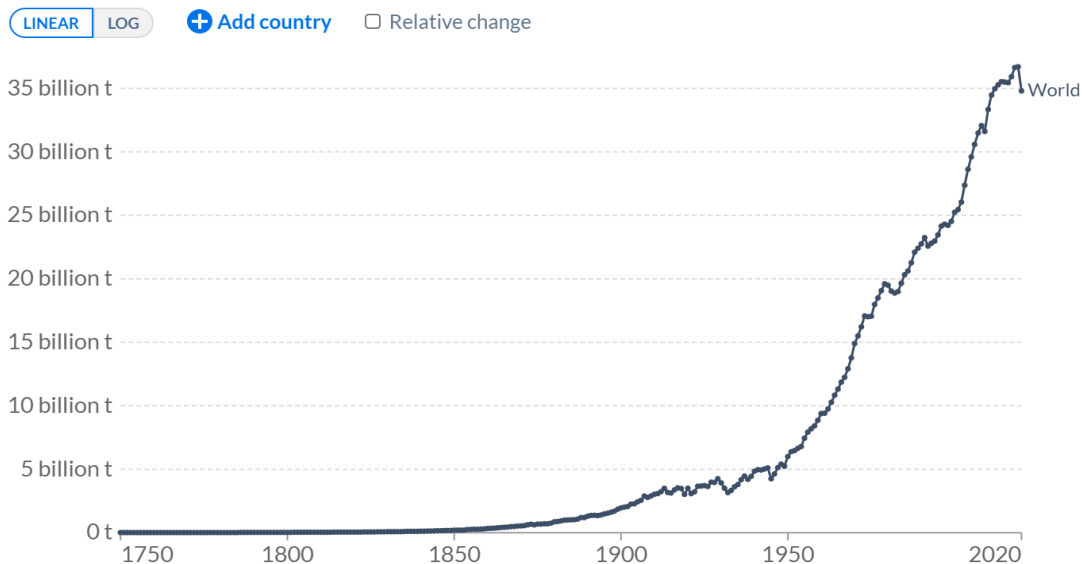
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growth. Moreover, for a long time, the environment acted like a sleeping giant; not reacting to misuses.

Humans' insatiable appetite for fossil fuels continued and expanded until it made a dent in the world atmosphere in the middle of the 19th century—when atmospheric CO₂ levels began to rise beyond historical standards. (See graph).

Graph 1: Annual CO₂ emissions:

Carbon dioxide (CO₂) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.



Source: Global Carbon Project.

By then, many dangerous global environmental problems had occurred threatening human health and wellbeing.

It seems, that the sleeping giant finally woke up, throwing its salvos at the world. The world, also, finally, woke up to the danger of climate warming. Worldwide programs were set up to study environmental issues. World nations committed themselves to the stabilization of greenhouse-gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interferences with the climate



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system. (3) And plans and policies were introduced to encourage and support innovations in wind and solar energy technologies to replace use of fossil fuels. But, overall, the response proved to be inadequate.

The following are a number of observations on global climate warming, and how the world nations are responding to it.

1. Global carbon emissions

Contributions by countries across the world to global CO₂ emissions have not been equal. As the Table below shows, in 2017, for example, the US which accounts for 3.7 percent of the world population contributed 25 percent of global emissions; and the one billion population of Sub-Saharan Africa, emitted 823 million tons per year, a per person rate of 0.8 metric ton, about one-20th that of the United States. There is also wide disparity in regional contributions to global emissions. For example, according to the International Energy Agency (IEA), Asia and Australia together produce and consume three quarters of the world coal, and in 2020 Asian countries alone were responsible for 49 percent of global carbon emissions. (4)

Table 1: Contributors to Global Carbon Dioxide Emissions per Year in 2017

US		Europe		China		India		Sub-Sharan African Countries	
Billion tons	Metric tons	Billion tons	Metric tons	Billion tons	Metric tons	Billion tons	Metric tons	Million	Per person ton



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	Ton per person		Ton per person		Ton per person		Ton per person	Metric tons	
5.3	16.2	3.6	7.0	10.0	7.4	2.3	1.7	823	0.8

Source: OurWorldInData.org

2. Damages

The increase in the planet's average surface temperature is causing serious damage to the planet and its population. According to the UN Intergovernmental Panel on Climate Change (IPCC) (that looks at the causes, impacts and solutions to climate change), it is making large tracts of permafrost impermanent, swallowing mountain glaciers and reducing the area of long lasting ice on the Arctic Ocean by 90%; it is destabilizing the great sheets of Greenland; causing mid-sized hurricanes to intensify into most powerful storms; it is increasing the frequency, intensity, and duration of droughts and heat waves; it is causing raging wildfires, and raising the sea level-causing hundreds of millions of people around the world to suffer. (5) The IPCC's latest report shows that extreme weather events linked to climate change, are hitting humans and other species much harder, and their impact is already going beyond the ability of many people to cope. It also shows that, between 2010 and 2020, 15 times more people died from floods, drought and storms in extra vulnerable regions in Africa, South Asia and Central and South America. Certain parts of Africa are likely to become uninhabitable. (6)

3. Costs

Climate warming has cost the world economy heavily, and the cost has not been evenly distributed. Three types of cost are discernable: (a) the cost of short-term climate warming events (fire, floods, droughts, and storms); (b) the long-term cost of adapting to climate change; and (c) the cost of economic output lost because of high temperature.



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The cost of loss and damage through short-term climate events have been colossal, and have been suffered by many countries. The cost of adaptation-measures taken to adjust to the changing climate and transform to new cleaner sources of energy-have proved formidable, and, also, unequally distributed. For example, while Sub-Saharan African countries account only for 15 percent of the world population, and 2 percent of energy related carbon dioxide emissions, they bear nearly 50 percent of global adaptation costs; hence, African countries requests to make “Adaptations” a global responsibility; and developed countries to make a greater financial contribution as “they caused the crisis in the first place”, Their call for ‘Climate justice’, which is enshrined in the United Nations Convention Framework on Climate Change (UNFCCC) should be ‘on the basis of their common but differentiated responsibilities and respective capabilities. (7) Finally, according to the National Academy of Sciences, climate warming caused the sub-Saharan Africa countries, Burkina Faso, Niger, and Sudan) a loss of more than 20 percent of per capita GDP in 2019”. (8)

4. MENA Region

The MENA region, already recognized as the world’s most water-stressed, rising temperature made its chronic problems of water scarcity, desertification, and food security even worse. It has also contributed to population movement inside the countries causing violent conflicts in some parts, and heightened existing transboundary water disputes between states in the region. (9)

The region itself is a heavy contributor to harmful global greenhouse emissions. MENA countries rely heavily on extractive fossil fuels for wealth. The petroleum producers of the Middle Eastern countries make 31.3 percent of global oil production. Their economic systems rely mainly on fossil fuel for electricity generation and transportation; raising their share in global emissions and making the region’s share of the global pre-tax energy subsidies the highest. Thus, MENA region, which accounts for just over 6 percent of world population, accounts for 9.4 percent of global oil consumption. (10)

5. International cooperation



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Reducing the impact of greenhouse gases and halting global climate change call for intense international cooperation. This cooperation is needed, for example to: increase innovation in renewable energy and related applications; accelerate innovation in carbon absorbing materials; build energy sectors dominated by alternatives to fossil fuels; explore the use of hydrogen for widespread industrial use and electrification; help countries adopting green growth strategies; and support developing countries whose need for energy is rapidly increasing due to population increase and economic growth.

The MENA region gives a good example of the support international cooperation can provide.

The region has become a hub for bilateral and international cooperation to combat the effects of climate change. For example, to combat water scarcity, the league of Arab States, and the World Bank (Development Report 2018) (UNMDG 2002-2015) (UNMDG7 & UNMDG8) (WHO 2008), **(11)** implemented several projects including: water treatment plants to lower burden on aquifers (in Jordan and Tunisia); improving management of groundwater usage (in Morocco); and reforming, preserving and enhancing water supplies (in Egypt and Saudi Arabia) (World Bank Report 2018). The projects also reach vulnerable communities. **(12)**

Several United Nations, multinationals and national organizations cooperated in applying multi-sectoral approaches to preserve fresh water resources, enhance water productivity, and manage water scarcity levels, helping millions to have access to safe, secure, and sustainable water supplies. **(13)** MENA countries, in turn, pledged commitment to multilateral climate target of zero-emissions by 2050. At the same time, Morocco has become a leader in solar energy. Egypt and UAE are hosting United Nations Climate Change Conference, COP 27, and COP 28 respectively (in November 2022, and 2023).

Still, climate warming continues to pose a serious danger to the Region. For example, in Iraq desertification has reached an alarming level, and sand storms, that were previously an annual event, are now hitting the country several times a year. It is also estimated, that even a modest increase in the sea level by 2050, will expose the cities of Algeria Benghazi, and Alexandria in North Africa to a great risk. **(14)**



6. The United Nations

The inadequacy of the world's response to the dangers of climate change, and the ferocity and frequency with which climate change problems occurred, needed more cooperative action. There was, therefore, a move to bring nations together in looking for consensus; to mobilize resources; to enable developing countries to transit to low carbon economies; and to promote innovation and cooperation in renewable energy and new carbon-replacing technologies. This role was assigned to the United Nations. The UN responded by establishing its environment program, setting up offices to monitor work progress, and significantly, organized several important world conferences on climate warming. Three of these conferences warrant mentioning.

The UN summit on Environment (in 1992) in Rio de Janeiro, produced the UN Framework Convention on Climate Change (UNFCCC). The UN Paris Agreement (in 2015), went a step further: by declaring the goal of “holding the increase in the global average temperature to well below 2°C pre-industrial level; and put a limit of 1.5°C on the temperature increase above pre-industrial levels. And, recently (in 2021) in the COP26 ‘Conference of the parties’ in Glasgow, a new global agreement was reached to cut emission of carbon dioxide; keep world temperatures increases to below 1.5°C; and to limit global warming to about 2.4°C to prevent climate catastrophe. Also, higher funding levels were “allocated” for developing countries to cope with the effects of climate change and switch to cleaner technologies. (More on this later).

7. Country line up

World nations tend to differ in their response and commitment to climate change. Below they are listed within the following- five groups.

1. Island countries - threatened by rising sea levels, they are committed and desperate for help.
2. Developing countries, and the least developed countries- they suffer from a lack of technological capability, and investment funds.



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3. Industrial democracies- they are heavy contributors to pollution, and have, by and large, contributed resources and capabilities to the world decarbonization effort; but need to do more.

4. Some democracies- notably, USA (until recently) and Brazil (still), have been hampered by internal politics in playing their expected role.

5. Three countries, China, India, and Australia, are the largest contributors to carbon emission by using coal for energy production. Recently, they have shown signs of gradually moving away from coal to other new energy sources, (but, suspicion still lingers) (more on this later)

Fortunately, many Asian countries have already taken steps to reduce the use of coal.

8. Why countries differ?

So, why do, China, India, and Australia (and few other countries) are not pulling their weight to reduce global carbon emission; knowing that global de-carbonization goal cannot be done without their cooperation?

It is here where the second characteristic of our environmental problems comes into play.

Unfortunately, and unlike COVID-19, while climate change affects all, it doesn't affect all equally. Therefore, there is a serious divergence between (individual) country gains and global (social) environmental damage.

While climate change is a global phenomenon the response to it, ultimately, is at a national level, with each nation facing its own unique set of circumstances. The majority of world nations see their interest in cutting emissions to achieve the global goal of de-carbonization. The three heavy fossil fuel users and some others, however, have different considerations when deciding to restrict carbon emission. While their decisions, like others, are made by governments and industries, in their case, they are weighted more by economic and political considerations. Economically, they require huge investments to replace coal. For them, the cheapness of coal is not matched by substitutes. Politically, there are vast interest groups in these countries, that are cashing in on the use of coal. Often, (as in Brazil



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recently, and in some Asian democracies) replacing coal is removed from the political agenda in election years.

(There are two other reasons that prevent some countries using their full potential to cut carbon emissions).

First, the alternatives to fossil fuels for them are neither free nor cheap, nor are they adequately supported to facilitate the transition to cleaner energy.

Second, not all countries have the technological capabilities and resources to produce, or apply, new technologies to replace fossil fuels, nor is there, as yet, a world authority to promote or supervise the application of new technologies.

9. New technologies to reduce climate warming

Global emissions are the product of four factors: population, GDP per Capita, energy used per unit of GDP (measuring efficiency), and carbon emission from the energy used (measuring de-carbonization).

To reduce emission, one must reduce one or more of those four factors. **(15)** Movement towards the first two have been slow and difficult. The ‘smart money’ is on progress in the last two. Progress here calls for massive investment, innovations, and intensive international collaboration. Without huge amounts of investment de-carbonization will take longer; and innovations become slower; and without international collaborations the benefits will not always reach where it is needed most. **(16)** To speed up de-carbonization the world needs to discover better ways of storing energy, cooling and heating residential quarters, growing and processing crops, and producing plastics, just to give a few examples. **(17)**

So, how have new technologies changed the composition of world’s energy?

During the period 1997-2020, the share of renewables- wind turbines and solar panels- increased from zero to 3%; of nuclear power- also generated without fossil fuels- fell from 5.3% to 4%; of Hydroelectricity remained stable at 6%. **(18)**

The modest increase of renewables in the world’s energy should be seen in the right perspective. First, in one year, 2020, the share of energy generated by solar panels,



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grew by 21% (that of wind went up by 12%). Second, this increase was accompanied by substantial reduction in the cost of wind turbines and solar panels. Finally, these developments took place when there was still no tax on carbon users, or restriction on permits for trade in carbon emission goods, or rate allowance for money borrowed by renewable developers. Attending to these drawbacks could substantially enhance the share of renewables in the global energy supply. **(19)**

10. Technologies to reverse emissions

The world also needs more than an energy system without emissions. It needs innovations and investment to reverse emissions. Three such new technologies include Carbon Capture and Storage (CCS), Direct-air-capture (DAC) and, technologies to pull out CO₂ faster than emitting it - (producing net negative emissions). The success of these modern methods of negative emissions, requires, in addition to massive investment, making fossil fuels very expensive to use, by taxing them.

11. Contentious Issues

Financial support for developing countries to meet costs of adaptation to climate change, became a contentious issue overshadowing the climate conferences.

At the Earth Summit in Rio de Janeiro in 1992, developed countries recognized that they were more liable than the rest of the world for global warming, and agreed on the UNFCCC that enshrined the concept of “common but differentiated responsibility”.

The 2009 UN Climate Change Conference, in Copenhagen, pledged an annual \$100 billion for climate finance, technology transfer and capacity building in developing countries; but they disagreed on the legally binding financial aspects.

At the 2011 Climate Summit in Durban, South Africa, and, on the insistence of developed countries and oil producing countries, a new condition was attached before approving the designated annual \$100 billion; all countries (not only developed countries- as was previously stated) were to produce plans to cut emissions. Application of this mandate was to begin in 2020. At the Paris conference



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in 2015, the rich countries reaffirmed their commitment to financial support for poor countries to fight climate changes, and made further commitment to increase levels of funding every five years. But the 2020 dead line for the mandated \$500 billion was missed. And, at the UN climate summit in Glasgow, it was further pushed down the road to be decided upon in the next climate summit. There are some interesting points to note here. **(20)**

One, while the mandated \$500 billion assistance for developing countries is still pending, industrial countries- according- to the International Monetary Fund- “provided \$5.2 trillion subsidies for fossil fuels industries outside their countries (up from \$4.7 trillion in 2015)”. **(21)**

Two, a 2018 report by Oil Change International (a research and advocacy organization) showed that between 2014 and 2016, 60 percent of international public aid for energy projects in Africa was spent on fossil fuels- principally through investments in oil and gas infrastructure – with only 18 percent directed to renewable sources such as wind and solar energy”. **(22)**

12. New proposals for climate negotiations

Global de-carbonization efforts have not met the global warming challenge. There are now some new suggestions for supporting the global effort. Two of them could provide a good base for future COP negotiation

According to the first view, “there is a total disconnect between the need for sharp emission reduction and the outcome of the COP deliberations”. And “the world is no closer to the target of reducing emissions in 2022 than it was after COP in 1995”. **(23)** This is because, “There is no binding international agreement on climate change”. “The COP Declarations have relied on voluntary arrangement which induce free-riding that undermines any agreement”. **(24)** Therefore, “the best way for a strong and effective coordination and cooperation of nations is to set up a mechanism that penalize countries that do not abide by the limit”. **(25)** Hence, future COPs should make survival of the biosphere the core of both national and international security concerns, and international organizations and foreign investment should be directed towards this goal. It advocates putting a tax on



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emissions, and argues, that, had there been a tax on emissions, research and development would have found ways to limit emissions, and would have worked on inventing new technologies to replace their causes. (26)

The second view, separates weather from climate. It distinguishes the long-term goal of reducing global emissions, from the short-term climate warming events (fires, flood, droughts and storms. “While there is a general agreement on rapid reduction in greenhouse emissions, governments should emphasize adaptation equally”. (27) Short-term climate warmings events, it argues, need to be treated to prevent their interactions and their potential cumulative impact on the ecosystem. It defines adaptation to mean: developing forward looking policies to protect people; infrastructure, ecosystems and society; discourage people and industries settle in exposed areas; and giving more resources to international agencies to help the least developed countries. It also argues, that “trapped heat that has been absorbed by the oceans over decades is bound to emerge, warming the earth”, and “no amount of emission reduction will be enough to spare communities that do not also adapt” (28). These two new proposals could make a good base for future COP negotiation.

12. Where are we now?

Undoubtedly, the heightened global effort and the global conferences to cut carbon emissions, have made a tangible difference in the fight against global warming. Overall, however, the effect has not met the challenge. World nations would have to redouble their effort to meet the decarbonization goal; and consensus reached at global environment conferences would have to be effectively implemented. Global Conference resolutions are all beset with the same type of problems:

- Not all countries live up to their commitments;
- commitments are not enforceable;
- implementation is self-policed;
- only few countries made legally binding pledges.

The world, isn't moving as fast as environmental change.



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The decline in the level of CO₂ has not been noticeable. According to ‘Our World in Data’, in 1992, about 78% of the world’s primary energy (electricity, heating and transportation) came from fossil fuels, two decades later, in 2019, fossil fuels still provided 79% of the total energy used.

To end

We shall end this short journey with two more observations. One, relating to the prospect of achieving the global de-carbonization goal; and the second, reaching a common ground in the COP negotiations. The outlook, unfortunately, in both cases, is not very promising.

First, perhaps the best way to summarize the challenge of global warming is to present the Gist of the Economist’s Climate Report: the challenge of climate warming at the base, the Report argues, is to find a substitute for carbon that is technically as simple and economically cheaper. The three billion Indian passengers travelling by railway every year, know they inhale soot and sulphate particles, but they travel anyway, because it is cheaper. Unless we discover this substitute the world- it would seem may not remain a pretty site. (29)

Second, the negotiations in the COPs immediately remind us that the world is already not a pretty sight. It is eerily similar to the Roman Coliseum. In whose arena gladiators fought beasts while the audience looked on.

So, the environmental negotiators in our arena try in vain to fight the terrible climate disasters that come out ever more frequently threatening to kill and destroy. Hanging over them is an ever more grueling sun, beaming light and heat into the arena. However, the gladiators rather than fight the beasts, spend their time wrangling and jostling for positions whilst the world swelters.

References:

1. Roni Caryn Robin, ‘Alcohol Related Deaths Spiked During the Pandemic’ New York Times article, 22 March 2022, based on a report by the National Institutes of Health (USA), published in the Journal of the American Medical Associate, Friday 18 March 2022.
2. UNEP, press release-16 September-2021:” Fossil CO₂ emissions – coal, oil, gas and cement –



IEN Policy Papers

peaked at 36.64 GtCO₂ in 2019, followed by an extraordinary drop of 1.98 GtCO₂ (5.6%) in 2020 due to the COVID-19 pandemic”.

3. The United Nations Framework Convention on Climate Change (UNFCCC), agreed upon at summit in Rio de Janeiro in 1992.
4. United Nations Statistics for 2017. And International Energy Agency (IEA (2020).
5. OurWorldInData.org
6. Climate change: ‘Five things we've learned from the Intergovernmental Panel on Climate Change’ (IPCC) Report, 1 March 2022. Matt McGrath, BBC Environment correspondent.
 - ‘Impact, Adaptation and Vulnerability’, The working Group II Sixth Assessment Report.
 - Matt McGrath, BBC Environment correspondence, Climate Change, IPCC report warns of ‘irreversible’ impacts of global warming. 28 February 2022.
7. UNFCCC 1992, United Nations Framework Convention on Climate Change.
 - The Economist, Special report Stabilising the Climate, Oct 30th-Nov5th 2021, page 4, paras 1, 2 & 3.
 - Mohamed Adow, ‘The Climate Debt, What the West Owes the Rest’, Foreign Affairs, May/June 2020, pages 62-64 (figures based on National Academy of Sciences Report published in 2008).
8. Frederic Wehrey & Ninar Fawal, Carnegie Endowment for International Peace, ‘Cascading Climate Effects in the Middle East and North Africa: Adapting Through Inclusive Governance’, February 24. 2022.
9. Mohamed Adow, Foreign Affairs, May/June 2021, Ibid, pages 60-68.
10. Frederic Wehrey & Ninar Fawal, Carnegie Endowment for International Peace, 2022, Ibid.
11. World Bank Development Report 2010, document number 53077,
12. - World Bank Annual Report 2018.
- 13.- Millennium Development Goals 7: “ensure environmental sustainability’, target 7 C: by 2015, halve the proportion of people without sustainable access to safe drinking water and basic sanitation”. UNSDG report 2015.
 - The Sustainable-Development Goals, Report 2020, CHs: SDG6 page 11, SDG 7 page 12, SDG, page 17, SDG 13 page 18, SDG 14 page 19, SDG 15 page 20. UNSDG Report 2021, CH. 6, CH. 7, CH. 13, CH. 14, and CH.15.
14. UNEP and League of Arab States Cooperating on Environment, NOV 2014, ‘The most water-stressed region on Earth: How the Arab region is pursuing a goal of environmental protection’. <http://sdg.iisd.org › news › unep-league-of-arab-states>.



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- Weststrate, J., Dijkstra, G., Eshuis, J. et al. 'The Sustainable Development Goal on Water and Sanitation: Learning from the Millennium Development Goals', 25 August 2018. Soc Indic Res. 143, 795–810 (2019). <https://doi.org/10.1007/s11205-018-1965-5>. And
 - International Panel on Climate Change (IPCC) 2021 & Patrick Verkooijen, CEO, The Global Center on Adaptation.
 - Frederic Wehrey, Ninar Fawal, Carnegie Endowment for International Peace, Ibid, 2022.
15. The Economist, Economist Special Report, 'Stabilizing the Climate', Ibid, page 17, para. 1.
 16. The Economist, Ibid, page 17 paras 8 and 9.
 17. The Economist, Ibid, page 17 paras 9.
 18. The Economist, Ibid, page 4, para 8.
 19. The Economist, Ibid, page 7, paras 1,2 and 3.
 20. Sara Colenbrander, Director of Program Climate and Sustainability, United Nations Climate Change Conference, 'Our Thought on COP 26, reflection on Glasgow Conference pact', Glasgow, UK. 2021.
 21. Mohamed Adow, Foreign Affairs, May/June 2021, I bid, page 67, para 3.
 22. Mohamed Adow, Foreign Affairs, May/June, 2021, I bid, page 67, para 4.
 23. William Nordhaus 'The Climate Club How to Fix a Failing Global Effort' Foreign Affairs, Vol.99, Number 3, May/June 2020, page 10, para 3.
 24. William Nordhaus, Foreign Affairs, May/June 2020, I bid, page 10, para 1.
 25. William Nordhaus, Foreign Affairs, May/June 2020, I bid, page 15 para.2
 26. William Nordhaus, Foreign Affairs, May/June 2020, pages 10 to 17.
 27. Michael Oppenheimer 'Climate Change's Dangerous Next Phase', Foreign Affairs, Vol. 99 Number 6, Nov/Dec 2020, page 39 para.5.
 28. Michael Oppenheimer, Foreign Affairs, Nov/Dec. 2020, Ibid, page 40. Para 1.
 29. The Economist, Economist Special Report, 'Stabilizing the Climate', Ibid, pages 3-24



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