Secure Tomorrow

Minet

AON | Global Network Correspondent

MINET THOUGHT LEADERSHIP

Minet is a trusted pan-African advisor that meets the uncertainties of tomorrow by delivering risk and human capital solutions today. As the largest Aon Global Network Correspondent, Minet has access to a network of over 50,000 colleagues in 120 countries as well as to proprietary data, research and analytics which enable us to manage and secure the risks of tomorrow and provide clients with an unrivaled advantage. For more information, please visit www.minet.com

Risk. Reinsurance. People.

EYE OF THE STORM AN INSURANCE PERSPECTIVE OF CLIMATE CHANGE, ITS RISKS, AND AFRICA

November 23rd, 2021

Deadly floods in Europe, hurricanes ravaging North America, the drying up of South America's second largest river system and unprecedented wildfires across the Mediterranean, sounds like the opening scenes to a dystopic science fiction movie, right? Far from fantasy, these were just a handful of the many climate catastrophes experienced globally in 2021 alone. "It is unequivocal that human influence has warmed the atmosphere, ocean and land; [as a result] widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred," was one of several worrisome assessments made by the Intergovernmental Panel on Climate Change (IPCC) in their sixth assessment report released in August 2021. Similarly, in his opening statement at the November 2021 United Nations Climate Change Conference, COP 26 President Alok Sharma concurred that indeed "our shared planet is changing for the worse" and "the lights are flashing red on the climate dashboard", while UN Secretary General António Guterres sounded off against "brutalizing biodiversity", "killing ourselves with carbon", and "burning, drilling and mining our way deeper" into crisis. With scientific consensus now indubitable, and climate disasters more prevalent, we must transition discussions on climate change, its effects, and mitigation away from the annals of science and to the mainstream, particularly in Africa. With the African continent warming at a slightly higher rate than the rest of the world, its surrounding sea rising slightly more than the global mean, and projections that "30 of the world's 40 most climate-vulnerable countries are in sub-Saharan Africa" we must act immediately. This article will seek to outline the impacts, both current and emerging, of climate change - globally and in Africa - and how finance and insurance can contribute to building resilience amid such ongoing crises.

At the landmark 2015 Paris Agreement, two hundred countries committed to keeping a global temperature rise this century to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. At COP 26, the Glasgow Climate Pact was adopted, which doubles down on the global temperature goal by recognizing that "the impacts of climate change will be much lower at the temperature increase of 1.5°C compared with 2°C and resolves to pursue efforts to limit the temperature increase to 1.5°C". The Climate Pact candidly admits that "limiting global warming to 1.5°C requires rapid, deep and sustained reductions in

global greenhouse gas emissions, including the reduction of global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around mid-century, as well as deep reductions in other greenhouse gases."

Already, as reported by the IPCC, "the likely range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019 is 0.8°C to 1.3°C, with a best estimate of 1.07°C". The focus on limiting global temperature increase this century to 1.5 °C stems from the borderline apocalyptic forecasts of a 1.5-2°C rise, which, amongst others, include: higher frequency of heat waves, rapid decrease in global freshwater levels, loss of most if not all tropical reefs, plunging agricultural yields leading to global food insecurity, melting of arctic sea ice resulting in drastically raised sea levels and extinction of roughly a quarter of global plant and animal species. Africa would be even more exposed, as reported by the Worldwide Fund for Nature (WWF), in today's climate, the average African region experiences one to three heatwaves per year, under 1.5 °C of warming, this number could more than double by 2050. Additionally, megacities like Lagos in Nigeria will be more vulnerable to heat stress, with perhaps twice as many becoming affected by the middle of the century, meaning more than 350 million people exposed to potentially deadly heat. Furthermore, as summarized by the IPCC, global temperature increases of greater than 1.5 °C could engender the following key risks for Africa: reduced crop productivity attributable to heat and drought stress affecting regional, national, and household livelihood and food security, adverse effects on livestock linked to temperature rise and precipitation changes, as well as shifts in the range of pests and diseases adversely impacting pastoral livelihoods and rural poverty, changes in the incidence and geographic range of vector- and water-borne diseases due to variability of temperature and precipitation, changing crop yields that could lead to undernutrition (with its potential for life-long impacts on health and development and its associated increase in vulnerability to malaria and diarrheal diseases), and increased migration leading to human suffering, human rights violations, political instability and conflict.

Alas, by no means are these risks exclusively in the future, according to the World Meteorological Organization (WMO), "EM-DAT (Emergency Events Database) records from 1970 to 2019, weather, climate and water hazards accounted for 50% of all disasters (including technological hazards), 45% of all reported deaths and 74% of all reported economic losses, that translates to 2.06 million deaths and US$ 3.6 trillion in economic losses." The report highlights that, "a disaster related to either a weather, climate or water hazard occurred every day on average over the 50 years – killing 115 people and causing US$ 202 million in losses daily". Key to note in their report however is how "of all deaths from weather, climate and water hazards, 91% occurred in developing economies according to the United Nations country classification [...], the proportion remains similar for the World Bank country classification, according to which, 82% of deaths occurred in low and lower-middle income countries." The WMO report brings to the fore two major insights, the first being that the overall magnitude of climate related disasters, both past and present, has either been underreported, underestimated or under-appraised in mainstream discourse, and secondly, a reality gradually becoming more apparent and accepted, the disproportionate effect climate change will have on developing countries and low to lower-middle income economies, which, unfortunately, encompasses most African countries.

Part of the "awareness" challenge for climate change risks, particularly in Africa, is the over-reliance on the popularised and relatively binary illustrations of climate change being either absolute flood or drought. This, however, desensitizes us from appreciating, identifying, and mitigating ourselves against the broad spectrum of climate related risks. The Bank for International Settlements, in their

Climate-related Risk Drivers and their Transmission Channels Report (2021), categorized climate risk into physical and transition risks with physical risks being, *Economic costs and financial losses resulting from the increasing severity and frequency of*:

- *Extreme climate change-related weather events (or extreme weather events) such as heatwaves, landslides, floods, wildfires, and storms (i.e., acute physical risks),*
- *Longer-term gradual shifts of the climate such as changes in precipitation, extreme weather variability, ocean acidification, and rising sea levels and average temperatures (i.e., chronic physical risks or chronic risks) and,*
- *Indirect effects of climate change such as loss of ecosystem services (e.g., desertification, water shortage, degradation of soil quality or marine ecology).*

While transition risks are risks related to the process of adjustment towards a low-carbon economy.

To illustrate just how ubiquitous and multifaceted these risks are, especially the physical risks, here are a few continental examples: in Kampala, Uganda, near-surface temperature increased between 1979 and 2005, making localized rainfall both more intense and more variable, resulting in increased prevalence of flooding and, in conjunction with longer dry periods, disruption of hydroelectric power generation and distribution of electricity. Poor coastal planning and injudiciously reclaimed land in the deltas of Lagos, Dakar and Alexandria will be exposed by sea-level rise. An assessment of the vulnerability in the Egyptian cities of Alexandria, Rosetta and Port Said suggests that a sea-level rise of 0.5 meters (m) could see more than 2 million people abandoning their homes, 214,000 jobs lost and over US$35 billion lost in property value and tourism income. In Cape Town, South Africa, where parts of the city are built on reclaimed land, the cost of sea-level rise has been estimated at US$49 million–US$2.01 billion by 2035, depending on the extent of the rise. Climate change–induced recurrent flooding has caused severe economic losses in cities in Senegal. The floods of 2009 in Saint Louis, Kaolack, Thies, and Dakar resulted in the temporary displacement of more than 200,000 people and caused more than US$100 million in damages and losses. Moreover, an estimated 17% of the area in the city of Mombasa, Kenya, amounting to 4,600 hectares, could be submerged by a sea-level rise of 0.3 meters, with a larger area rendered uninhabitable or unusable for agriculture because of waterlogging and salt stress.

Furthermore, the World Meteorological Organization's State of the Climate in Africa 2020 Report highlighted the almost dire straits of Africa's Crisis with the following observations: the warming trend for 1991–2020 was higher than for the 1961–1990 period in all African subregions and significantly higher than the trend for 1931–1960, annual average temperatures in 2020 across the continent were above the 1981–2010 average in most areas, the rates of sea-level rise along the tropical and South Atlantic coasts and Indian Ocean coast are higher than the global mean rate, the current retreat rates of the African mountain glaciers are higher than the global mean and if this continues will lead to total deglaciation by the 2040s,with Mount Kenya expected to be deglaciated a decade sooner. The report points out that, with each flood or drought in sub-Saharan Africa, food insecurity increases by 5–20 percentage points, and an estimated 12% of all new population displacements worldwide in 2020 occurred in the East and Horn of Africa region, with over 1.2 million new disaster-related displacements and almost 500, 000 new conflict-related displacements. Africa, both in the literal and figurative sense, finds itself in the eye of a storm; with empirical evidence now insurmountable, we must hastily abandon the pretense that climate change is this distant, transitory, imperialistic theory and accept that it is one of, if not, the biggest collective threat to Africa in the coming decade.

What then can we do? Rather worrisomely, the IPCC forewarns us that "many changes due to past

and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level." However, at a global level, IPCC instruct, "limiting human-induced global warming to a specific level requires limiting cumulative CO_2 (Carbon Dioxide) emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other greenhouse gas emissions [...] strong, rapid and sustained reductions in CH_4 (methane) emissions would also limit the warming effect resulting from declining aerosol pollution and would improve air quality." Unsurprisingly, such objectives will require coordinated global initiatives and accords, as well as intentional political will and commitment. This should not, however, be an excuse for us to bequeath responsibility solely to "the powers that be", instead, as highlighted above, the magnitude of climate related disaster is such that it requires all-hands-on-deck for us to be able to cope with and manage climate risks, the role of finance and insurance, in particular, cannot be overstated.

Simply put, the responsibility of finance and insurance, as highlighted as way back as 2005 by Allianz and the WWF, is twofold, "on the one hand it needs to prepare itself for the negative effects that climate change may have on its business and on its customers. On the other hand, it can significantly help mitigate the economic risks and enter the low-carbon economy by providing appropriate products and services". Similarly, in the Glasgow Climate Pact (2021) finance and insurance play key roles within the "Finance, technology transfer and capacity-building for mitigation and adaptation", and "Loss and Damage" pillars, where, amongst other resolutions, the pact *"Emphasizes the need to mobilize climate finance from all sources to reach the level needed to achieve the goals of the Paris Agreement, including significantly increasing support for developing country Parties, beyond USD 100 billion per year" and "Reiterates the urgency of scaling up action and support, as appropriate, including finance, technology transfer and capacity-building, for implementing approaches for averting, minimizing and addressing loss and damage associated with the adverse effects of climate change in developing country Parties that are particularly vulnerable to these effects"*

Acknowledging that we do have a crucial role to play, let us try and deconstruct some of these climate risks into insurance parlance, to appreciate the diversity and complexity of risks involved. According to Savitz (2019), when we divide insurance companies into three categories: Property & Casualty, Medical, and Life & Annuity we can notice that all these categories confront various risks related to climate change phenomena. Although not exhaustive, climate risks can be allocated per insurance class as outlined below:

- ***Property & Casualty***
  - **Infrastructure**

    Climate change phenomena (floods, storms, rising sea level, extreme weather events, etc.) increase the frequency and severity of weather-related disasters and loss events. These changes affect not only properties but also, infrastructure (water supply, transportation, roads, power plants, etc.).
  - **Economic sectors**

    According to the European Commission (2015) climate change affects the economic sectors sensitive to changes in temperature and precipitation levels, such as agriculture, forestry, energy, and tourism. Extreme weather events and natural disasters also generate important business interruption losses as well as company property damages.

- **Property & Casualty**

Water damages can be caused by hurricanes, tornadoes, severe downpours, hailstorms, flash floods, etc. Serious climate disasters bring with them significant human casualties.

- *Medical*
  - **Air pollution**

Changes in wind patterns, the ecosystem and temperature affect air pollutant levels, especially ground-level ozone, and airborne particles concentrations, which play a significant role in human health. Additionally, wildfires and biomass burning generated by high temperatures reduce air quality as a result of different gases and compounds that are spread in the atmosphere (carbon monoxide, nitrogen oxides, etc.).

  - **Allergens**

Warmer temperatures, reduction of the numbers of cold days, and exposure to different air pollutants can increase levels of pollen concentration and pollen seasons with direct effects on allergic diseases: asthma and hay fever.

  - **Extreme temperature**

Heat waves can affect the cardiovascular, cerebrovascular, and respiratory systems, especially in older people. These disruptions of the temperature can increase the number of patients with dehydration, nephritis, heat stroke, cardiovascular disease, respiratory disease, cerebrovascular disease, electrolyte disorders, kidney disorders, etc.

  - **Floods, droughts, and heavy rainfall**

Flood events can increase the risk of waterborne disease, respiratory infections (as a result of mold contamination) and can result in injuries and mortality. Droughts can generate a decrease of water quantity and quality as a direct result of water pollution with viruses, protozoa, and bacteria that generate different infectious diseases and gastrointestinal illnesses.

  - **Vector-borne diseases**

Climate change also generates changes in the distribution and behavior of insects and animals. Due to the distribution and expansion of these vectors, there is an increased risk of vector-borne diseases like Lyme, Malaria, Chagas disease, dengue fever, West Nile virus, Onchocerciasis, yellow fever, Leishmaniasis, Chagas disease, etc.

- *Life & Annuity*
  - Lastly, but certainly not least, climate change will adversely impact human mortality. As characterized by WHO (2014), climate change coupled with population growth creates mortality risk induced by heat and flood related mortality risks. Similarly, the US Centre for Disease Control and Prevention outline how air pollution, changes in vector ecology, increasing allergens, water quality impacts, water and food supply impacts, extreme heat and severe weather all have potentially lethal effects on human health.

Furthermore, according to Transparency International (TI) Kenya and Germanwatch (2019)

climate risk insurance can be distinguished furthermore as micro-, meso - or macro-level insurance, according to who takes the policy. Microlevel insurance is provided to individuals directly, an example of this is the R4 Rural Resilience Initiative that was launched in 2011 by the World Food Programme and Oxfam America providing insurance for farmers in Ethiopia, Senegal, Malawi and Zambia, and piloting in Kenya and Zimbabwe. In meso-level insurance, a risk aggregator serves as the policyholder; risk aggregators can be communities or community-based organizations, microfinance institutions, non-governmental organizations, or cooperatives. An advantage of meso-level insurance is that it can build on existing structures and distribution channels. An example is the African and Asian Resilience in Disaster Insurance Scheme (ARDIS) by Vision Fund. It allows existing microfinance institutions to provide post disaster recovery lending to smallholder farmers – mostly women – in Cambodia, Kenya, Malawi, Mali, Myanmar, and Zambia. In the case of macroinsurance, governments may be provided insurance as sovereign entities or through multinational risk pools. States insure themselves against the potential impacts of climate-related risks. The African Risk Capacity (ARC) established by the African Union is an example for such a multinational risk pool.

From the above, despite the gloomy forecast on climate change, some consolation can be found in the advancements of finance and indeed insurance at a global level at seeking to provide relevant solutions to climate risk. Much more needs to be done however, as Swiss Re highlight, rising weather-related catastrophe losses will translate into USD 149–183 billion of premiums, increasing global property premiums by 33-41% between 2020 and 2040. Additionally, an escalation of climate risks such as floods and wildfires, will increase weather-related insured claims and premiums. Swiss Re estimate, that in advanced economies, weather-related insured losses could increase by 30–63% by 2040. However, as pointed out by the Insurance Development Forum (IDF, 2021) emerging economies such as Africa face the additional challenge of narrowing the insurance protection gap, this is "the difference between economic losses caused by disasters, and the amount of those losses covered by insurance coverage." IDF valuate the potential size of the global insurance protection gap at $162.5bn, with emerging economies accounting for $160bn (96%) of the same. Furthermore, IDF highlight that only 1% of natural disaster losses in developing countries between 1980 – 2004 was insured, compared to 30% in developed countries. Though international funding is assisting African countries fill the gap, for example World Bank's recent US$ 150 million credit to support community identified and locally led climate resilience projects in all rural wards in Kenya, unlocking local support and funding will be pivotal.

The onus, therefore, on the finance and insurance sector in tackling climate change in Africa is huge. As insurance intermediaries, our role as risk advisor must include climate related risk identification and mitigation for clients in vulnerable sectors as well as those who may be indirectly affected such as the food, education, and healthcare sectors. Moreover, the insurance industry at large must intentionally innovate climate change solutions across the micro, meso and macro level, ensuring pricing, especially at the micro level, is favourable enough to incentivize uptake. The African finance and insurance sector will also have to invest internally on the necessary skills and competencies, both human and technological, to enhance its overall climate risk solutions service delivery. Buy-in from reinsurers will also be pivotal, and global disincentives on non-renewable businesses

could be enforced in Africa through reinsurance agreements. The African insurance industry should also seek to join in meaningful global sustainability programs such as the Net Zero Insurance Alliance, whose members seek, amongst other commitments, to "engage with clients and potential clients, particularly those with the most greenhouse gas (GHG) intensive and GHG-emitting activities, on their decarbonization and net-zero transition strategies" and "develop and offer insurance and reinsurance products, solutions and arrangements for low-emission and zero-emission technologies and nature-based solutions that are key to the net-zero transition". Additionally, as announced during COP26, twelve donor governments pledged $413 Million for the Least Developed Countries Fund (which comprises almost 30 African countries), that helps recipient countries address their short-, medium- and long-term resilience needs and reduce climate change vulnerability in priority sectors and ecosystems.

Insurance though, is not a panacea for climate change, it should be part of a multi-stakeholder "toolkit" that includes, among others, risk awareness and understanding, prevention and risk reduction, plan for disaster response and protection gap financing. We must do as much as we can, as fast as we can, because, as Ms. Amina Mohammed, Deputy Secretary General for the UN declared, "*We are the last people who can prevent catastrophe on the planet. We have no excuse for failure*."

Kimathi Mwenda | Manager - Business Intelligence | Minet Kenya

References

https://www.e-ir.info/2021/09/28/opinion-what-climate-code-red-means-for-africa/ | https://www.fsdafrica.org/news/the-role-of-insurance-in-climate-change-and-sustainable-development/ | https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement | https://unfccc.int/sites/default/files/resource/cma3_auv_2_cover%20decision.pdf | https://wwfint.awsassets.panda.org/downloads/backgrounder___comparing_climate_impacts_at_1_5c__2c__3c_4c.pdf | https://wwfint.awsassets.panda.org/downloads/sr1_5_regional_impacts_and_the_1_5_degree_climate_target.pdf | https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf | WMO ATLAS OF MORTALITY AND ECONOMIC LOSSES FROM WEATHER, CLIMATE AND WATER EXTREMES (1970–2019) | https://www.bis.org/bcbs/publ/d517.pdf | Cartwright. 2015. 'Better Growth, Better Cities: Rethinking and Redirecting Urbanisation in Africa'. Working Paper. London and Washington, DC: New Climate Economy, Global Commission on the Economy and Climate. Available at: http://newclimateeconomy.report/2015/wp-content/uploads/sites/3/2015/09/NCE2015_APP.pdf | Kareem, B., Lwasa, S., Tugume, D., Mukwaya, P., Walubwa, J., Owuor, S., Kasaija, P., Seviiri, H., Nsangi, G., and Byarugaba, D. 2020. 'Pathways for Resilience to Climate Change in African Studies', Environmental Research Letters 15. Available at: https://iopscience.iop.org/ article/10.1088/1748-9326/ab7951 | Cartwright. 2015. 'Better Growth, Better Cities: Rethinking and Redirecting Urbanisation in Africa'. Working Paper. London and Washington, DC: New Climate Economy, Global Commission on the Economy and Climate. Available at: http://newclimateeconomy.report/2015/wp-content/ uploads/sites/3/2015/09/NCE2015_APP.pdf | Zermoglio, F., Steynor, A. and Jack, C. 2015. 'Climate Change and Health Risks in Senegal'. Washington, DC: United States Agency for International Development (USAID) | Kareem, B., Lwasa, S., Tugume, D., Mukwaya, P., Walubwa, J., Owuor, S., Kasaija, P., Seviiri, H., Nsangi, G., and Byarugaba, D. 2020. 'Pathways for Resilience to Climate Change in African Studies', Environmental Research Letters 15. Available at: https://iopscience.iop.org/ article/10.1088/1748-9326/ab7951 | https://www.banktrack.org/download/climate_change_and_the_financial_sector_an_agenda_for_action_full_report_/wwf_allianz_climatechange_report_june2005.pdf | Savitz, R., Gavriletea, M.D. (2019), "Climate Change and Insurance", Transformations in Business & Economics, Vol. 18, No 1 (46), pp.21-43 | Haines, A., Kovats, R., Campbelllendrum, D., Corvalan, C. (2006), "Climate Change and Human Health: Impacts, Vulnerability and Public Health", Public Health, Vol. 120, No 7, pp.585-596, doi: 10.1016/j.puhe.2006.01.002. | Sheffield, P.E., Knowlton, K., Carr, J.L., Kinney, P.L. (2011), "Modeling of Regional Climate Change Effects on Ground-Level Ozone and Childhood Asthma", American Journal of Preventive Medicine, Vol. 41, No 3, pp.251-257, doi: 10.1016/j.amepre.2011.04.017 | Akagi, S.K., Yokelson, R.J., Wiedinmyer, C., Alvarado, M., Reid, J., Karl, T., Crounse, J., Wennberg, P. (2011), "Emission factors for open and domestic biomass burning for use in atmospheric models", Atmospheric Chemistry and Physics, Vol. 11, pp.4039-4072, doi:10.5194/acp-11-4039-2011.
Houser, T., Hsiang, S., Kopp, R., Larsen, K., Bloomberg, M.R., Steyer, T.F., Paulson, H.M. (2015), "Health", in: T. Houser (Ed.), Economic Risks of Climate Change: An American Prospectus, Columbia University Press, New, York, pp.75-84 | Schär,

C., Vidale, P.L., Lüthi, D., Frei, C., Häberli, C., Liniger, M.A., Appenzeller, C., (2004)," The role of increasing temperature variability in European summer heatwaves", Nature, Vol. 427, pp. 332–336 | Thomas, F., Sabel, C.E., Morton, K., Hiscock, R., Depledge, M.H. (2014), "Extended Impacts of Climate Change on Health and Wellbeing", Environmental Science & Policy, Vol. 44, December, pp.271-278, doi: 10.1016/j.envsci.2014.08.011 | Franchini, M., Mannucci, P.M. (2015), "Impact on Human Health of Climate Changes", European Journal of Internal Medicine, Vol. 26, No 1, pp.1-5, doi: 10.1016/j.ejim.2014.12.008.

Rey, G., Jougla, E., Fouillet, A., Pavillon, G., Bessemoulin, P., Frayssinet, P., Clavel, J., Hémon, D., (2007), "The impact of major heat waves on all-cause and cause-specific mortality in France from 1971 to 2003", International Archives of Occupational and Environmental Health, Vol. 80, No 7, pp.615-626, doi:10.1007/s00420-007-0173-4 | Bezirtzoglou, C., Dekas, K., Charvalos, E. (2011), "Climate changes, environment and infection: facts, scenarios and growing awareness from the public health community within Europe", Anaerobe, Vol. 17, No 6, pp.337-340, doi: 10.1016/j.anaerobe.2011.05.016 | Penning-Rowsell, E., Floyd, P., Ramsbottom D., Surendran, S. (2005), "Estimating injury and loss of life in floods: A deterministic framework", Natural Hazards, Vol. 36, No 1-2, pp.43-64 | Jonkman, S.N., Vrijling, J.K. (2008), "Loss of life due to floods", Journal of Flood Risk Management, Vol. 1, No 1, pp.43-56 | Kovats, R.S., Campbell-Lendrum, D., McMichael, A.J., Woodward, A., Cox, J. (2001), "Early effects of climate change: do they include changes in vector-borne disease?", Philosophical Transactions of the Royal Society B, Vol. 356, No 1411, pp.1057-1068 | Sutherst, R.W. (2004), "Global change and human vulnerability to vector-borne diseases", Clinical Microbiology Reviews, Vol. 17, No 1, pp.136-173 | https://apps.who.int/iris/bitstream/handle/10665/134014/9789241507691_eng.pdf | Impact of Climate Change on Human Health, George Luber, US Center for Disease Control and Prevention, found in http://www.actuaries.org/cttees_enviro/papers/rewg_ccandmortality_final_nov2017.pdf | https://tikenya.org/wp-content/uploads/2019/05/Climate-Risk-Insurance-Report.pdf | Sigma Report No 4, 2021| https://www.wto.org/english/res_e/reser_e/iyahen_290421.pdf | https://www.unepfi.org/psi/wp-content/uploads/2021/07/NZIA-Commitment.pdf | https://unfccc.int/news/us-413-million-pledged-for-most-vulnerable-countries-at-cop26 | https://unctad.org/system/files/official-document/ldc2021_en.pdf | https://www.thegef.org/topics/least-developed-countries-fund-ldcf