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Climate Tribune

Covid-19 through a gendered lens

It is crucial that we take a step back in this moment to assess why men are dying more while women are taking on greater responsibilities

Tania Ahmed

Smoking, drinking, not washing hands, a lack of estrogen and an additional X chromosome are all reasons why men are dying more than women when it comes to Covid-19. Behaviourally and biologically, men and women are different, causing men to die anywhere from 10% to more than two times as many women globally.

The difference in death rates is not the only gendered effect, as women are taking on more unpaid care work at home during this era of social distancing and treating Covid-19 patients more but with less pay than their men counterparts. The effect the virus has had is similar to that of climate change disasters, and it is crucial that we take a step back in this moment to assess why men are dying more while women are taking on greater responsibilities, both at home and in the public domain.

Let's start with biology. The evidence is clear - in China, 64% of men compared to 36% of women suffering from Covid-19 died from the disease, according to the Global Health 50/50 Initiative.

The pattern is confirmed in France, Germany, Italy, South Korea, and Spain. In Italy, 71% of the deaths were male. Two times as many men as women died in Spain. Although men and women are infected at similar rates, men are dying more. One biological reason could be that women have stronger antiviral responses, as they have higher levels of oestrogen.

Women also have the advantage of an additional X chromosome, which harbours many genes that regulate the immune response. Men have only one. Furthermore, women's bodies inherently function differently, as they are built to carry a foetus for nine months without rejecting it as an invader. These gendered differences are already evident in blood samples collected from Covid-19 patients in China.

There are several social and behavioural reasons why men are more likely to die if infected by Covid-19. Firstly, men smoke and drink much more than women, causing a higher incidence of cardiovascular and pulmonary disease. Men are less likely to follow public health advice and seek treatment when they first start exhibiting symptoms.

Furthermore, men wash their hands less than women do. According to a 2013 Michigan State University field study, women wash their hands significantly more often, use soap more often, and wash their hands for a longer period of time than men. Each of these behaviours leaves men more susceptible to the virus than women.

Despite taking more men's lives, women's lives have become more stressful in the era of Covid-19. Women are left with more unpaid care work, such as raising children in the wake of school closures, looking after an ill family, cooking, and cleaning, without adequate support from men.

With responsibilities heightened and less economic stability, women are facing more mental illness. One American study reports that 16% of women, compared to 11% of men, are experiencing severe mental illness as a result of the pandemic.

For many women, staying home means facing unrelenting domestic violence. Already cases have shot up worldwide. In China, local police stations had three times as many domestic violence cases reported in February compared to the number in the same month of 2019, according to Wan Fei, the founder of anti-domestic violence non-profit.

In France, cases increased by 32% in one week, according to the Secretary of State for Gender Equality Marlène Schiappa. Furthermore, women make up 70% of the healthcare workforce worldwide and are the main caretakers of Covid-19 patients.

Despite their greater numbers in healthcare, the disparity in pay remains, as women make 28% less than their men counterparts in the field. For all these reasons, the Covid-19 pandemic brings to the forefront of the existing gender disparities in society.

PIXABAY

This disparity is not a surprise considering that climate change disasters highlight similar gendered effects, due more to social constructs than biology. For example, the 1991 cyclone in Bangladesh killed women disproportionately more than men because of gender-differentiated roles and lack of access to and control of resources.

The same can be said for cyclones Sidr and Aila, which hit in the years 2007 and 2009 respectively. In the aftermath of hurricane Katrina, which hit the United States in 2005, rates of gender-based violence in Mississippi increased from 4.6 per 100,000 to 16.3 per 100,000 a year later, according to Anastario et al (2009). Women who survived each of these climate disasters had to care for their children despite inadequate support and increased violence.

Knowing all this, one might wonder what they can do to 1) reduce the death rate for men and 2) improve the quality of life for women. At the global level, nations need to step up in collecting data on gender differences in Covid-19 deaths. This information should be used to shape public health messaging.

Men, especially elderly men, need to know that their risk is greater to encourage better hygiene. At the domestic level, men need to support women in caretaking activities, such as raising children, cooking, and cleaning.

This work is valuable and crucial despite being unpaid. Lastly, whether man or woman, it is important that we take a step back and become aware of our positions in society, including our power, privileges, and roles. ●

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Financing for adaptation

Despite financial pledges and rhetoric on the importance of climate adaptation for vulnerable nations, the lack of tangible finance flows tells a different story. If the most at-risk communities are to adapt before it's too late, we must unblock adaptation finance now

Mizan R Khan and Saleemul Huq

We already live in a climate-changed world. The recent Intergovernmental Panel on Climate Change (IPCC) special reports warn us of the increasing frequency and magnitude of climate hazards. Extreme weather events are now the 'new normal'. The IPCC's Special Report on 1.5°C presents a stark picture of the much higher risks for natural and human systems of global warming of 1.5°C compared with current global temperatures. At 2°C, the risks to those systems are yet higher.

> Climate impacts have temporal and spatial dimensions

The IPCC argues that these risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options. However, the impending emissions pathway points to a global temperature rise far above that pledged at Paris in 2015. Even if all the collective commitments under the 170 submitted nationally determined contributions (NDCs) are fully complied with, the world will witness warming of 3°C.

Climate impacts have temporal and spatial dimensions. Because of the ratchet effect caused by previously emitted greenhouse gases, the future impacts will be much more severe. Developing countries will overwhelmingly bear these impacts. The foremost victims are the small island developing states (SIDS) and the least developed countries (LDCs).

Many of these countries can be regarded as 'nano emitters' with the least capacity to adapt. Oxfam's 2019 report, Who takes the heat? Untold stories of climate crisis in the Horn of Africa and Mozambique, shows that while climate impacts are likely to cause an average reduction of about 0.4 per cent of developed countries' GDPs, the reduction for low-income countries (LICs) will be almost 2 per cent. Climate impacts are likely to push an additional 100 million people into poverty by 2030. LICs' geographic location and their low level of development combine to increase their vulnerability.

Here is the rationale of support for climate adaptation for these countries. The basic provisions of the United Nations Framework Convention on Climate Change (UNFCCC), such as Articles 3, 4.3 and 4.4, and Articles 9.1, 9.5 and 9.7 of the Paris Agreement, impose obligations on developed countries to provide climate finance transparently to developing countries.

Preferential treatment should be given to the SIDS and LDCs. Articles 4.3 and 4.4 provide for assistance with "new and additional... adequate and predictable" finance, particularly for

> We need increased investment of adaptation finance to enhance the adaptive capacity of local communities, facilitated by local governments, with a focus on youth and women

meeting the costs of adaptation. These provisions implicitly refer to the 'polluter pays' principle.

As a response, developed countries pledged $30 billion as 'fast-start' finance during 2010-12 and $100 billion a year by 2020, subsequently shifted back to 2025. But the availability of support is orders of magnitude smaller than the needs estimated by various agencies, which range from $86 billion to more than half a trillion dollars a year.

Reports from the Organisation for Economic Co-operation and Development show the availability of around $60 to $70 billion a year from both public and private sources. But research from Oxfam shows that countries in need have received less than $10 billion during the last decade from UNFCCC funds including the Green Climate Fund (GCF). Oxfam's calculations also show that LDCs are receiving just $2.4 to $3.4 billion a year in adaptation finance - or the equivalent of less than one cent per person per day. A Himalayan gulf between the claimed delivery and actual receipts continue to damage mutual trust.

The International Institute for Environment and Development shows that only 10 per cent of adaptation finance reaches the local level - or just 2 per cent of the global total of climate finance flows from developed to developing countries.

Despite the repeated pledges of balanced allocation between mitigation and adaptation, including the GCF's commitment to an equal share, more than 80 per cent of climate finance goes towards mitigation. And when it comes to the adaptation finance that is provided, the picture is even bleaker for the SIDS and LDCs, with less than 20 per cent of adaptation finance going to them (in contrast with the GCF's commitment that at least 50 per cent of adaptation finance should go to vulnerable countries).

More disquieting is the fact that grants account for only a third of bilateral climate finance, and a paltry 10 per cent of multilateral funding.

The delivery of adaptation finance is also extremely fragmented: the number of public and private financing channels range from 99 to over 500, including more than 20 multilateral funds. There are too many overlaps, necessitating huge transaction costs and generating frustration both at the delivery and receiving ends. All this compromises the effectiveness of adaptation finance support.

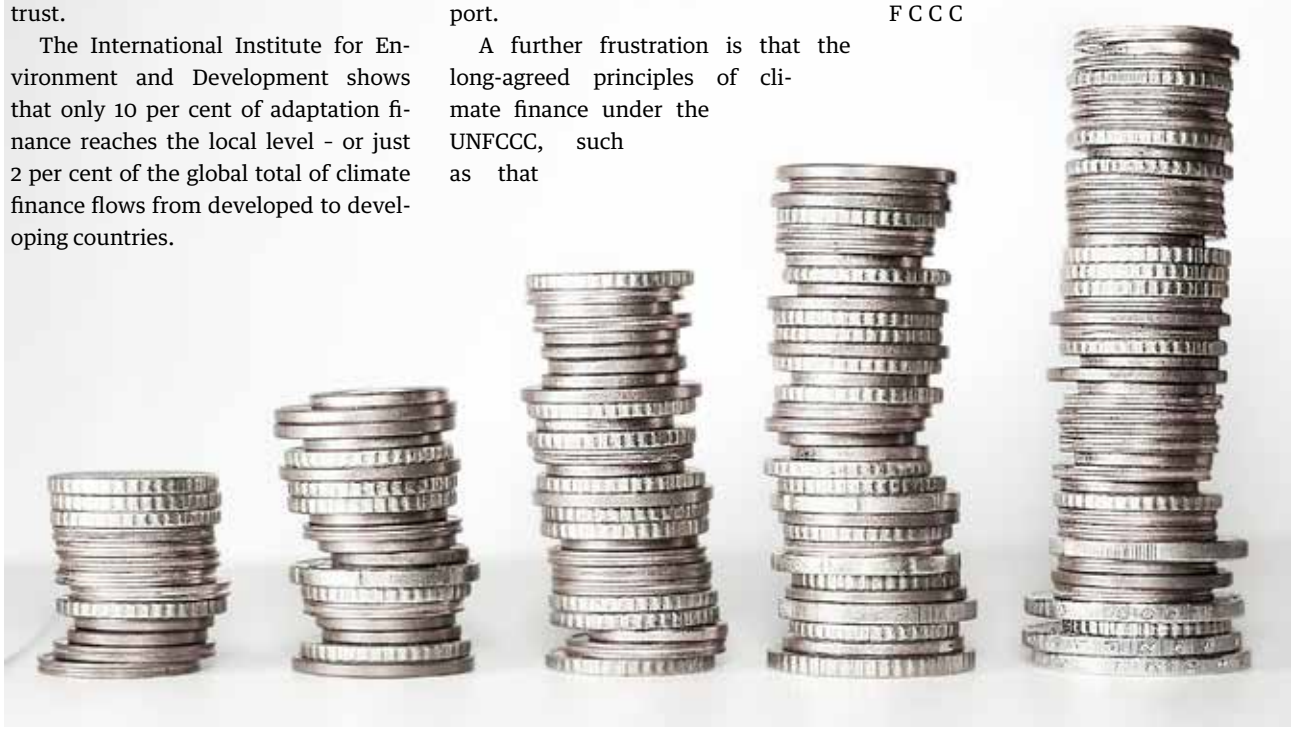
A further frustration is that the long-agreed principles of climate finance under the UNFCCC, such as that financing should be "new and additional" have been totally diluted, with no signs of their resuscitation. Climate finance has been an extremely rancorous issue in UNFCCC negotiations since the $100 billion pledge of 2010. But the absence of an agreed understanding of what climate finance is, accompanied by persistent opposition by many developed countries, gives those countries the wiggle room for creative accounting.

The decision rule adopted at COP24 on reporting of climate finance under Article 9.7 is relatively permissive, allowing countries to report the full value of loans, rather than the 'grant equivalent' share as climate finance. So the double - or triple - counting of the same money, or the repackaging of development assistance as climate finance, continues.

Looking through the lens of justice and equity, we can firmly conclude that adaptation finance is failing us totally.

As power manufactures consent from the weak, developing countries have had to forego any option of claiming compensation. Climate governance, rooted in neoliberal values, presents distinct challenges.

Within the post-Paris context, we are witnessing the further neglect of distributive justice as a guiding principle. This allows the naked pursuit of short-term self-interest, the de-emphasising of public responsibility in favour of the market and private sector, a focus on transparency without robust systems of accountability, and exclusive decision-making processes in which core decisions are increasingly made bilaterally between powerful states outside the consensus-based UNFCCC process. This has resulted in harping on voluntary action, and a growing emphasis on leveraging private finance and market-based strategies.



Finally, we have some suggestions for COP26 on how to scale adaptation finance and improve its effectiveness:

- To agree to a scheme that when a country fails to reduce emissions as pledged in the NDCs, the 'failed' amount should be valued financially. This should then be transferred towards adaptation support (to one or more of the existing UNFCCC funds).
- The evolving consensus on carbon pricing globally should be translated into a decision by COP26 under the UK's leadership, and the money delivered as support for adaptation.
- As the private sector appears less interested in adaptation because of the inefficacy of market mechanisms (with the exception of profit-based insurance), a specified share of their profits should be dedicated as adaptation finance as their corporate climate responsibility, both at national and global levels.
- No more bureaucratic dilly-dallying by the GCF to direct access to adaptation finance. It should focus on ensuring a robust accountability mechanism at the receiving end.
- The extreme fragmentation of adaptation support warrants a 'thinning out' of the weedy tendrils of agency bureaucracies, which often slow or prevent finance reaching the target communities.
- We need an agreement between development partners and developing countries that a majority share of adaptation finance must go directly to the most vulnerable communities, including women.
- We need increased investment of adaptation finance to enhance the adaptive capacity of local communities, facilitated by local governments, with a focus on youth and women.
- Finally, we need to reach an understanding of what climate finance and adaptation finance is, both for public and private sources. ●

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From pandemic to opportunity: Youth, online platforms and climate change

If you do what you have always done, you will get what you have always got.

Jennifer Khadim and Saqib Huq

It is crucial to understand that climate change poses uncertainty in every sphere of our lives. Going with the 'business as usual' mindset is no longer an option. The recent global pandemic is just an example of what life may feel like in uncertain times and circumstances. However, every situation in life can be a way to learn something new, unique, or innovative. The current Covid19 Pandemic is no different.

The crisis has pushed students into a home-bound, online education system not just in Bangladesh, but worldwide. Primary, secondary, and higher education institutions are looking for effective ways of delivering the designated lessons for their current semesters. In Bangladesh, the lessons are (mostly) being delivered online through meeting platforms, by email or through television broadcasts. In some cases, hosting classes via video conferencing has proved messy, the infrastructure in rural, remote areas aren't always capable of supporting lengthy video calls. Furthermore, it has put a strain on the data and credit balance of young people (who in many cases do not have access to broadband/wi-fi and rely solely on mobile data).

We should think about how we can bring the most out of such a crisis in terms of continuing education. Can a blended educational practice hold the key to keeping education on track? The mainstream education system in Bangladesh have long been in need of reforms, such as; shifting away from rote-learning and emphasis on memory over critical analysis of topics, to large (and often unwieldy) classroom of students rather than a more dedicated approach with smaller sizes and more room for discussion and interactions.

Additionally, we could think as far as considering mental health issues and emotional education as part of a "balanced diet" for young people, which had often been ignored in pursuit of high grades and job prospects. In light of these unique circumstances that the pandemic has dumped us all in, why is it so necessary to try and get back to things as they were before, without fully considering if things before were actually effective, beneficial, morally and socially just?

In our sector, climate change and development, the equivalent to formal education is termed as 'capacity building', which can range from formal seminars (with presentations and academic experts), to workshops (to discuss and exchange more practical lessons), to trainings (more intensive and task oriented to teach methods/techniques with specific purposes).

Increasingly, it has been a better approach to have a blend of teaching and capacity building techniques, to provide a holistic understanding of topics and allow for better retention of the core ideas (rather than just reciting textbook statistics). The mixed methods approach allows for participants of the sessions to feel more engaged, included and strives to give a better uptake of the intended knowledge and understanding (meaning people are better equipped to apply the teachings and training).

It seems the current 'lockdown' conditions will apply to schools, colleges and universities for the remainder of the school year, as per the governments' instructions, even if other businesses and markets are able to open under revised social guidelines. Therefore, it seems the best option is to try and shift our age-old educational methods and incorporate new and innovative techniques to engage with the youth of today, soon to be the leaders of tomorrow.

How to engage students in online learning?

The current Bangladesh country representative of UNICEF, Tomoo Hozumi mentioned the importance of keeping children connected to their studies is the key to not lose students from schools. To do that, implementing alternative ways to face to face education will be the best option during emergency responses.

While the public TV channels have initiated certain hours for school lessons, it might be better to develop a dedicated broadcast channel that delivers classes throughout the day, as many young people (especially girls) are also engaged in other household activities and chores, so it may allow students a better opportunity if the classes were more flexible in their timings.

KORIE CULL

Online classes/video conferencing should be in supplement to reading/written assignments on educational topics and allow for interactive discussions to enhance the students' understanding. This can guide teachers/trainers to understand where the knowledge gaps exist and allow for a more interactive lesson, something that is harder to achieve through one-way broadcasting of lessons, as everyone learns and retains information differently.

Many online platforms allow for video recording of sessions, or even through podcasts (audio recording), which can aid students that lack good internet access and have difficulty attending live sessions. Attending physical classes/being at school is not only necessary for education but also to help young people develop social skills and relationships and maintain peer-peer interactions. Encouraging students to also build 'peer-peer learning groups'

can aid in deepening their understanding as well as provide support networks for students that are struggling during these new methods.

Teachers, trainers, and educators can rely on a wealth of online materials to help kickstart these virtual learning sessions. From websites that have entire syllabuses, to smaller videos explaining topics, in these times where students lack the intensity of in-person classes, it's imperative that they be guided through a variety of sources and expertise.

Most of the climate change seminars have turned into webinars at present time. These are attracting young people to get involved with climate change scientists and academic experts, policy - makers and development sector professionals. For higher education students, this allows them a broader knowledge base to learn and understand certain topics and expands their thinking and ideas, which is critical to tackling the issues that are likely to develop in their lifetimes.

As a country, it's critical that we get engaged in the broader discussions on what services need to be made available for young people? What measures can help to shape a more well-rounded learning? It may not be possible to provide all types of teaching, where face to face sessions are more necessary (topics that require special equipment or surroundings), however, attempting to adopt new practices will have a long term benefit of formulating efficient contingency plans and shape our younger generations into becoming future leaders. Better preparation strategies for dealing with current and future crises, those that are more inclusive and participatory for the youth, will set a pathway for better actions and solutions.

Climate Change and Covid-19: Global crises

There have already been multiple parallels being drawn between the current pandemic and the overarching climate change crisis that looms over the world. When we talk about climate change, particularly in Bangladesh, painting a dystopian future becomes effortless.

The strategies to deal with climate change impacts are not so different from the current global crisis. Though it may not require a quarantine/lockdown, but the climate crisis would need a systemic reform of almost every sector and segment of society. That can only be done by educating people (especially the youth) in understanding the severity of the issues and being innovative in what actions and solutions can be applied to them.

Therefore, what is central to developing effective strategies to take climate actions are to engage communities to act as a whole, while being aware of and addressing their unique challenges. In the current context, the youth can also play an integral part in identifying those challenges, brainstorming and initiating solutions that are fit-for-purpose. Including young people in support systems for 'vulnerable communities' can not only achieve a more connected link to groups that are often marginalized, but also shape the youth in understanding the inter-linkages between societal and developmental challenges.

With the aid of mobile technology, the youth can relay current shortfalls and highlight areas for improvement that are in line with the needs of the under-privileged and vulnerable communities. Capturing and delivering the information in a variety of formats, story - telling via video, audio or through plain writing, can serve as records and documentation that is necessary in developing effective policies and strategies.

The youth can approach communities which are socio-economically challenged, people that lack access to internet/technology, even engage their own groups and networks which can develop their own skills at establishing social connections, problem/solution analysis, information gathering and fact-finding.

These local context and essential knowledge can serve as discussion topics for addressing in their online seminars, allowing them to better identify their current issues and develop their critical thinking of approaching solutions. This helps in developing their transferable skills and adds value to their overall education and knowledge base.

The schools may be locked down for the remainder of the year, but it's only the buildings/facilities that are shut, the need for continuing young peoples' education in more creative methods and future-proofing their knowledge is an indispensable obligation. We cannot stop the learning process during an emergency.

The current state should be seen as good practice and open for experimentation and innovation. Covid19 was not a problem until a few months ago and society cannot deal with it through 'business-as-usual' practices. Similarly, the problems our youth will face in future may not exist currently, so it would be folly to think they can tackle them without educating them more critically and creatively. ●

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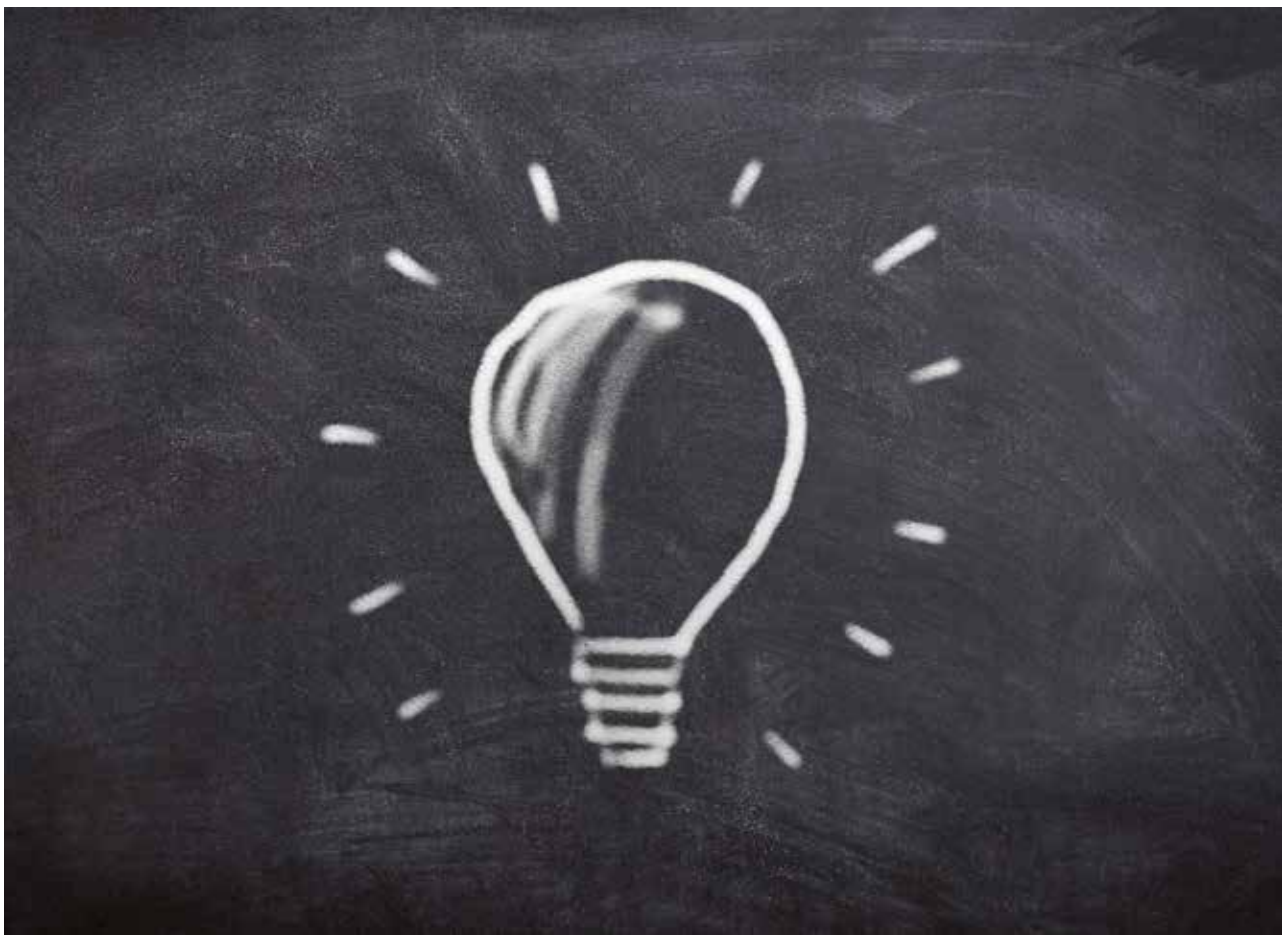
> The strategies to deal with climate change impacts are not so different from the current global crisis



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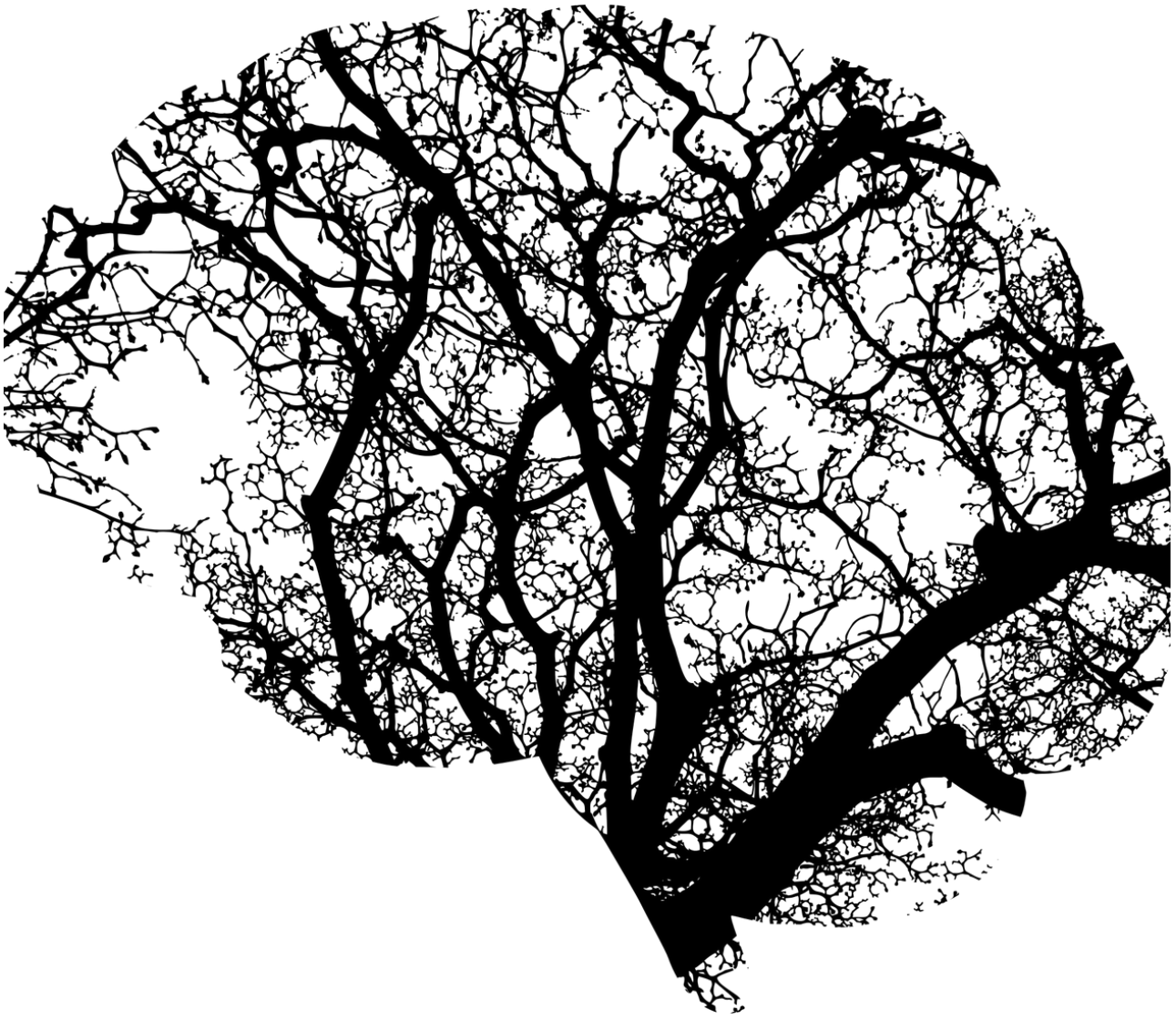
Artificial intelligence to combat climate change: A legal-ethical perspective

In connection with climate change adaptation and mitigation, AI that includes machine learning and deep learning can play a mammoth role. But there are also legal and ethical concerns involved in deploying AI.



Md Mahatab Uddin

Last year, the planet Earth experienced three alarming incidences of bushfires that took place in three different continents- America, Africa, and Oceania.

Statistics show that 2019 was the second warmest year on record (Washington Post, 2018). As per the World Meteorological Organization's (WMO) provisional statement on the State of the Global Climate, in 2019 (January to October) the global average temperature was about 1.1°C above the pre-industrial baseline *ie 1850-1900*.

In fact, all over the last decade (2010-1019), the world experienced exceptional heat, retreating ice and record sea level rises, which scientists believe mainly caused by increased greenhouse gases resulting from human activities (WMO, 2019).

Hence, WMO Secretary-General Petteri Taalas states that if global temperature continues to increase at current trend, by the end of the 21st century the Earth may experience 3-5°C increases in global temperature.

To combat climate change, although countries have become united under the umbrella of the 1992 United Nations Framework Convention on Climate change (UNFCCC), as per Taalas the steps taken by the states are not adequate to meet 'climate change targets and rein in temperature increases'. Accordingly, he adds, "[I]t is worth repeating once again that we are the first generation to fully understand climate change and the last generation to be able to do something about it" (WMO, 2018).

However, strategies to combat climate change require development of strategies for adaptations (preparedness to adjust with adverse impacts of climate change) and mitigation (preparedness to reduce as well as offset greenhouse gases emissions in atmosphere).

Global community as well as UNFCCC considers technologies (widely known as environmentally sound technologies or green technologies) as an important tool of realization of adaptation and mitigation. Mitigation of greenhouse gas requires advanced technologies or energy efficient technologies in transportation, buildings, electricity systems, and land use, etc sectors (Williams et al).

Besides, prediction of greenhouse gas impacts of old or newly invented technologies is also important for mitigation. Adaptation to climate change requires advanced technologies like risk prediction, climate modeling, disaster management or resilience planning (WMO, 2016).

In connection with climate change adaptation and mitigation, artificial intelligence (AI) that includes machine learning and deep learning can play a mammoth role. A recent study shows that machine-learning can intervene at least in thirteen essential sectors for battling climate change.

These sectors include building better electricity systems, monitoring agricultural emissions and deforestation, creating new low-carbon materials, predicting extreme weather events, making transportation more efficiently, reducing wasted energy from buildings, arranging geo-engineering for a more effective earth, and providing people with tools to reduce their carbon footprint, etc (Hao, 2019) .

Hence, the ultimate key player in battle against climate change will be applications of AI based technologies, which has already been denoted as 'game changer' by the conglomerate Microsoft before launching its 'AI for Earth' program and committing $50 million over five years for research and development of new AI applications.

However, the endeavour for developing and employing AI to combat climate change has also some legal and ethical concerns. From the perspectives of public international law on climate change, although the 2015 Paris Agreement does not directly refer to the notions - artificial intelligence, preamble to the agreement recognizes 'the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific

knowledge.'

AIs have obviously fallen under the notion of 'the best available scientific knowledge'. Besides, Art 4(1) of the Agreement acknowledges the necessity of application of 'the best available scientific knowledge' for climate change mitigation and Art 7(5) calls for the same for climate change adaptation (Paris Agreement 2015).

One important ethical concern as to global climate change is that countries which were least responsible for greenhouse gas emissions in the past are likely to suffer the most serious impacts. This issue is also considered as a 'historical contribution' factor of the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), which is also a guiding principle of the UNFCCC.

Another important ethical concern is that the most victims of climate change are not in a position to blame or hold us to account. This is because the most climate change victims are either poor communities of the world or unborn child of future generations or non-human creatures *eg plants and animals*.

This issue is considered as 'respective capability' factor of the above-mentioned CBDR-RC principle of the UNFCCC. However, these factors are not only fallen under the discourse of ethics but also dealt under the concept of environmental justice or climate justice as well as principles of equity and sustainable development of international environmental law (ATD Fourth World) (Uddin, 2016) (Pauw et al 2014). One can bring the issue even in the light of transitional justice (Klinsky et al, 2018).

Consequently, battling climate change through employing AI has two global concerns. First, it is essential that innovation, development and deployment of AI based environmentally sound technologies should take place urgently.

Second, such innovation should not be limited merely within the realm of the industrialized developed world. Rather, it is important to make sure that poor communities of developing and least developed countries (who lack capabilities of access to those technologies) do also have access to those technologies.

In line with this idea, the Paris Agreement first requires that technologies essential to battle climate change are transferred to the poor and developing countries (Art 10). Thereafter, it also calls for financial cooperation that includes cooperation for innovation, development and transfer of the required technologies (Art 11).

Successful innovation, transfer and deployment of AI are also dependent on factors like creating suitable environment for innovating AI applications, creating suitable market for newly innovated AI technologies, and above all willingness of both public and private sector entities to invest in innovation, development and transfer of those kinds of AI technologies, which are essential for battling climate change (Cf Erzurumlu and Erzurumlu, 2013).

> Bangladesh should also start thinking about how to deal with legal and ethical consequences of the possible errors and mistakes to be made by AI based climate technologies

No single country can bring this into reality through its own initiative. All countries need working together and coming to a consensus as to methods of cooperating with each other in innovating and implementing AIs to combat climate change, where necessary.

In addition to the regular discussion on innovation and transfer of environmentally sound technologies, the issue of cooperation in innovation and transfer of AIs demands special attention from the Conference of the Parties (COPs) to the UNFCCC. If Parties to the UNFCCC can adopt special climate financing provisions for development and innovation of AI based climate friendly technologies, it might open a new horizon in the UNFCCC paradigm of battle against climate change.

On the national level, in the context of above discussions, Bangladesh being one of the most climate change affected countries of the planet has a threefold task to accomplish soon. First, the country needs to prepare itself as a technically sound and capable place to receive international cooperation for innovation and development of AI based climate technologies. For this, the country should take a vigorous initiative to establish a national research and innovation centre for climate technology innovation that confers special focus on machine learning and AI. Governments might also pay attention to enrich machine learning and AI research potentials in higher educational institutes of the country.

Secondly, Bangladesh should create a favourable environment for innovation and dissemination of climate friendly technologies including AI and machine learning based technologies. Creating a favourable environment for innovation is possible through adopting special laws providing special facilities for foreign and local investment in climate technology innovation. Creating a favourable environment for dissemination of climate technology is also possible through adopting laws which might offer direct or indirect market privileges for these technologies over other technologies.

Finally, Bangladesh should also start thinking about how to deal with legal and ethical consequences of the possible errors and mistakes to be made by AI based climate technologies. In this regard, before passing a set of sound and reasonable laws by the national parliament, the government needs to follow an inclusive preparatory process that must ensure a wide range of citizen's participation.

However, discussion on AI applications, ethics, and tackling climate change will remain incomplete; if some inherently associated ethical aspects of AI technologies *eg 'artificial stupidity'*, *'bias behaviour'* are not discussed.

AIs have a training phase and they 'learn' to identify accurate patterns and act as per their input. But, during the training phase of AIs, it is literally impossible to cover all possible examples that AIs might face in real life. As a result, AIs may sometimes come up with wrong or biased outcomes, which in consequence might bring unexpected circumstances at the implementation stage (Bostrom & Yudkowsky).

The consequences might be more catastrophic while AIs will be employed to deal with climate change like sensitive issues. Till now, international laws on climate change are silent on legal consequences of unintended mistakes or erroneous behaviour of the AI technologies. But, on the national plane, the Bangladesh government should start thinking how to bring potential 'artificial stupidity' or 'bias behaviour' issues of all AI based technologies under the national legal framework. ●

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What makes Satkhira infertile?

The unusual salinity in the soil of Satkhira isn't caused by climate change alone

Sarah Farheen Khan

COURTESY

Climate change has been the cause of the sea-level rise and this slow onset event has resulted in salinity intrusion in the coastal zones of many countries, especially in Bangladesh. Satkhira, located in the south-west coastal region of the country is currently facing the adverse effects of saltwater intrusion and it is posing a grave threat to the rural living and food security. Since agriculture is the mainstay of the people in this region, uncultivable land is nothing but a fountain of sorrow for the farmers.

As salt concentration increases, water becomes highly challenging for the plant to absorb. A plant can as well perish from water stress or drought in such saturated soil if the salt concentration is more than adequate. There has been a progressive escalation in soil salinity in terms of intensity, and affected area over the past decades. There are numerous interacting drivers that influence soil salinity in Bangladesh other than sea-level rise. Satkhira was not always this saline. When the Farakka Barrage was built over Ganges River, it was made to divert water from the Ganges river of India to the Hugli river of Bangladesh.

> There has been a progressive escalation in soil salinity in terms of intensity, and affected area over the past decades

As Bangladesh is a downstream country, water supply significantly decreased with increasing entry of seawater into the Ganges basin. Consequently, it increased the river and groundwater salinity in this region (Gain et al, 2007; Shamsuddin, Xiaoyong, & Hazarika, 2006).

Further, followed by many other human-induced actions making the region extremely vulnerable to hazards and such natural calamities. Building unplanned dams, polders, embankments, and spread of saltwater shrimp farming that requires large bodies of saltwater is why salinity intrusion is increasing bit by bit in this region.

A possible solution for soil salinity reduction

According to the SRMAF Project of The Ministry of Agriculture (2010), it is encouraged to adopt various land and soil management practices including agronomical techniques for reducing the adverse effect of salts. For example, having protective embankment with the provision of the sluice gate, well-levelled land to prevent the accumulation of water in the low-lying patches and to facilitate uniform drainage of excess water, selection of Kharif rice variety, the introduction of winter rice and shrimp cultivation, or storing of excess rainwater for irrigation.

Other than adopting the soil management practices, the least expensive and rapid desalination process that could be used by the Agriculture Ministry may be phytoremediation. As plants are able to extract salt from the soil. However, the necessary step will be to select the appropriate plants with a high tolerance to salinity. In addition, it does not have any after-effect as it is not degrading the soil fertility.

The total amount of salinity affected land in Bangladesh was 83.3 million hectares in 1973, which had been increased up to 102 million hectares in 2000 and the amount has risen to 105.6 million hectares in 2009 and is continuing to increase, according to the country's Soil Resources Development Institute (SRDI).

It is high time for the authorities to take uncompromising policies to transform these barren lands to fertile ones, as agriculture is the largest employment sector of Bangladesh, it is greatly affecting the country's GDP and most importantly the livelihood of the farmers in those regions. ●

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