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CLIMATE CHANGE AS A SECURITY THREAT. LOSSES, DAMAGES AND IMPLICATIONS FOR FUNDING POLICY

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Abstract:

This paper is an argue for considering climate change as a security threat, with all the advantages, disadvantages and implications involved in. Our work provides a condensed scientific explanation of how global warming leads to climate change and extreme weather events, and then frame climate change through both a narrow and broad understanding of security. The main research questions addressed in the study are: In what sense might climate change be viewed as a security threat? What are the advantages and disadvantages of viewing climate change as a security threat? What are the funding policy implications in the context of existing climate justice models? With appropriate literature references we argue that climate change can be viewed as a security threat because of its consequences for migration, civil war and interstate conflict, and for human security. Therefore we address the main advantages for considering climate change a security threat (namely the chance for states to prepare for worst-case scenarios) and the main disadvantages (namely the securitisation of climate change).

An outline of the components of 'loss and damage' policies was made, explaining exactly what sort of measures are required by developing countries and climate-vulnerable countries to respond to climate disasters. Next, four different models for prescribing responsibility onto developed countries for funding climate justice were assessed and critically evaluated. Lastly, concluding remarks covered the overall need for caution when discussing climate change in a security context and the need to ensure a balance is struck between militaristic and humanitarian approaches to climate change.

Keywords: climate change, climate migration, human security, climate justice, funding policy.

JEL: Q54, Q58, I38, J68

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INTRODUCTION

Since 1750, atmospheric concentrations of gases such as carbon dioxide, methane, and nitrous oxide have increased as a result of human activities predominantly occurring in affluent countries (such as industrial agriculture, increases in industrial output, and a rapid uptake of vehicular transport reliant on fossil fuels) (Intergovernmental Panel on Climate Change (IPCC), 2007). This has resulted in an estimated 1.0°C of global warming above pre-industrial levels and it is possible that this could rise to 1.5°C between 2030 and 2052 if the current rate of global warming continues (IPCC, 2018). This rise in global temperature levels fundamentally alters Earth's climate, resulting in what we know as "climate change". This term refers broadly to meteorological changes (such as

temperature rises) and to the consequences of those changes (such as flooding, drought, heat waves, and extreme weather events).

A global temperature increases of the level predicted could result in (and is already contributing to) 1) changes to weather systems and patterns, and 2) melting of parts of the polar ice caps in Antarctica and the North Pole. The former can be characterised as an accelerating factor in more frequent extreme or unusual weather events, such as excess rainfall, droughts, elongated heat waves, and extreme weather events such as Storm Ophelia, impacting parts of the world they would previously have not (IPCC, 2018). The latter is the cause of rising sea levels resulting in the flooding of and destruction of low-lying coastal areas, small islands, and deltas (IPCC, 2018).

Such weather events will have a domino-like effect on humans. Extreme droughts, flooding, hurricanes, or coastal flooding may negatively impact the agricultural sectors of disadvantaged and vulnerable populations (through reduced crop yields or death of livestock). This will severely damage the livelihoods of populations dependent on agriculture and increase their chances of entering poverty. Limiting global warming to 1.5°C as opposed to 2°C could reduce the number of people exposed to climate-related risks and susceptible to poverty by 'several hundred million' (IPCC, 2018).

Within security studies, there exist two broad perspectives that inform how 'security' is defined (Williams, 2008). The first is a narrow definition centred on military power and conflict. Here, security is the 'freedom from' violent conflict, or the possession of a greater arsenal of weapons or a larger military. When viewed in the narrow sense, climate change may be a security threat if it leads to war between countries or civil war between regions. The second perspective informs a broader definition of security, which encompasses humanitarian issues. This sense of security is the "freedom to" live a life unthreatened by poverty or loss of livelihood. In such a context, climate change threatens human security because it threatens the basic requirements for life: flooding or wildfires may destroy homes and businesses, leaving people without livelihoods; extreme drought may kill crops or animals, leaving people without food.

1. CLIMATE CHANGE AS A SECURITY THREAT

Since at least the 1970s, climate change has slowly assimilated itself into security studies as a legitimate concern on the security agenda, being a threat both to nation states and to humanity itself. Nyman (2018) consider that linking climate change to security issues has gained much traction in mainstream policy discourse during the past decades. Such a trend is practiced by various state actors from Western democracies, to predict the security implications of environmental hazards and construct an alarmist discourse aimed at attracting the attention of a broader public or high-level decision-makers (Gverdtiteli, 2023).

Literature offers different ways of approaching the climate change-security relationship, with different accounts of that relationship encouraging different sets of responses (McDonald, 2024) Concurrently climate change is increasingly identified as a security issue, proof being the large number (more than 70%) of national security strategy documents among those states producing such documents, containing climate change aspects (Vogler, 2023). Therefore, the next sections will discuss in what ways climate change might be viewed as a security threat. Firstly, it will discuss the potential of mass migration occurring as a result of global warming and will then examine the security consequences of climate migration. It will then discuss if and how climate change contributes to violent conflict between regions and states. Finally, taking a broader view of security, this section will address the threat to human security posed by climate change.

2. METHODOLOGY

The aim of the paper is to inquire if the climate change could become a component of security policies. In this sense, this paper captures the main implications of considering climate change from the perspective of security policies, such as climate migration, violent conflict and human security. The main research questions addressed in the study are: In what sense might climate change be viewed as a security threat? What are the advantages and disadvantages of viewing climate change as a security threat? What are the implications for funding policy in the context of existing climate justice models? The information needed to formulate relevant answers to the research questions was collected by reviewing the literature. A significant number of bibliographical resources have been consulted in various international databases.

3. CLIMATE MIGRATION

Climate change is already having catastrophic effects on developing countries and this is expected to intensify if global warming is not acted on. Such effects include sudden, extreme weather events (leading to localised destruction of towns or cities) and more gradual processes – (such as slowly rising sea levels, declining freshwater resources, and decreased food security) – all resulting in dampened economic growth. Poverty and disadvantage are expected to increase as global warming increases and this puts millions of people in the least developed countries at risk (IPCC, 2018). Current climate migration estimates range between anywhere from 25 million people to 1 billion people by 2050; however, the generally accepted figure within the literature is 200 million (International Organisation for Migration (IOM), 2008). Most climate migration is domestic, with people moving from one region to another within their home country, yet some climate migration is expected to cross borders (Rigaud et. al., 2018).

Reuveny (2007) envisages four main potential reasons that mass climate migration events may lead to conflict within and between host and origin states. Firstly, competition over potentially scarce resources may drive resident-migrant conflict and the state may have to reach beyond its borders to acquire additional resources, increasing the risk of conflict. Secondly, ethnic tension could lead to conflict if migrants and residents belong to different ethnic groups. Residents may feel threatened and the host country may fear separatism. Thirdly, distrust may arise between the origin and host states. The host state may suspect the origin state of infiltration; the origin state may fear the host state is only accepting migrants to create ethnic imbalance; the origin state may also resent perceived mistreatment of migrants in the host state. Fourthly, existing socioeconomic fault lines (such as urban-rural divides) may worsen in a situation where migrants and residents are competing over jobs or land.

However, Reuveny (2007) also acknowledges that migration does not always lead to conflict; indeed, in many cases, governments may step in and assist migrants in integrating into their new homes – perhaps through financial aid or alleviating distrust. The key difference, however, is that sudden influxes of migrants (more likely to occur with sudden climate change) when the host country or region is unprepared has the potential of instigating conflict.

Human migration history illuminates a common strategy for managing the risks of environmental and climatic changes, as evidence points to prehistoric migration, with more-recent migration patterns emerging in response to climatic shifts (Blake et al., 2021). Climate-related migration has erupted as a distinct discourse, with copious developmental, humanitarian, research, and policy fields aiming to grasp its complexity (Ferris, 2020).

Climate change is causing growing numbers of people to migrate away from increasingly vulnerable home regions and communities. Raimi et. al. (2024) consider that such a trend is expected to accelerate in coming years, with hundreds of millions potentially displaced between 2050 and 2100. Migration and displacement due to environmental degradation and disasters caused by global

climate change have led to the emergence of the concept of climate refugees, unlike the traditional refugee approach. However, in the context of climate change, the definition, scope and legal status of climate refugees are still unclear.

4. CLIMATE CHANGE AS A DRIVER OF VIOLENT CONFLICT

It has been argued by many security scholars that the effects of climate change could be potential drivers of violent conflict between peoples or between nations. In fact, Ide (2025) consider that research on climate change and conflict has so far almost exclusively focussed on high-intensity intergroup conflicts related to the impacts of climate change (in the form of higher temperatures, changed precipitation patterns, and climate-related disasters).

climate change amplifies securities risks, economic challenges, and resource competition, creating intricate connections with geopolitical conflicts (Alam et. al., 2024). However, it is important to note that what is being suggested is not that climate change will be the sole driver of violence. Instead, the effects of climate change will add to existing burdens (such as poverty, wealth and social inequalities, and unstable governments) and the cumulative effect will result in conflict (Buhaug et. al., 2010). In other words, the effects of climate change may be a last straw for already unstable countries.

One such example is conflict beginning over natural resources that have been adversely affected by climate change – such as freshwater rivers becoming polluted. However, Goldstone (2001) outlines that such conflicts are more likely to occur between groups within one country than between countries. Also, such disputes rarely escalate into violence because of the costly nature of war. War will not create more of the scarce resource, and war will also usually be more expensive than adapting to using less of the resource being fought over or importing it (Goldstone, 2001). It is far less costly to, for example, compensate for a reduction in water by altering agricultural patterns to produce more foods that require less water (such as dry grains instead of rice) or to switch to more efficient use of water for irrigation purposes (Goldstone, 2001). As a result, countries that find themselves in conflict over sharing river water are more likely to settle the dispute diplomatically instead of waging war with each other. This was the case in several disputes over water between countries such as Jordan and Israel over the Jordan River or Slovakia and Hungary over the Danube River. While this form of conflict does not always lead to violent conflict, it is unwise to overlook it as a possibility.

Despite increasing concerns about the major socioeconomic impacts of climate change, the association between conflict and climate has not received much attention. Thus, past dispute-resolution strategies have some drawbacks. A comprehensive approach to resolving conflicts relating to climate change has not yet been established (Bedasa and Deksisa, 2024).

5. CLIMATE CHANGE AS A THREAT TO HUMAN SECURITY

Climate change can also be viewed as a security threat when we consider security to mean something broader than the mere absence of conflict. This broader definition of security incorporates elements such as human rights, shelter, safety, clean water, adequate sources of food, and a stable environment. All of these elements (and more) make human life possible and, without them, we cannot say that security exists. Climate change poses a significant threat to the security of all the elements described above – in both the southern and northern hemispheres of the globe.

One such threat is posed by the destructive effects of extreme weather events which are exacerbated by climate change. A successful climate change policy at the local level necessitates collaboration and alignment between cities and regions, given their shared competences in various fields such as urban (spatial) planning and transport, including public transport and infrastructure (Shtjefni et. al., 2024). But these extreme events made by climate change especially affect people in

developing countries who might not live in buildings made of brick and concrete that can survive flooding or who depend on animals and crops for their livelihoods.

Climate change under these circumstances (when livelihoods or homes are threatened) constitutes deprivation of basic needs, which is not conducive to security (IPCC, 2014). One such example includes economic losses (including loss of property and livestock) affecting at least 15% of farm households in Fiji during flooding in 2009. Hurricanes are also predicted to occur with increasing frequency in the northern hemisphere, especially Europe, which could result in similar loss of livelihoods (Haarsma et. al., 2013). However more developed countries (such as in Europe) will be better equipped to handle extreme weather events, and this will provide a buffer of sorts when facing extreme weather events (Reuveny, 2007).

Climate change also threatens human security through cumulative effects such as slowly rising sea levels, an increased spread of diseases, or gradual increases in mean annual temperature. Similar to above, rising sea levels results in the (slow) destruction of property and infrastructure, which can threaten livelihoods of people who are depending on the coast for their income (such as fish farmers) (IPCC, 2014). Human health also suffers as a result of climate change: destruction of agricultural land can result in food shortages, which may exacerbate existing problems of food insecurity. The risk of disease also increases as temperature increases, and diseases such as malaria have the potential for shifts in their geographical range, meaning that they could migrate to new countries where they would not typically be found (IPCC, 2018). This poses a security risk for both the new country and the residents of the new country who may be ill-equipped to deal with such diseases. Livestock are also expected to suffer as climate change worsens, depending on factors such as feed quality and water availability. Finally, a predicted increase in the number of people experiencing a mean annual temperature of $>29^{\circ}\text{C}$ to one-third of the global population also poses a considerable threat to human health through an increased rate of heat-related mortality (Xu et. al., 2020).

Considering all of the above, it is easy to understand why climate change has become a priority issue on the international security agenda. Whether or not it directly poses a security threat in the narrow sense, it is shown to exacerbate existing threats or causes of violence. Also, in the broader sense, climate change contributes to security threats considering the damage extreme weather events cause for livelihoods and human security in both developed and developing nations. As such it has earned a place on the international security agenda.

6. THE ADVANTAGES AND DISADVANTAGES OF VIEWING CLIMATE CHANGE AS A SECURITY THREAT

In terms of advantages, the main theme under discussion in this section is that considering climate change as a security matter could help governments be better prepared for potentially devastating results following global warming. The main disadvantage discussed is that there is a risk of the discourse around climate change meshing so far with the language of security that the root causes are overlooked (overconsumption, fossil fuel use) and only the symptoms are treated (migration, extreme weather events).

One of the principal advantages of considering climate change a security threat is that this prepares countries for the potential of security issues arising from climate change. This avoids the possibility that countries will find themselves totally unprepared because there will already be a body of knowledge and research that governments may fall back on if necessary. Dalby (2008) argues that there is no reason to believe that future climatic changes resulting from global warming will be predictable or slow in nature. Indeed, if dramatic changes in the Earth's environment occur, states may not be capable of adapting in time (especially underdeveloped states, which are at the highest risk of the dangerous possibilities of climate change). People from poorer nations may migrate en masse to richer states, which could instigate conflict if richer countries, such as the United States,

enforce military power to prevent migration (Schwartz and Randall, 2003). As such, it is advantageous to consider climate change in security terms to ensure states are prepared for worst-case scenarios.

The central disadvantage to viewing climate change as a security threat is the risk of 'securitising' climate change to the point that it becomes detrimental. The traditional language of security (militaristic, state centric) and the language of environmentalism (international co-operation, globalism) are quite different and may lead to confusion. Deudney (quoted in Dalby, 2008) argues that traditional state-centric ways of viewing security are incompatible with the environmental movement: for environmentalists to consider climate change in militaristic terms is to 'betray their core values.'

Dalby (2008) echoes this when the author considers that geopolitical or militaristic reasoning on climate change is more likely to result in policies that attempt to limit conflict or migration rather than addressing the root cause of climate change or the poverty resulting from it: "*once the focus comes on the military dimension of this [...] once again the poor are presented as a threat to the rich rather than the other way around.*" (Dalby, 2008: 270).

In a similar vein, Barnett (2003) argues that a significant disadvantage in considering climate change a security threat arises when the nation state becomes the dominant referent object in security discourse. This results in the nation state appropriating the discourse no matter how counterproductive and neutralising the efficacy of security problems in order to uphold the power of the security establishment. This means that governments are not encouraged to re-focus their budgetary power away from military spending and towards investing in climate research and foreign aid (or at least matching the finances given to the military). In other words, effectively summarising both disadvantages outlined in this section: "*understanding climate change as a security issue risks making it a military rather than a foreign policy problem, and a sovereignty rather than a global commons problem.*" (Barnett, 2003: 11).

There are benefits and drawbacks to viewing climate change as a security threat. If it is not considered such, we risk states finding themselves trapped by the results of climate change and unable to protect themselves from potentially violent conflict. However, if the security discourse around climate change goes too far in the opposite direction, we risk losing focus of the humanitarian response needed when dealing with the consequences of climate change.

7. CLIMATE CHANGE IN TERMS OF LOSS AND DAMAGE

Regarding to climate change, the risks associated with acting involve the costs of engaging in deep decarbonization of the economy, a transition that is likely to involve sacrifice on behalf of many individuals, as well as some industries and the communities that rely on them (Wang & Lo, 2021). In its recent report, IPCC highlighted that increased concentrations of greenhouse gasses (GHG) in Earth's atmosphere are unequivocally caused by human activities predominantly occurring in developed countries. It predicted that the planet's surface temperature will exceed a 2°C rise from pre-industrial levels within the 21st century unless deep reductions are made to polluting activities (Filho, et. al., 2019; IPCC, 2021). The global temperature increases of roughly 1°C that has been observed since before the industrial revolution has already resulted in an increased likelihood, frequency, and intensity of extreme weather events. Such events are expected to continue occurring in parts of the world which are most economically and environmentally vulnerable and least equipped to handle weather disasters, highlighting the injustice embedded within climate change. To achieve climate justice, this imbalance must be redressed (Klinsky and Mavrogianni, 2020; Yeo, 2019).

This leads us to the question of what kind of financial aid should be given to climate-vulnerable developing countries to achieve climate justice. Here, the concept of "loss and damage" is useful in

reaching a better understanding of this question. In recent years loss and damage has gained significant traction in international negotiations at various conferences of the parties but remains a controversial and contentious topic that has been highly politicised (Calliari et al., 2020).

Loss and damage refer to both the actual climate-related disasters and the inventory of policies which can be used to adapt to, mitigate, and deal with these disasters (Roberts and Pelling, 2018). Recent work by the Heinrich Boll Foundation (2021) outlines policies of adaptation, risk management, and humanitarian aid in detail to aid understanding of loss and damage. Firstly, adaptation policies refer to measures which are taken by developing countries to adjust to climate change and are essential to averting and minimising loss and damage. For example, crop rotation and diversification can be used by farmers working in countries experiencing severe drought or flooding, ensuring that any incurred financial losses are mitigated (Heinrich Boll Foundation, 2021). Adaptation measures in developing countries cost \$70bn USD annually and are expected to increase to \$300bn USD by 2030.

Risk management policies refer to systems used to reduce climate risks and manage the outfall from climate disasters. Vanhala, Robertson and Calliari (2021) exemplify early warning systems, like mass text alerts and sirens, emergency preparedness, retrofitting of houses and infrastructure and response and recovery efforts. The cost of these measures is normally paid by the affected nations, costing up to \$2bn USD (Heinrich Boll Foundation, 2021). In the decade ending in 2020, global losses from disasters have averaged \$170bn USD per year, with developing countries the hardest hit (Liu et. al., 2024).

Finally, humanitarian aid is also required to respond to climate change. This involves measures intended to help people rebuild their lives after a climate disaster (e.g., refugee support, emergency food, healthcare and child protection). It is a commonly underfunded area of international aid. For example, the cyclone Yasa caused \$54m USD in damage to Fiji's agricultural sector; however, only \$500,000 USD was given to address this from international donors (Heinrich Boll Foundation, 2021). Having established an understanding of current and future needs of developing countries with respect to climate preparedness, we must now examine the financial models available to fund these needs.

8. CLIMATE JUSTICE MODELS AND IMPLICATIONS FOR FUNDING POLICY

Several different models exist to provide a decision-making framework for allocating financial liability to ensure climate justice, none of which are perfect solutions. It is important to recognise the time-sensitive nature of the climate crisis: any such finance model will be flawed in some respects as there does not exist infinite time for all the philosophical, moral, and legal implications of every solution to be debated and contested. This literature critically evaluates different finance models and draw on the benefits of each in order to propose a climate justice finance model which is both fair to developing countries and palatable to developed countries.

The first model assessed here is the Polluter Pays Principle. This principle stipulates that polluters are morally obliged to pay for environmental damages caused by their activities (Caney, 2010). However, this is deceptively simple: in the context of global climate change, there are far too many variables to make effective use of such a simple model. While climatology has made significant strides in recent decades, it remains difficult to accurately estimate the true effects of climate change such that blame can be fairly attributed. Tracing these effects back to any individual causal actor and attributing liability for funding loss and damage policies is also challenging. A final issue with this model is that much of what is known now about the links between industrialisation and climate change was not known in previous centuries, further complicating blame attribution (Caney, 2010). However, this can also be challenged on the grounds that polluters were made aware as early as the mid-20th century and nonetheless continued to pollute.

The Contribution to Problem model, discussed by Page (2008), addresses several of these concerns. It specifies that countries should contribute to the financial costs of managing the ill effects of climate change in proportion to their contribution of GHG emissions. In the period 1750-2005, developed countries contributed an estimated 75% of GHG emissions, implying a higher ethical responsibility for financing climate justice. This model implies that developed countries should: 1) identify and compensate victims of their climate-damaging activities; 2) reduce and aim to eliminate GHG-emitting activities; and 3) subsidise measures to compensate the human cost of unavoidable climate change impacts. However, this model also has several limitations. Firstly, it is not clear where the limitations of climate change liability lie. Applying this model strictly, in a hypothetical scenario where a poor developing country was somehow discovered to have contributed to GHG emissions to the same degree as any of the major developed countries, it ought to pay a heavy duty in line with a developed country despite the disparity in its resources and wealth. This model also does not answer the question of from which point in history should emissions-related liability begin, which spawns the related problem that the individuals who created GHG-emitting industries and technologies contributing to historical emissions are now dead. As highlighted by Page (2008), seeking compensation from current generations would be to seek it from the wrong people. As such, it would seem fairer to seek compensation from a point later in history (e.g., from the mid-20th century when awareness of climate change became more prevalent).

A closely related model, the Beneficiary Pays model, argues that a country's level of contribution to climate justice costs should correlate to the extent to which it has benefited from GHG-emitting activities (Page, 2008). This does not mean that countries are held strictly liable for causing climate change, but they are held liable for contributing to the alleviation of negative consequences of polluting activities from which they have derived benefit. However, this model presents one obvious problem in the paradoxical notion of seeking payment from countries which benefited from industrialisation, without which their citizens would not have been born (Page, 2008). Since it would be the citizens of developed countries funding climate justice donations through general taxation, individuals would effectively be paying reimbursement for the negative consequences of systems which made their very lives possible, which they had no choice in accepting. As such, this model would likely not be palatable to the citizenry of developed countries.

The final model under discussion is the Ability to Pay model, would suggest that countries should take on the burden of ensuring climate justice by contributing to the cost of loss and damage policies in proportion to their wealth or income (Page, 2008). This model recognises that justice involves the 'efficient achievement of desirable outcomes' and as a result does not differentiate between countries based on their historical contribution to climate change, only on their current levels of wealth. An obvious problem arises with this model in that a country's comparative wealth does not necessarily mean that it is able to donate significant amounts of its revenue to climate justice efforts (Caney, 2010). However, this could easily be alleviated by imposing a lower limit on domestic wealth, below which point developed countries are not expected to contribute.

Having established an understanding of the type of loss and damage payments required to ensure climate justice, and having outlined a number of potential approaches to dictating which countries should foot the bill, we must now briefly outline a potential solution. An ideal solution should incorporate the benefits of the models outlined above, such that donor countries should: 1) have contributed to climate change; 2) provide compensation for polluting activities occurring after the links between GHG emissions and climate change were well understood and provable; and 3) be able to donate to climate justice without compromising the well-being of their citizens.

Any finance model for funding climate justice must be fair to developing countries and palatable to developed countries and their citizenry – no national government would agree to a model which it believes would be deeply unpopular with its voters. One of the key concerns of developed countries is the legal liability implied by many of the above models – a model based on solidarity which is

sensitive to the changing demands of developing countries would be preferable to an unlimited legal liability model (Acayan, 2020).

CONCLUSIONS

Climate change may be considered a security threat because of its potential for mass, sudden migration, its potential to instigate violent conflict, and its impacts on human welfare and security. When considering climate change, it is important to ensure states are prepared for violent conflict while not losing focus on helping vulnerable states and their people who are most adversely affected by climate change. Most important to stress is that the unique challenge posed by climate change is one that humanity has never needed to encounter before: it requires a robust security response, a compassionate humanitarian response, and a harsh examination of the root causes of global warming.

The task of discovering a fair and politically acceptable model for funding climate justice is incredibly difficult due to its diplomatic and political sensitivity. But wealthier countries should bear the greatest responsibility for tackling climate change and ensuring climate justice for less developed countries, which will experience the impacts of climate change earlier and more severely. Therefore, this paper has provided an overview of what sort of international aid is required and a brief understanding of some of the potential finance models and their consequential problems. A workable finance model ought to draw on the benefits of all available models, including ones not discussed here. Such a model should also constitute a solution which addresses the ever-evolving needs of climate-vulnerable countries and balances these needs with the capability of developed countries to donate.

AUTHORS CONTRIBUTIONS

The author/authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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