Exploring the Multifaceted Impact of Climate Change on Madagascar

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Abstract

Climate change is now becoming one of the major non-traditional security threats for all states. Among those states, the one that is becoming more impoverished due to these changes is Madagascar, which is an island nation located at the southeast coast of Africa. Though Madagascar contributes very little to the global carbon emissions, still it is facing the repercussions of the climate change. These changes hit severely to the biodiversity of Madagascar, especially of human existence, by causing drought and food crises. Extreme weather events, raising temperatures, and erratic rainfall patterns have a negative influence on people, agriculture, and the region's ecosystem. This article analyzes the implications caused by climate change on Madagascar. This article finds that the complex climate effects on Madagascar are alarming triggers and ultimately call for a global effort that ought to be coordinated and dedicated to equitable and sustainable development. Furthermore, it is also recommended that overall proactive measures ought to be taken internationally to reduce carbon emissions and to build more resilience and funding to foster mutual collaboration to combat the climate change issue.

Keywords: *Madagascar, Biodiversity, Climate change, Food crises, Drought*

Introduction

Madagascar is an island country off the southeastern coast of Africa in the Indian Ocean and is home to exceptional biodiversity where more than 90% of species can be found no place else on Earth, especially iconic lemurs and some rare plant species, thereby making Madagascar's ecosystems world significant and irreplaceable. However, it is also one of the world's poorest countries, heavily affected by poverty and a highly insufficient availability of basic resources including clean water, education, and health care. Due to socio-economic fragility, Madagascar is particularly susceptible to climate change impacts, which it is not financially and infrastructural equipped to handle on its own to secure the well-being of the population and biodiversity **(Goodman, 2011)**.

The years have exacerbated environmental and socio-economic challenges in Madagascar because of climatic change. Climatologically, shocks such as heavy droughts, cyclones, and a rise in the levels of sea water have deteriorated island ecosystems and biodiversity. Beyond threatening the existence of some unique species, these climatic events worsened the socio-economic vulnerability in the dependency of marginalized groups upon biodiversity-based livelihoods. The degradation of natural habitats, propelled by both climate impacts and resource use that is unsustainable, further jeopardized the ecological balance of Madagascar. Grinding poverty has only heightened demographic pressures, like very fast population growth and the urbanization of population that further stresses the already fragile ecosystems and puts Madagascar's rich biodiversity at a very high risk. In that sense, this interplay between socio-economic vulnerability and ecological degradation shows the need for urgent application of sustainable strategies to conserve the biodiversity of Madagascar while meeting people's welfare needs **(Vences, 2009)**.

Geography

Madagascar is located to the east of Mozambique, off the African continent, in the Indian Ocean. Being the fourth-largest island in the world, it hosts a high variety of biodiversity, comprising a considerable percentage of the species in the world, many of which are endemic to the island (Ali, 2022). Officially known as the Republic of Madagascar, the nation remains relatively sparsely populated, with just about 94 people per square mile (36 people per square kilometer), which really categorizes it as being remarkably under populated, and this is especially the case by international standards (Dewar R. E., 2012). With such low population densities, huge swaths

of the island are unreached, and the lands boast pristine and biodiverse forests across much of their lands. These are resources that are being threatened by human activities and the effects of climate change, and they are important for the economy and ecosystem of the country. Undeniably, the natural direct causes of climate change, like cyclones, droughts, and unpredictable rainfalls, have been critical factors that often increase the threat the country is exposed to. Environmental disturbances undermine not only the beautiful, unique natural landscapes but also the country's agricultural productivity and food security. This further takes a toll on the well-being of people (Dewar R. E., 2012). Island's fragile ecosystems, which once bloomed in perfect harmony with their biodiversity, are linked up for a humanitarian disaster. Since much of the people depend on agriculture and fishing to feed themselves, climate-change-related disturbances to these two industries have led to increased hunger, displacements, and vulnerabilities to disasters. This further worsens people's well-being (Thomas P. , 2002).The island's fragile ecological environment, once blossomed majestically with its much-diversified biodiversity, is facing an inevitable humanitarian catastrophe. For most of the people who depend on farm produces and fish to survive, human perturbations by climate change associated with these two sectors triggera rise in hunger and, population dislocations, and the same with other vulnerabilities exposed in the event of other forms of disasters (Mittermeier, 2008). Although Madagascar depends on natural resources, it is impossible for the country to overcome the food crises as the climate change causes it. For instance, the prolonged droughts have adversely affected agricultural production that, in turn, led to food scarcity and economic uncertainties (Jolly, 2016). More importantly, the country's poor infrastructure and inadequate resources have undermined its capacity to respond and recover from these crises, making it more susceptible to repeated climatic disasters (Thomas P. , 2009). Such a situation requires immediate international intervention, for its socio-economic and environmental vulnerabilities would limit Madagascar's ability to adapt to its climate vulnerabilities.

Drought

The protracted and apparent drought crisis in Madagascar has worsened to more destructive levels of deficiencies in all aspects of life. The grinding drought tension that has lasted for four decades poses an unacceptable threat to the socio-economic stability of the country. The chronic drought crisis has resulted in various emerging challenges and put the country in a precarious situation that is not easy to address. People have been forced to eat locusts, leaves, clay, sand,

and even leather shoes to survive the extreme conditions. Children and parents alike are forced to beg for food, while about 30,000 people live under vicious levels of hunger. Experts say that extreme weather events and rising temperatures have caused the worsening drought and the associated food insecurity. According to the World Meteorological Organization, "A trend of drought, more extreme weather, more fires and floods, an unprecedented drought in Madagascar, pressure on agriculture to a large extent that has not been seen for those 40 years, a massive strain of food production, and the country is in huge crisis; people are at risk of malnourishment, and large numbers of people are dying from starvation (Rasoafaniry, 2024)." This drought in Madagascar has caused a humanitarian disaster as nearly 27 million people are affected, and over half of the country's population is in dire need of food aid. According to the World Food Program, it would cost around 31 million euros to provide assistance to 1.5 million people who are facing acute hunger. According to the (Otekunrin, 2020), it is estimated that nearly 690 million people in the world are suffering from starvation. There are 144 million children suffering from stunting and 47 million suffering from wasting. Moreover, 5.3 million children die before attaining five years of age due to malnutrition (Naji, 2023). This has meant children experience five years of drought and famine, affecting many who walk miles searching for water, and in this quest to survive, end up taking whatever they come across for nourishment. The COVID-19 pandemic exacerbated all the effects caused by the drought and made it worsen hunger as well as increase insecurity related to food (Randremanana, 2020).

Current Climate Trends in Madagascar

The protracted and apparent drought crisis in Madagascar has worsened to more destructive levels of deficiencies in all aspects of life. The grinding drought tension that has lasted for four decades poses an unacceptable threat to the socio-economic stability of the country. The chronic drought crisis has resulted in various emerging challenges and put the country in a precarious situation that is not easy to address. People have been forced to eat locusts, leaves, clay, sand, and even leather shoes to survive the extreme conditions (Hending, 2022). Children and parents alike are forced to beg for food, while about 30,000 people live under vicious levels of hunger (d'Orsi, 2023). Experts say that extreme weather events and rising temperatures have caused the worsening drought and the associated food insecurity. According to the World Meteorological Organization, "A trend of drought, more extreme weather, more fires and floods, an unprecedented drought in Madagascar, pressure on agriculture to a large extent that has not been

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Table 1

Climate Change Impact	Description	Impact on Madagascar	Severity (1-10)	References
Rising Global Temperatures	Increase in global temperatures causing disruptions in global weather patterns and intensifying extreme weather events.	Rising temperatures will alter local climate conditions, increasing the risk of heat waves and changing seasonal patterns.	8	IPCC, 2021 – Climate Change 2021: The Physical Science Basis (Allan, 2024).
Damaged Marine Ecosystems	Rising ocean temperatures harm marine life and ecosystems, causing coral bleaching and disrupting the food chain.	The warming waters surrounding Madagascar threaten its coral reefs, marine life, and the fishing industry, a key economic sector.	7	FAO, 2020 – Impact of Climate Change on Fish Stocks and Fisheries (Galappaththi, 2022).
Changes in Rainfall	Changes in atmospheric circulation patterns due to global warming result in altered rainfall patterns, which affect regional	Irregular rainfall patterns could lead to droughts or floods, significantly impacting Madagascar's agricultural production and freshwater resources.	6	NASA, 2022— Climate Change and Global Water Cycle: The Impact of Altered Rainfall Patterns (Ehtasham, 2024).

	climates.			
Heatwaves	The occurrence of more intense and frequent heat waves due to rising temperatures, impacting ecosystems and human health.	Increased frequency of heat waves will push both human and wildlife populations beyond their thermal tolerance, threatening agriculture, fisheries, and ecosystems.	9	Bellard et al., 2015 – Impacts of Climate Change on Species (Bellard, 2015).
Intensifying Droughts	An increase in the frequency, duration, and intensity of droughts due to climate change.	Madagascar has already been facing droughts that lead to agricultural failure. With increasing droughts, food and water security will be further compromised.	8	Government of Madagascar, 2021 – Climate Change and Agricultural Impacts in Madagascar (Harrington, 2022).

*(**Note:** The severity ratings are based on the estimated level of impact that each climate change factor will have on Madagascar's environment, economy, and biodiversity.) These are subjective ratings based on available research and projections from climate models. The references used provide a basis for understanding the sources of information on each impact and its projected severity on the island.*

This table critically discusses the impacts of climate change on Madagascar, indicating their severity and relevant studies. Rising global temperatures are one of the impacts that have drastically altered local climate patterns, increasing the risk of heat waves and changing seasonal cycles. The severity rating is 8, meaning this is one of the most pressing issues since it affects human and natural systems. The referenced IPCC report underscores the importance of addressing global temperature increases to mitigate these disruptions. This means that the second impact—the damaged marine ecosystems—emphasizes the harmful effects from the warming oceans on marine biodiversity in Madagascar, mostly concerning coral reefs. Here, the severity is reported as 7. This means that its harmful influence touches not only marine life but also the fishing industries that are crucial to Madagascar's economy. The ecological shift and changes reported by FAO may bring about vast losses in fisheries. Changes in Rainfall another issue is the changes in rainfall, where the changed pattern of rainfall can cause potential droughts or floods. These will badly affect the agriculture and freshwater resources. Being an essential resource, this change has been rated as severe 6. The NASA research associates these changed

patterns of rainfall with broader climate change shifts, indicating that Madagascar can experience both water scarcity and flooding risks. The table also indicates heat waves as an emerging, frequently occurring problem. Heatwaves have a severity score of 9, which is ranked among the many big threats to human health, animal health, agriculture, and fisheries. In this research by Bellard et al., it has shown extreme heat will surpass local populations past thermal tolerance and also worsen already existing vulnerability. Lastly, intensifying droughts are another major climate risk. Already a chronic problem, droughts are expected to become more frequent and intense, exacerbating food and water insecurity in Madagascar. This issue, with a severity of 8, is critical because of Madagascar's reliance on agriculture, and the Government of Madagascar's report warns about its growing impact on the stability of the country. This table depicts a wide spectrum of climate-related challenges the country is experiencing, but the rising temperature and extreme weather events are the worst and most urgent threats. Each of these impacts is interlinked with others, and thus the overall risk that the island ecosystems, economy, and society face can be multiplied. Urgent global and local action is the only way to address such issues, as indicated by these studies.

Impacts on Biodiversity and Ecosystems

The biodiversity of Madagascar is highly endemic and is increasingly threatened by climate change, which disrupts ecosystems. The island has unique species of flora and fauna, many of which are found nowhere else in the world, such as the lemur and the fossa (Desbureaux, 2018). However, these species are also under threat due to global warming, deforestation, and other human-induced environmental threats. Deforestation, mainly caused by large-scale agriculture, logging, and charcoal production, amplifies habitat loss and fragmentation, putting many of those endemic species at extreme risk of extinction (Gardner C. J., 2009). This has worsened as climate change accelerates at such a pace that some of these species might not find a niche in it with increased temperatures, shifting of rainfall patterns, and changes in weather, thereby influencing the already vulnerable ecosystems found in Madagascar (Virah-Sawmy, 2009).

The global mean temperature has risen steadily and with increasing rates throughout the years, though its rising rate accelerated during the last half of the twentieth century. The rising rate is projected to continue and perhaps speed up in the future and cause faster climatic change in the following decades (Rogers, 2010). The rising temperatures, accompanied by changed precipitation patterns, are likely to destroy Madagascar's ecosystems because they shift the

climatic zones within which species live. For example, many plant and animal species that thrive in the unique tropical climate of the island are vulnerable to the changes in rainfall and temperature. As a result, these climatic changes may change the timing of such important ecological events as flowering, breeding, and migration, which can cause mismatches between species and their environment.

Some other more notable features of global climate change that are influencing the ecosystems of Madagascar include changes in temperature and precipitation.

Table 2

SNO	Climate Change Effect	Impact on Madagascar
1	**General melting of glaciers**	Even though Madagascar lacks glaciers, rising temperatures will affect global weather patterns and the island's climate (Heine, 2024).
2	**Increasing heat content in the upper ocean**	Damages marine ecosystems, potentially putting fisheries at risk, which is vital for the local economy (Nematchoua M. K., 2018).
3	**Decreases in northern hemisphere snow cover**	While mainly impacting the northern world, changes in atmospheric circulation could influence Madagascar's climate and rainfall (Tadross M. R., 2008).
4	**Increases in the duration of heat waves**	Heat waves will increase in tropical regions, affecting both ground and aquatic species, pushing them past their thermal tolerance (Bellard , 2015).
5	**Intensity and spatial extent of droughts**	Droughts in Madagascar have led to agricultural failure, and the frequency and intensity are expected to rise due to climate change (Rigden A. G., 2024).

Changes in global atmospheric circulation may influence the alteration of rainfall patterns, thus the climate pattern on the island could be altered. Additionally, more intense and prolonged heatwaves would likely be experienced by Madagascar, which could push local species beyond their thermal tolerance limits. With increasing intensity and frequency, the overall droughts would lead to bigger agricultural challenges with increased danger of crop failure. With these combined effects, a grave environmental and economic threat in the island is seen ahead.

Reconciling Observed Trends and Future Change

The projected temperature and rainfall changes for the middle of the twenty-first century present key physical changes to the regional climate system that can help reconcile observed trends with the future projections even in divergent cases. This has very substantial implications for

ecosystems, populations, and biodiversity in the country of Madagascar. It is along this line that the physical changes to the projection of climate change have presented the following critical points related to the constantly projected future:

1. **Temperature Rise:** As the temperatures continue to increase globally, there will be increased convective activity, especially during mid-to-late summer. This would mean more frequent and severe heat waves and droughts that would exacerbate the already unstable climate in Madagascar (Holder, 2024). Increased temperature would bring about a change in species distribution where some species would have to move to higher altitudes or more hospitable climates. Agriculture is sensitive to temperature changes; hence, stress resulting from temperature would impact agriculture and, in turn, food security (Kreppel, 2016).
2. **Humidity:** Once the temperature increases, the atmosphere will be able to absorb more moisture, which will increase the humidity of the area. This readily available moisture can make the rainfall events heavier, especially during pre-existing disturbances. However, the interaction between the humidity and rainfall is complex and may result in intense periods of rainfall followed by long dry spells. This may make the recurrence and intensity of droughts worse in areas that are already vulnerable; hence, water management and agriculture in Madagascar face great challenges due to the growing scarcity of water (RAMANANTSOA, 2023).
3. **Changing Storm Systems:** The winter seasons, which may even extend to fall and spring, are likely to withdraw mid-latitude storm systems with the strengthening of continental high-pressure systems. It will result in longer dry periods, impacting the agricultural sector and increasing vulnerability to droughts. Some areas would see increased precipitation, whereas others would experience extreme dryness. The severity of that impact on Madagascar's climate system makes it quite a challenge to come up with an effective adaptation strategy. However, these physical changes will not uniformly or linearly occur across all regions of Madagascar. Instead, they will interact with each other in complex and nonlinear ways, appearing separately at different times in the future. Thus, mechanisms dominating at any given point in time—and which may interact with or counteract one another—will significantly influence how climate change manifests regionally. For instance, this could be compensated by increased atmospheric moisture that leads to heavier and less frequent rainfall, thus reducing the number of rainy days. This makes climate shift forecasting and

preparation tricky, as some regions face more severe droughts than others, while others get hit by intense flooding events (Randriamarolaza L. Y., 2023). This would mean that alterations in precipitation may not be important for decades after the initiation of global change. On the other hand, it is evident that changes in temperatures caused by global warming are already being observed, and this will continue to happen over the coming decades. Differences in the trend and magnitude of observed changes highlight some of the difficulties in reconciling historical observations with future forecasts, which may not sometimes match with existing models or predictions (Nematchoua M. K., 2017). This means climate change projections for Madagascar will pose quite a challenge to the policymaker and planner charged with the responsibility of managing climate impacts and preparing for future risks.

One such need of balancing past and future changes relates to climate adaptation planning through the incorporation of observed and forecasted trends. Statistical examination across different stations in Madagascar with observed data would be an important means to identify important trend changes in temperature and rainfall patterns. However, where the future projections show inconsistencies or do not agree with a direction of change, the additional monitoring and data will be required in refining the climate models for further accuracy into the projection of future risk (Nematchoua M. K., 2018).Such is key to ascertaining whether the disaster risk reduction efforts and other climate adaptation approaches are valid and built on credible scientific evidence. In regions where there are perceived trends but not statistically established, or perhaps masked by natural variability, continued monitoring and adaptive approaches will be needed for responding to emerging threats when they begin to define themselves (Tadross M. R., 2008). In terms of addressing these challenges as Madagascar experiences them, all international partnerships and collaborations need to be aligned with the local climate adaptation efforts.

Technical know-how, financial provision, and capacity-building measures are essential in developing comprehensive monitoring systems, enhancing early warnings on extreme weather events, and ensuring the sustainable exploitation of natural resources, among other things that will make it possible for Madagascar to navigate the complexity of climate change (Jury, 2003). Also, there will be implementation of climate-resilient infrastructure and policies that promote sustainable agriculture and water management in terms of enhancing

the resilience of people on the island (Rigden A. G., 2024). Overall, reconciliation of existing observed climate trends with such projected trends will be decisive to create an effective adaptation to the changed climate in Madagascar.

Challenges and Opportunities

Besides that, lack of coordination among various government agencies and other stakeholders in Madagascar presents an inhibition to scaling successful climate adaptation and mitigation efforts. The fragmented approach in trying to address climate change because of overlapping responsibilities and lacking communication undermines the policies and programs that are set out to combat climate-related disasters. This fragmented approach usually misses opportunities for synergy and thereby hinders the advancement of meaningful solutions (Randriamarolaza L. Y., 2023). Furthermore, weak institutional capacity and resources at the local and national levels compound these problems, limiting the rollout of large-scale climate resilience programs (Antonelli, 2022).

Still, within all these difficulties, there are gigantic opportunities for innovation and collaboration. Exploring the connections between international organizations, NGOs, and the private sector can unlock technical know-how, much-needed financial inputs, and opportunities for knowledge exchange for local governments. It has much to do with the enforcement of policies and the breaking down of barriers towards appropriate climate action (Ralimanana, 2022). International donor partners can, for instance, be critical to raising funding for such sustainable agriculture projects and even the restoration of ecosystems and disaster risk reduction. NGOs, which also have grassroots connections, will ensure that the adaptations are suitable for the local level and are integrated with marginalized communities (Zambiazzi, 2023). Moreover, with its innovative capacity and access to new technologies, the private sector will find practical solutions to the challenges climate poses through green investments, renewable energy projects, and development of climate-resilient infrastructure (Weiskopf, 2021).

Its collaboration potential extends even beyond national boundaries also. As climate change is an issue in all parts of the globe, regional cooperation among nations within the Indian Ocean region will help develop joint knowledge and resources. For instance, the regional framework, Indian Ocean Commission (IOC), could possibly bring about cross-border collaboration regarding adaptation strategies toward climate change in fisheries, water, and disaster management (IOC., 2022). Regional networks' development will, therefore, enhance local

community resilience towards the adverse impacts of climate change without facing the challenges alone.

It goes even further, as new climate technologies and strategies, such as climate-smart agriculture and early warning systems for extreme weather events, would reduce the impact of climate change on Madagascar's vulnerable groups. These technologies would minimize the vulnerability of rural communities, enhance agricultural productivity, and improve food security (Clark, 2012). Renewable sources of energy, such as solar and wind power, may provide sustainable energy to the country by reducing the importation of fuels, thus providing support toward the country's carbon reduction goal (Bank., 2021).

In addition, there is increasing recognition in mainstreaming climate change adaptation into national development planning. Mainstreaming climate change within agriculture and infrastructure policies, as well as public health, enables the country to respond more coherently and effectively to the impacts of climate change. This also aligns with international frameworks, such as the Paris Agreement, which advises that climate change mitigation and adaptation should be put into the countries' agenda for development (UNFCCC, 2022). Therefore, despite the huge challenges that Madagascar faces, these challenges may become opportunities for innovation, collaboration, and sustainable development that pave the way for a more resilient future for the nation.

Conclusion and Recommendation

Past and present responses to climate change must be understood, future scenarios projected in terms of change, and biological responses modeled. With this kind of foundation, successful strategies to protect Madagascar's biodiversity against accelerating climate change could be developed. And if such knowledge is integrated together with these insights, a good and wise approach toward the very complicated interactions between humans and their biodiversities can be done, thus making safe recommendations for the island. Considering the biological standpoint, a proactive approach to managing their native forests is needed for enhancing the species response capability to climate change. The process is not only replenishment of degraded ecosystems but also protection and conservation of riverine forest corridors, of importance for maintaining biodiversity and ecosystem functions (Gardner C. J., 2021) .Apart from forest management, promotion of woodlots and other managed production systems can help in meeting local human needs and supporting biodiversity adaptation efforts. However, these interventions

are crucial but cannot replace the complex ecological functions provided by natural forests; hence a balanced approach combining human development and conservation goals is required. Two major biological assumptions underlie the effectiveness of these measures: first, that the mechanisms driving biodiversity responses to climate change, such as species migration and adaptation, will continue to function effectively; and second, that species will have enough dispersal and colonization capacities to track climate change across the diverse landscapes of Madagascar. Even though projections indicate that temperatures could be significantly increased by 2050, thereby threatening the survival of lowland species, the capacity of species to shift their ranges upwards and preserve forest habitat connectivity will be vital in maintaining biodiversity resilience (IPCC, 2022). However, if climate change were to continue unchecked during the 21st century, it would further limit the species' adjustments in their ranges, reducing the capacity of species to deal with the fast-changing climate. This calls for the urgency of global climate action as well as effective measures on climate adaptation to mitigate the worst effects on biodiversity. Besides biological factors, adaptation success in Madagascar will be determined by socio-political factors: continued political support by the Malagasy government and the international community. It is only through considerable financial investments that the unique biological heritage of Madagascar and the ecosystem services it supports can be preserved. These investments should be significantly greater than the funding levels now envisaged for conservation, including REDD+ and ecosystem service payments. Huge financial commitments are needed to maintain conservation programs and adaptation strategies that will safeguard Madagascar's biodiversity from climatic impacts that are already taking place (UNDP, 2022). However, human adaptation to climate change, such as human migration, changes in agricultural practices, and shifts in resource consumption, will have important implications for human as well as ecological well-being. Poor integration of human responses into policies for climate adaptation will not only exacerbate existing vulnerabilities but will also produce new threats to biodiversity. The management of natural resources must be sustained in terms of local community needs in a country as underdeveloped as Madagascar. Conservation efforts must therefore be holistic enough to recognize that human and environmental well-being are intertwined. Conservation strategies need to be designed in such a way that both biodiversity and living standards of local populations can resiliently face the changing climate as well (Tucker, 2020).

Summarizing, Madagascar is the fourth largest island on earth and the largest island in the Indian Ocean. Climate disaster has hit it that even the world community needs to act fast on these issues. The developed world, the industrialized nations responsible for a majority of global carbon emissions, needs to recognize that it plays a role in the intensification of the crisis in Madagascar. Though it is one of the biggest contributors to carbon emissions in the world, Madagascar suffers from being at the worst end, experiencing the worst ecological damages and livelihood loss due to climate change. In May 2021, an urgent appeal for $35 million in aid was launched to deal with growing food insecurities in southern Madagascar, where almost 750,000 people require assistance, issued by the World Food Programme. It's necessary that the international community, mainly the more developed countries, act urgently to give finances, technical aids, and capacity-building measures for the amelioration of the effects of climate change so that biodiversity in Madagascar and its populations can face and cope with climate changes.

The UN's approach to the disaster also involves research and advocacy and the distribution of funds and their active participation at the grassroots level. The industrialized world needs to wake up to its own realization about the fact that climate change has no barriers to national boundaries, and such a country, like Madagascar, which barely contributes toward the global emission, shall not bear its consequences as much. Only this will come about by way of efforts from the global community as it collectively aims at meeting the diverse influences climate change has brought over Madagascar and other vulnerable lands and contributes to the dual support, adaptation, as well as mitigations toward a brighter future.

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