

# Mitigation Policy Proposal



**SUBJECT:** Mitigation Policy

**TO:** Climate Policy Makers, Influencers, and Stakeholders

**FROM:** Mitigation Team, Emerging Leaders for Climate Action

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*"The water, energy, food nexus is at the heart of strategic climate commitments." - Walter Leal Filho, "Water, Energy and Food Nexus in the Context of Strategies for Climate Change Mitigation" (2020)*

## Executive Summary

The following research aims to provide context and recommendations on centering the water, energy, and food (WEF) nexus (Appendix I) in addressing the climate crisis, going beyond the standard definition of mitigation. This is apt, because, throughout the world, water usage and food systems are creating increasing demand for energy which is currently being provided via fossil fuels and therefore is carbon intensive. This fuels a vicious feedback loop in the form of worsening outcomes of climate change, less climate-resilient regions, and more fragile communities.

Our approach seeks to utilize a multi-vector and temporal approach. This means both top-down policy recommendations at the international, regional, and national levels and the bottom-up utilization of grassroots, locally-focused methods of incorporating relevant on-the-ground considerations. The approach also includes time-specific goal setting to provide short-, medium-, and long-term objectives to provide a pathway for all countries to address the multifaceted issue.



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## Background

Rapid mitigation of greenhouse gas (GHG) emissions via phasing out fossil fuels is key to achieving global climate goals such as the 2050 net-zero target as set out in the Paris Agreement and avoiding the most extreme outcomes of climate change. Meanwhile, some countries are already experiencing acute water and related food security concerns, further exacerbating conflict risk in water-scarce regions. The mitigation of GHG emissions, which largely come from our carbon-intensive energy system (~70%), is the defining, existential, and global problem. Amidst mounting evidence of human-caused climate change and growing pressure domestically and abroad, countries have started to plan and invest heavily in ways to decarbonize their economies to meet their commitments under the United Nations (UN) Paris Agreement. There have been growing efforts to finance mitigation efforts abroad as well, either bilaterally or through international agencies like the UN Green Climate Fund or other multilateral agencies like the World Bank. Private investors have also taken notice due to the profit potential. As such, mitigation investment accounts for over 90% of climate financing globally.

However, merely targeting mitigation via efforts towards decarbonizing industries alone risks downplaying the dire needs of existing groups that are currently facing the impacts of anthropogenic climate change. Furthermore, given that these impacts are felt disproportionately by people who have contributed the least to historical GHG emissions, it is an equity issue as well. Thus, as befitting a poly-crisis, a holistic approach must be taken at the policy planning and investment level to simultaneously address GHG emissions while at the same time also addressing the near- to medium-term impacts on water and food. In particular, such an approach could shift some of the climate financing currently earmarked for mitigation to address these concerns.

As alluded to above, energy systems negatively impact water supply. Carbon-intensive energy production, such as from fossil fuel power plants, is water-intensive due to cooling needs and contributes to water pollution. Furthermore, according to the Intergovernmental Panel on Climate Change (IPCC), the hydrological cycle is intensifying and becoming more unpredictable due to GHG-induced climate change, causing water security concerns around the globe. This causes an added problem for energy systems, particularly in some developing countries that are heavily dependent on water for power generation, such as Vietnam, Thailand, Laos, and Cambodia. Extreme fluctuations in major waterways make hydropower unreliable, forcing these countries to meet their energy security needs by other means. This usually means GHG-emitting power plants, thereby exacerbating climate change.



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The relationship between energy systems with their associated GHG emissions and water is also multidirectional. Maintaining water infrastructure has become one of the most energy-intensive systems across the world due to processes such as treatment and distribution. Furthermore, if the water demand increases (especially for supporting any water-intensive energy production or industries), more energy must be consumed to support that demand, and if this energy is produced from carbon-intensive means, this leads to more GHG emissions. The Environmental Protection Agency found in 2008 that the annual treatment and distribution of water creates as much global warming potential as 10 million cars, and data from the California Energy Commission's 2005 report suggests that “water-related energy use consumes 19 percent of the state’s electricity [and] 30 percent of its natural gas”.

Similarly, the relationship between GHG emissions, energy systems, and food is also complex. GHG emissions, which have led to global warming and also greater weather extremes, are affecting food security. However, the food sector also puts a strain on energy systems, such as through fertilizer production (which is energy intensive) and food distribution networks. As a major emitter of methane and nitrous oxide, both potent GHGs and a major driver of deforestation, the food sector also directly contributes to climate change. Ultimately, food accounts for ~20% of GHG emissions. As the global population continues to grow, leading to greater demand for food, these impacts will intensify.

Last, water and food systems also interact. The agriculture sector is a major user of water, especially in many agrarian countries (contributing up to 90% of water use), so growing food demand directly hurts the water supply. Meanwhile, climate change-induced changes in the hydrological cycle also hurt the agriculture sector.

## ***International Framing and COP 28 Goals to Keep in Mind***

The WEF nexus offers a paradigm to consider the issues of water security, food security, and carbon emissions synergistically, without neglecting one over the other. This intertwined dependency is critical, as these are key resource components to global stability. Thus, it is pertinent that mitigation targets from new Nationally Determined Contributions (NDCs) and international climate finance projects discussed at COP28 include considerations of how projects being pursued reflect impacts on water and food security. It is critical to consider the WEF nexus in mitigation to avoid disastrous delays in implementation, especially as it can be a critical handoff to the teams that are dedicated to developing adaptation strategies. Furthermore, bringing together Sustainable Development Goals (SDGs) and climate goals at the UN level opens paths to channel mitigation funding to meet critical needs. Last, as phasing out fossil fuels is central to mitigating climate change as well as WEF nexus concerns, it only further strengthens the capacity for a systemic solution that addresses a holistic issue.



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## Policy Recommendations

Our main goal is to elevate the water, energy, and food nexus into a policy framework that countries should consider when thinking about mitigation strategies for their respective territories. The following recommendations, designed after surveying existing literature on best practices (Appendix II), are process-focused and broad in strategy. They aim to be effectively applied to different geographical areas and maintain respect and acknowledgment of individual needs, challenges, and aspirations. For example, one pillar might take the lead in an agrarian country versus an industrial country. Depending on the stage of development of the relevant governmental bodies and infrastructure, priorities may differ; for developing countries, it is crucial that policies still enable the achievement of SDGs, while for developed countries, it may be more important to formulate a strategy for optimizing their industrial energy usage and invest in upgraded infrastructure. Nonetheless, regardless of the differences between countries, the policy implementation should provide a public service, equitably reduce the impact on humans, address price volatility, and anticipate policy conflicts.

Our first recommendation is to **identify a water stress and/or energy security index**. Such an index could be used for either corporate or national strategic decision-making or to inform climate finance projects. Such an index could be used in the national electricity grid (including decisions regarding what types of renewables to adopt and where to prioritize decarbonization efforts) or agriculture policy making.

Domestically, the water stress index can be used to prioritize fossil fuel plants for decommissioning. It can also be used for energy planning when determining decarbonization pathways. For example, nuclear power could be deprioritized due to high water needs. Also, green hydrogen should be produced or imported only from regions or countries with low water stress. In developing countries, such an index could be useful for the justification of corporate or government-level energy planning. It can also inform investments being made in this setting, such as international climate finance projects.

The second recommendation suggests **the development of a “nexus” agency** for programs that exist at the intervention points within the WEF nexus. This nexus agency can engage in cross-agency coordination, helping to avoid duplication of efforts or negative externalities. It can also prioritize the equity component with stakeholder engagement, quantification of impacts, innovation, and storytelling. It would include governmental policies and referendums on existing and repeat offenders for greenhouse gas emissions.



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Ethiopia, for example, has existing nexus agencies and working groups that convene to coordinate sources of funding for projects that address water, energy, and food, such as the Ministry of Water and Energy of Ethiopia. The Ministry is involved in the development, planning, and management of water and energy resources, policies, strategies, programs, and regulations and conducts studies and research activities. It also provides technical support to regional water and energy bureaus and offices. In the United States, there are existing agencies such as the U.S. Department of Agriculture (USDA), Department of Energy (DOE), and Environmental Protection Agency (EPA) that could convene similarly with more deliberate consideration of policy intersections.

Our third recommendation is to **create a framework for a cross-sectoral impact assessment**. This could look like an environmental impact assessment, except with a greater focus on the intersection with other agencies and public problems, as well as intersections on multiple time scales. This requirement can also be enforced at the UN level to ensure minimal policy leakage and also guide international climate finance best practices. The United States, with its existing environmental impact assessment requirements by the DOE under the National Environmental Policy Act (NEPA) for energy infrastructure projects, provides a model for how cross-sectoral impact assessment could be enforced and implemented at a national level.

The potential benefits of cross-sectoral assessments are manifold: for example, previous case studies show that such assessments can improve monitoring networks for water mismanagement. Setting accountability standards can also allow nexus agencies to make better decisions around domestic or international investments. In these assessments, the impacts on vulnerable populations can also be evaluated. On the other hand, the absence of a cross-sectoral impact assessment can be disastrous. For example, the Grand Ethiopian Renaissance Dam in Ethiopia, which was intended to produce hydroelectricity and facilitate flood protection in lower region areas, has potential negative impacts on various downstream countries like Sudan and Egypt, which could have been identified and ameliorated at the planning stage.

## **Further Considerations and Limitations**

These recommendations do not necessarily need to be implemented concurrently to be successful. Each governmental body should determine priorities based on its circumstances, such as its stage of development and existing decarbonization plans to meet Paris Agreement commitments. It is also pertinent to understand that developed nations will most likely be mature at implementing these recommendations and must therefore enforce stricter requirements as developing nations work to upgrade their infrastructure to be able to meet them as well. To increase the rigor of implementation regulation, these recommendations could be enforced at the UN level.



Having a cross-sectoral assessment framework allows countries to not only understand how to evaluate critical infrastructure projects in support of their constituents but also enables them to make decisions strategically over multiple time horizons. These assessments can serve as scorecards for mitigating climate change and can be tied to economic and developmental goals and the SDGs. They serve as the primary evaluation method for supporting decarbonization commitments, and they also establish a methodology for governmental bodies to understand and prioritize their projects. Thus, while there are worries that having these additional considerations could hamper the speed of decarbonization, as observed in the United States with the permitting debate, it is arguable that to minimize policy and infrastructure lock-in, it is important to consider the problem holistically to ensure that the pathway chosen minimizes the immediate impacts on those who are facing the brunt of climate change.

Another central point is monitoring and enforcing these recommendations. This can be achieved at the UN level, with the UN having overseen the Global Stocktake process under the Paris Agreement. While the UN has also found it difficult to enforce decarbonization commitments made by governmental bodies, they have proven to be able to at least keep countries accountable through reporting requirements, and it is probably the most appropriate body for this task. Additionally, country-level commitments are known to be more easily enforced than a blanket pledge sign-on that does not include unique characteristics from one governmental body to another.

## Conclusion

Water and food systems are impacted by climate change. Climate change is already felt worldwide, from worsening droughts to longer and more intense heat waves. These conditions are to the detriment of global water and food security. Moreover, water and food systems also impact climate change itself. The WEF nexus and our proposed framework aim to address not only the immediate impacts but also the impacts on future generations in a holistic way that ties mitigation to other key pillars of the UN Framework Convention on Climate Change (UNFCCC), such as adaptation.

Fossil fuels need to be phased out as quickly and efficiently as possible if we are to minimize further climate change impacts, which to date have been felt most severely by the worst off in the world. Our framework provides not only a strong reason to move away from fossil fuels given their indirect and direct effects on issues related to the WEF nexus but also provides a multi-tiered process for identifying decarbonization pathways that will minimize impacts on the WEF nexus and highlight the negative feedback loop that exists between these issues.



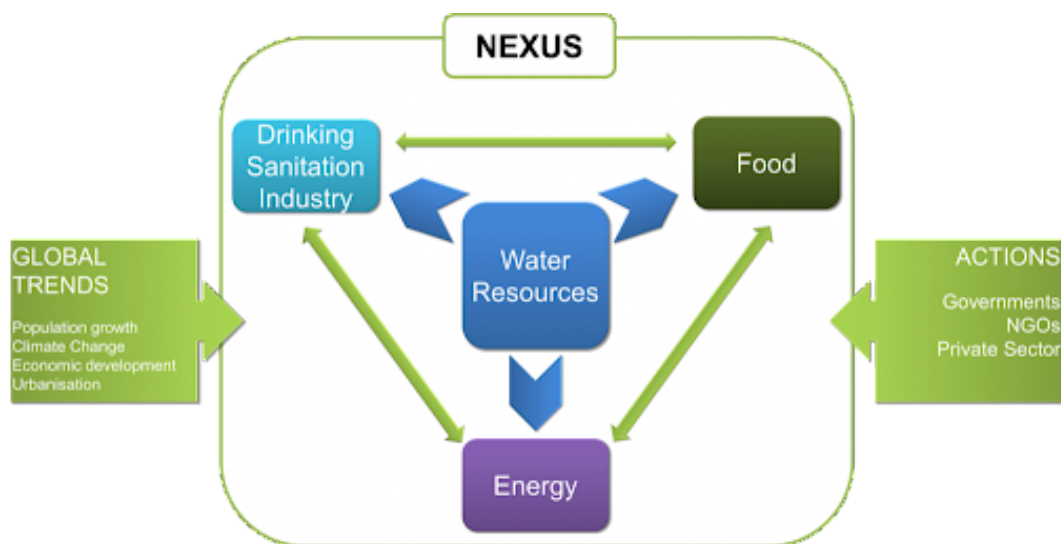
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## Appendix

### Appendix A: Charts and Visual Resource on WEF Nexus

Figure 1. "Water-Food-Energy Nexus: Towards a Widening of the Water Agenda – FutureWater." n.d. Wwww.futurewater.nl. Accessed November 5, 2023. <https://www.futurewater.nl/projects/water-food-energy-nexus/>.



### Appendix B: Contact Information

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## Appendix C: Existing Water-Energy-Food (WEF) policies

<b>Denmark:</b> Established a water-energy-food nexus multisectoral agenda	W/E/F
<b>France:</b> Cross-sectoral investment (dam), allows sharing of resources	W/E
<b>Tunisia:</b> Water allocation and rationing	W/F
<b>Spain:</b> Water buyback payment scheme (agriculture)	W/F
<b>India:</b> Defining % of energy grid intended for agriculture use	E/F
<b>India:</b> Solar pumping system for groundwater, allows for sale of excess	W/E/F
<b>Pakistan:</b> Subsidizing water for irrigation at different prices based on the crop	W/F
<b>Nepal and Ethiopia:</b> Establishing a nexus Agency/Ministry	W/E/F
<b>Brazil:</b> Sub-national action committees	W/E/F
Input subsidies, for both energy and water	W/E
Market and infrastructure development	W/E/F