



# United Nations Environmental Programme

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<http://www.uvureview.com/media/2013/03/climate-control-2.jpg>



# Hypoxic Dead Zones

## Topic Background

Hypoxic dead zones are naturally occurring events. They are caused by a growth of massive quantities of algae known as algal blooms. When the algae dies, bacteria feed on them and as they do so, suck up the oxygen in the water. When the oxygen levels deplete to a low enough point the marine area can no longer support any sort of marine life, forcing the marine life that was currently present in the area to either go to other waters or die in the area. The algal blooms also cause these dead zone waters to turn a deathly brown resulting in an even physiological manifestation of the hypoxic dead zone (Silverman). These habitats that are normally brimming with life and organisms get turned into biological deserts.

Hypoxic dead zones occur naturally through just a seasonal basis where algae will bloom and cause these zones and their presence are actually a benefit to the ecosystem when created naturally, however with the advent of modern agriculture and the utilization of nutrients and fertilizers human activities are causing a larger percentage of these hypoxic dead zones to be created. There are many factors that lead to hypoxic dead zones: physical, chemical, and biological factors; however, the most concerning human factor is our rapid influx of nutrient pollution. These excess nutrients run off land and are then sent as wastewater into both rivers and coasts. This causes an overgrowth of algae, which then proceeds to sink and thus decompose in the water, which then sinks and depletes the oxygen available to marine life (What is a Dead Zone?). There is no country or part of the world immune to this action.

It has been estimated that in the 1960s there were 49 dead zones, in the 1970s there were 87, in the 1980s there were 162, and in a recent count there were 405 (SF Gate). This growth is unprecedented and can continue to still climb. There are many detrimental effects to a hypoxic dead zone. The lower oxygen levels have led to reproductive problems in fish mainly reducing the size of their reproductive organs and prevent spawning. This could have lasting ramifications on many sectors besides the marine ecosystem. A deficit of fish will lead to huge socio-economic ramifications due to our dependency on fish and marine goods (Environmental Economics and Policy).

Though the two pieces of geographical formations seem to be separate they are inextricably linked. The direct connection between land and sea is “best exemplified by the



relationship between estuarine and coastal fisheries production and land-derived nutrients” with the most productive fisheries zones are associated with significant inputs of land runoff and oceanic upwelling (NOAA). However the problem arises when the amount of nutrients exceeds the population that is able to absorb them.

Overall hypoxic dead zones are a naturally occurring event, however as with most environmental disasters being increased by human actions. And since we have caused them, it is our responsibility to clean it up.

## **UN Involvement**

The United Nations has made efforts to reduce the production of hypoxic dead zones across the globe. To begin with they have been pushing to reduce industrial emissions in areas around the globe where dead zones have become a serious problem (Scientific American). One of the key players in the reduction of hypoxic dead zones across the world is the Global Environment Facility (GEF) and the Scientific and Technical Advisory Panel (STAP) administered under the United Nations Environment Programme (UNEP). The GEF was commissioned to write a report on the state of hypoxic dead zones.

The GEF’s regional projects have incorporated 45 countries ranging from East Asia, the Mediterranean, and the Danube-Black Sea in an effort to reduce coastal pollution, conducting 23 national projects with \$144 million in grants and \$1.94 billion in co-financing (Iwlearn). The report founded the following recommendations to prevent hypoxia:

1. Urgently increase support to nutrient reduction projects.
2. Establish principles to support tests of management responses to permanent and seasonal hypoxic zones.
3. Develop a toolkit for evaluating hypoxia that can be used to evaluate new projects. It could be similar to the current Persistent Organic Pollutants Toolkit and should be available on GEF’s IW:Learn website.
4. Tools to address hypoxia and nutrient reduction that have already developed by GEF’s Large Marine Ecosystem projects should be included in its International Waters Transboundary Diagnostic Analysis and Strategic Action Programs.
5. All Large Marine Ecosystem (LME) projects should examine hypoxia in their areas and establish a monitoring, prevention and remediation program if one does not already exists.



6. Hypoxia research proposals should be developed to learn more about the problem and to guide GEF responses. They should also address the associated problem of disruption of the global nitrogen cycle.

The UNEP has been dealing with hypoxic dead zones since its inception, monitoring them, and assessing their damage. However little has been done in terms of international protocols and resolutions that actually create a sort of cohesive solution to the issue. This yields to creativity and originality from the member states in this organization to be a part of the solution.

## Case Studies

### 1 | Gulf of Mexico

Shrimp trawlers first identified the ‘dead zone’ in the Gulf of Mexico in 1950. Twenty years later, the size of the hypoxic zone had increased extensively, prompting a scientific investigation. Residing off the coast of Louisiana and Texas, the Gulf of Mexico’s dead zone is currently the largest hypoxic zone in the United States. Because of the Gulf’s location, at the bottom of the Mississippi River, the Gulf of Mexico acts as the drainage area for 41% of the US. Receiving excessive amounts of high-nutrient runoff, released from the treated sewage of urban areas as well as agricultural runoff, the Gulf of Mexico accumulates over 1.7 million tons of potassium, nitrogen, and phosphorus a year.

In the Gulf of Mexico, commercial and recreational fishing make up one of the most lucrative industries. The Gulf of Mexico is a major contributor to the international seafood industry. The large and imminently growing dead zone poses a huge threat not only to the environment but to the surrounding economy; fisherman and coastal state economies will be heavily impacted if the high nutrient runoff is not controlled and if preventative measures are not taken. Minimizing the Gulf of Mexico dead zone requires action be taken to address the problem at the source- the runoff of excess nutrients from farmland, water pollution from animal waste, discharge of septic systems and sewage treatments, and discharge of organic matter, nutrients, and chemicals from manufacturing facilities. By attending to these relatively direct problems, the input of nitrogen and phosphorus into the Gulf of Mexico can be significantly reduced.



## 2 | Baltic Sea

Without doubt, the largest dead zone in the world is the Baltic Sea. The deterioration of ecological integrity in this area of the world is once again due to anthropological factors of increasing chemical nutrient runoff. This has resulted in classic ecosystem changes that in hindsight should have been planned for; these include phytoplankton species composition changes, algal blooms, seagrass habitat loss, and a severe lack of oxygen.

The causation of growths of hypoxic dead zones in the coastal areas of the Baltic Sea can be assigned to two factors. One of them is nature orientated, though there can be argument that it is being impacted by human activities, that being stratification in areas of coastal zones due to seasonal temperature changes. However, the largest issue is large loads of nutrients that are flooding the many areas of the Baltic Sea such as the Danish Straits, which causes algal production, and stratification caused by salinity differences between deep and surface level water. In the Swedish and Finnish archipelagos, large nutrient dumps from urban and agricultural sectors also stimulate phytoplankton growth. However, what is interesting to note is that hypoxia is rare to nonexistent in the northern parts of the Baltic Sea as well as along the eastern shore; the northern shore having no nutrient dumps and the eastern shore having an enhanced circulation of water in areas along the coastline (Conley).

### Questions to Consider

1. Whose responsibility is it to clean up the hypoxic dead zones? Regional based? Or who contributed the most?
2. How can nutrient flooding be solved in lesser-developed nations?
3. What technologies are available to us that will allow us to achieve the same yields, while minimizing nutrient run off?
4. How do we deploy these sorts of technologies on a global scale?
5. How can we bring these dead zones back into the marine ecosystem while also ensuring that sustainable fishing can be held?



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# Climate Refugees

## Topic Background

Global warming, climate change, higher intensity natural disasters have plagued the Earth in an exponential growth since the advent of the Industrial Revolution that has caused unprecedented amounts of Carbon Dioxide to be released into our atmosphere. The rapidly changing environment has led to issues in our own human population.

“Climate Refugee” is a term that was originally coined in the early 1980s, but as climate change has begun to become more and more recognized by the public that term has gained traction and interest. There is no official definition for the term Climate Refugee though there are multiple interpretations of the term. One that has been popularly recognized, though I advise you to come up with your own definition that suits your country and policy, is one proposed by The Global Governance Project which defines Climate Refugees as:

*“people who have to leave their habitats, immediately or in the near future, because of sudden or gradual alterations in their natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity.” (GloGov)*

The term refugee, without the climate prefix attached to it, is defined by the 1951 Refugee Convention, as someone who "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality, and is unable to, or owing to such fear, is unwilling to avail himself of the protection of that country."(Refugees)

This definition has led to quite a bit of conflict in defining or even recognizing Climate Refugees due to the fact that climate change refugees are based within their country origin and are not running from persecution or harassment, but rather a literal loss of their homeland that is inhabitable.

Here are the facts as told to me by earthreform: 12 million people live in poverty because of climate change, 26 million people have been displaced as a direct result of climate change, 250 million people are affected by desertification, 508 million people in water-stressed or water-scarce countries, and 2.8 billion people live in areas of the world prone to more than one of the



physical manifestations of climate change: floods, storms, droughts, sea level rise (EarthReform).

The communities at most risk for extreme impacts from climate change are in the global south. The largest amount of refugees escaping from extreme weather events and sea-level rise will most likely be from Africa and Asia while small island nations risk potential flooding and destruction from even a very moderate sea-level rise.

## **UN Involvement**

As probably most of you have already assumed the UNHCR is the UN organ tasked with achieving any sort of resolution in this topic. The UNHCR is “a leading agency of the United Nations responsible for and possessing the expertise in the area of forced displacement” (UNHCR News). The Representative of the Secretary-General on the Human Rights of Internally Displaced Persons, Walter Kalin, identified five climate change-related scenarios that may directly or indirectly cause human displacement: hydro-meteorological disasters (flooding, hurricanes/typhoons/cyclones, mudslides, etc.); zones designated by Governments as being too high-risk and dangerous for human habitation; environmental degradation and slow onset disaster (e.g. reduction of water availability, desertification, recurrent flooding, salinization of coastal zones, etc.); the case of ‘sinking’ small island states; and, violent conflict triggered by a decrease in essential resources (e.g. water, land, food) owing to climate change (The Brookings Institution).

The UNHCR has recognized that some movements that have been prompted by climate change would fall inside the traditional refugee law framework, which would allow them to be privy to multiple forms of protection as within the UNHCR mandate (Refworld). However the UNHCR does not feel the need to recognize the term climate refugee, or environmental refugee as they feel it may undercut the current status quo. Also many states and NGOs have pushed for expanding the original 1951 Refugee Convention that first defined refugee status and their protections. However the UNHCR has also blocked that initiative due to the fact because they are afraid of a renegotiation of the 1951 Refugee Convention and may even result in the eventual failure of the whole international refugee protection regime (Refworld 2).

The United Nations Secretary-General is committed to creating responses to these climate change induced disasters. In fact on 22 September 2009 the Secretary-General hosted a



Climate Change Summit in New York to help countries get ready for climate change related issues.

The UNHCR has made moves though to begin to respond to natural disasters and the refugee problem arising from them. Since the Indian Ocean Tsunami in December of 2004 the UNHCR has responded to over 20 natural disasters providing funding and/or aid supplies. Overall the UNHCR has already begun an international dialogue to address all of these questions and these “protection gaps” that were posed by climate change issues (UN News Center).

## Case Studies

### 1 | Darfur

The conflict in Darfur is one of the first acts of brutality that resulted in large amounts of refugees being created due to climate change. The crisis has been attributed to partially by a decline in rainfall over the past 30 years as the region’s population began to grow exponentially almost doubling which caused conflict over any sort of arable land. In fact arable land was not the only thing missing from the Darfur area, one of the largest obstacles to posting peacekeepers to Darfur is a lack of a water supply for them, which can shed light on the severity of the water crisis in Darfur (Crisis in the Drylands).

It has been found that civil wars are much more likely to happen in warmer than average years, with one degree Celsius warmer temperatures in a given year result in an almost 50 percent higher likelihood of conflict in that year (Scientific American). The Darfur conflict resulted in hundreds of thousands of civilians displaced and dislocated. Climate change does more to our society than purely change the climate; the effects extend far beyond just our environment and things we consider outside of our anthropocentric lives. It manages to infiltrate into our society in ways we could not previously imagine. The Darfur conflict is a perfect example of a situation in which climate change affected not only an environment but also a group of people who began to compete for land and resources resulting in an increase in violence, death, and refugees; refugees with no home to call their own and no place to run to.

### 2 | Maldives

The Maldives is an island nation located in Southern Asia to the southwest of India. An incredibly small nation only about 1.7 times the size of Washington D.C., the Maldives hold significant amount of weight in the climate change refugee crisis as they risk complete



destruction if the current rates of change persist (CIA). Consisting of just 393,595 total people, the Maldives is consistently at the forefront of every climate change discussion. In August of 2006, the government of the Maldives organized a meeting of representatives of governments, environmental and humanitarian organizations, and United Nations agencies on an issue that had until then been largely outside the climate policy debate: the protection and resettlement of climate refugees (Republic of Maldives).

The Maldives is so concerned with the state of climate change because of the fact that it holds the record of being the lowest lying country in the world. The entire nation is built on coral reefs rather than stone and cement resulting in the nations own foundation to be incredibly weak and unprotected. Therefore with rising sea levels and rising acidity the Maldives faces an actual threat of being swept into the ocean. In 2012 Mohamed Nasheed began to tell Australia that it should begin to prepare for a huge influx of climate refugees from the Maldives. The Intergovernmental Panel on Climate Change (IPCC) has made a prediction of a sea level rise of up to 59 centimeters over the course of the next century; this level is more than enough to flood the majority of the Maldives (The Age). The Maldives has already began to stockpile funds and land overseas to move the relocation of the country's 350,000 people. Already fourteen islands in the Maldives have already been abandoned because of the constant erosion against the coral reefs.

The Maldives is a perfect example of the intensity of impact that climate change will bring. The nation has already begun to prep itself as if a nuclear war is coming rather than something like climate change. Their circumstance has shown us why we as an international community need to begin to prep for the inevitable, a series of events that will lead us into a new era of refugees.



## Questions to Consider

1. What is a climate refugee? How can we define this to be internationally recognized and understood?
2. Who should bear the burden of the climate refugee? Developed nations or developing nations? How should this responsibility be shared?
3. How should refugee camps be formed with the impending climate refugee situation?
4. What are steps we can take to prevent the climate refugee situation?
5. With the large span of problems that climate change will bring how can nations work together to reduce emissions and prevent the climate refugee situation?



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