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Food Security's Unholy Trinity – Environmental Degradation, Climate Change, and Migration

Food insecurity, starvation and malnutrition are not restricted just to the developing world. According to Danny Marks, environmental degradation, climate change and migration are increasingly compromising food security throughout the globe.

By Daniel Marks for ISN

It has been estimated that almost one billion people - or one in seven out of the global population - are either hungry or acutely malnourished. Among the most recent additions to this statistic are an estimated [43 million people](#) affected by severe food shortages in Yemen and sub-Saharan Africa. However, food insecurity is also experienced by communities in the developed world. In 2011, for example, [nearly 17 million](#) Americans suffered from "very low food security," meaning that they had to skip meals or not eat for a day because they lacked enough money to buy food.

The number of people facing food insecurity, which the [US Department of Agriculture defines as](#) a household-level "condition of limited or uncertain access to adequate food," is projected to continue rising as the impact of climate change and population growth accelerate, the environment further degrades, people migrate, and natural resources become scarcer. According to Oxfam, the costs of key staple foods are predicted to increase by [120-180% by 2030](#) (see [Figure 1](#) below), which would be disastrous for food-importing countries and could spark protests and riots throughout the world. An upsurge in food prices led to uprisings in at least 30 countries in 2008 and was a key trigger in the recent demonstrations in the Middle East. As the economic group most affected by higher food prices, the poor normally comprise the majority of the protesters.

Figure 1: Projected real food price changes over the next 20 years

Simply put, climate change multiplies the risk of hunger. And as the effects of climate change are likely to intensify in the coming years, the challenges posed by food insecurity are also expected to increase. “With each passing year the climate system and agricultural system are out of sync with each other,” says Lester R. Brown, president of the Earth Policy Institute. To add substance to this argument, Brown [points to](#) scientific research that predicts that for each Celsius degree rise in temperature during the growing season, grain yields fall by ten percent. Research also shows a one degree Fahrenheit (0.6 degree Celsius) rise in global temperature since 1970 and has even [concluded](#) that during the last 60 years the planet is nowadays experiencing the most frequent bouts of hot weather. As an illustration, July 2012 was the hottest month recorded in US history.

[According to Aiguo Dai](#) of the National Center for Atmospheric Research, “recent warming has caused widespread drying over land . . . and model predictions suggest that this drying is likely to become more severe in the coming decades.” Arguably among the most striking examples is the recent drought in the United States, the worst in 50 years. Blanketing 63% of the mainland, the drought withered one-sixth of the country’s corn crop and pushed the price of corn to an [all-time high](#). Largely as a result of this drought and poor crops in the Black Sea regions, [food prices in August were close](#) to levels reached during the food price crisis in 2008, which incited riots around the world.

In addition, floods are also expected to become more frequent and intense as a result of changing precipitation patterns and rises in sea-levels. For example, the widespread and long-lasting flooding in Thailand in 2011, which was [largely caused by very high rainfall](#), damaged more than two million hectares of farmland. After the flooding, an [outbreak of a rice pest](#) further exacerbated rice farmers’ problems.

More positively, although agricultural yields are predicted to decline globally because of climate change, some previously infertile regions [will become greener](#), such as parts of Scandinavia and the Sahara. Accordingly, the world must be prepared to face and work with geographical variations in the impact of climate change.

Environmental Degradation: Degrading Food Security Too

Compounding the threat of food insecurity is environmental degradation, caused particularly by over-pumping and the loss of topsoil. Agricultural supply is being constrained not only by climate change but also by growing water shortages. Brown [estimates](#) that one half of the global population live in countries where water tables are falling as a result of over-pumping for irrigation. A [2010 study](#) by the University of Utrecht and the Dutch research institute Deltares also found that the rate at which critical groundwater aquifers around the world were being depleted doubled between 1960 and 2000.

Over-pumping in India remains a particularly acute problem. A [2005 World Bank report](#) found that in India, where farmers have drilled more than 21 million wells, 175 million people are being fed by grain produced by over-pumping. Yet, over-pumping by definition is merely a short-term solution to problems. When aquifers are exhausted, harvests plummet – a phenomenon most recently experienced in Middle East countries like Saudi Arabia and Yemen. In this subregion, water shortages have caused irrigated areas and grain production to shrink. Similarly, in Texas and California, the amount of irrigated area has [shrunk by 10%](#) during the last decade.

Loss of topsoil is also a major concern because it reduces productivity and causes some previously-fertile areas to become barren. The Earth Policy Institute [estimates](#) that approximately a third of the world’s cropland is losing topsoil at an excessive rate, with further studies on U.S. crop yields revealing that each inch of lost topsoil causes wheat and corn yields to decline by almost six percent.

Overgrazing is one of the primary causes of topsoil loss. By destroying permanent vegetation, it enables wind and water to more easily erode topsoil. This is a particularly big problem in China where around ten dust storms strike the country each year. The number of China's cattle, sheep, goats, and yaks has [quadrupled in the last 50 years](#) to 400 million. Many of these animals graze on hills and steppes, thereby uprooting vast patches of grassland. After the topsoil becomes loose, winds blow it away, creating dustbowl and transforming land into deserts. Another large dustbowl has also formed in central Africa and is expanding rapidly.

Agricultural plantations – especially pulp, paper, and rubber – are also major culprits of environmental degradation. During the last decade, mono-crop rubber plantations in China's Yunnan province have not only contributed to [severe soil erosion](#), but also badly damaged biodiversity and depleted water resources. According to [a recent report on the drivers of deforestation and forest degradation](#), commercial agriculture is also major cause of deforestation in Latin America. And in Southeast Asian countries like Laos and Cambodia, deforestation affects [indigenous populations](#) that rely on the forests for their livelihoods.

Linkages between Migration and Food Security

Vulnerable groups facing environmental degradation and chronic food insecurity also tend to migrate involuntarily to other areas. By contrast, regular seasonal migration is often planned and can help communities maintain food security, particularly through remittances sent by migrant workers. For example, in dry areas of West Africa, young rural adults “eat the dry season,” by [migrating to urban centers](#) and sending most of their earnings back home to communities that cannot produce as much food during the wet season. The same is also true in Southern Africa, where [93% of remittances](#) sent by migrant workers are used to buy food.

Accordingly, the groups most prone to food shocks are those who cannot leave home, such as the elderly, young, and sick. They are the most dependent upon migrants, and families without them face serious long-term hunger risks. Additionally, rural migrant workers often [live in slums](#) in environmentally hazardous areas lacking adequate facilities such as shelter, sanitation, and healthcare. Living in these areas makes them more susceptible to starvation and malnutrition, especially after natural disasters.

A [study of rural-urban migration in Nigeria](#) reveals that migration can have a number of pernicious effects on food security too. First, new migrants can create intense job competition in urban areas which can lead to wage reductions, increased unemployment within local communities and sporadic outbursts of violent opposition to mass migration. Second, because the young and healthy are the ones who migrate, the labor force in the village decreases. To make up for the labor shortages, some farmers use more chemicals which damages the soil in the long-run. Third, in some rural areas labor shortages also caused local food prices to rise, due to reductions in food production.

Ignoring the Problem at Our Peril

The ‘unholy trinity’ of climate change, environmental degradation, and migration will undoubtedly compromise global food security for the foreseeable future. And while the most recent spike in food prices [has recently regressed](#), it was nevertheless the third food crisis since 2008. “Yet there is nothing meaningful being done by the international community to deal with this situation,” argues Lester R. Brown. According to Brown, the reason for inaction is that advanced countries have yet to be dramatically affected by rising food prices. However, he also sees a future in which the developed world will have to address the problem of global food price hikes as demand increases, due to population growth, and to higher consumption patterns, and as food supply tightens. As a response, Brown urges the international community to stabilize both the climate and world's population and to

launch a global effort to raise water productivity. Yet the lack of a breakthrough in recent international climate change talks, continuing population growth, and limited investments in water projects suggest that his calls have not yet been heeded.

Daniel Marks is a PhD Candidate at the University of Sydney's School of Geosciences. He holds an MA from the Johns Hopkins University School of Advanced International Studies (SAIS) in International Affairs.

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