# Environmental Updates

## November 2017

Designed for use with the Global Development And Environment Institute's *Environmental and Natural Resource Economics* textbook

# Scientists' Warning on Global Ecosystems

Twenty-five years ago, in 1992, a "World Scientists' Warning to Humanity" was issued by a group of more than 1700 independent scientists from all over the world, including a majority of living Nobel Laureates. Their message was clear: if drastic changes did not occur rapidly in the way human civilization interacts with its natural environment, "human beings and the natural world are on a collision course," rapidly approaching the limits of what the biosphere could tolerate in terms of damage involving ozone depletion, freshwater availability, marine life depletion, ocean dead zones, forest loss, biodiversity destruction, and climate change.

In November 2017, more than 15,000 scientists signed a second warning with even greater urgency, noting:

> With the exception of stabilizing the stratospheric ozone layer, humanity has failed to make sufficient progress solving these foreseen environmental challenges, and alarmingly, most of them are getting far worse…Soon it will be too late to shift course away from our failing trajectory, and time is running out. We must recognize, in our day-to-day lives and in our governing institutions, that Earth with all its life is our only home.

The major areas of ecosystem damage identified by the scientists include:

### Climate change:

$CO_2$ emissions have grown from 25 gigatons per year in 1992 (one gigaton or Gt = 1 billion tons) to 39 Gt per year in 2017; the elevation of temperature compared to pre-industrial times was 0.25°C in 1992, and has risen to 1°C today.

### Deforestation:

The planet has lost over 100 million hectares of forested land in 25 years. The worst losses are in tropical areas, but temperate forests have also lost significant area.

### Biodiversity loss:

"We have unleashed a mass extinction event, the sixth in roughly 540 million years, wherein many current life forms could be annihilated or at least committed to extinction by the end of this century". Between 1970 and 2012 vertebrate species abundance has declined by 58% — by 31% for terrestrial populations, 36% for marine populations, and 81% for freshwater populations.

### Ocean pollution and fishery loss:

In oceans, dead zones created by the eutrophication of rivers and estuaries (caused by the use of chemical fertilizers in agriculture and industrial pollution) are affecting almost 650 regions of the world's oceans, compared with 400 in 1992. The global catch of wild fish has declined since 1992 even as population growth has led to greater demand for fish as a protein source.

### Freshwater decline:

Freshwater resources per capita have declined 26% since 1992, with projections of a 40% global water deficit by 2030. 20% of the world's aquifers are being overexploited, leading to declining groundwater levels and seawater intrusion in coastal areas.

### Failure to curb human population growth:

There has been a 35% increase in human population since 1992, amounting to an additional 2 billion people,

increasing pressures on land, water, and atmospheric ecosystems, with at least another 2 billion expected by 2050. Accompanying human population growth has been a 20% growth in the numbers of ruminant livestock (from 3.2 to 3.85 billion), adding to a major ecological footprint in terms of greenhouse gases emissions and pressures on agricultural lands and water resources.

Some signs of progress include:

- reduction in extreme poverty and hunger worldwide;
- reduction in fertility rates, notably through important investments in girls' and women's education;
- reduction in deforestation rates in some regions; and
- the rapid growth of the renewable energy sector.

But according to the scientists,

> "the advancement of urgently needed changes in environmental policy, human behavior, and global inequities is still far from sufficient".

They call for additional measures including:

## Economic policies:

- divesting of monetary investments and purchases to encourage positive environmental change;
- devising and promoting new green technologies and massively adopting renewable energy sources while phasing out subsidies to energy production through fossil fuels;
- revising our economy to reduce wealth inequality and ensure that prices, taxation, and incentive systems take into account the real costs which consumption patterns impose on our environment.

## Environmental policies:

- prioritizing the enactment of connected well-funded and well-managed reserves for a significant proportion of the world's terrestrial, marine, freshwater, and aerial habitats;
- maintaining nature's ecosystem services by halting the conversion of forests, grasslands, and other native habitats;
- restoring native plant communities, particularly forest landscapes;
- developing policies to protect and restore threatened species and ecological processes.

## Behavioral changes:

- promoting dietary shifts towards mostly plant-based foods;
- reducing food waste through education and better infrastructure;
- drastically diminishing per capita consumption of fossil fuels, meat, and other resources in developed countries;
- further reducing fertility rates in developing countries by ensuring that women and men have access to education and voluntary family-planning services, especially where such resources are still lacking.

Ultimately, the scientists conclude that the immense task ahead will require a strongly mobilized civil society to put pressure on political leadership:

> Scientists, media influencers, and lay citizens must insist that their governments take immediate action as a moral imperative to current and future generations of human and other life. With a groundswell of organized grassroots efforts, dogged opposition can be overcome and political leaders compelled to do the right thing…Now, as an Alliance of World Scientists and with the public at large, it is important to continue this work to document challenges, as well as improved situations, and to develop clear, trackable, and practical solutions while communicating trends and needs to world leaders. Working together while respecting the diversity of people and opinions and the need for social justice around the world, we can make great progress for the sake of humanity and the planet on which we depend.

Sources:
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