Reform Food Production to Save Ecosystems & Biodiversity

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Ministers from around the world met in Nagoya late last year for a high-profile summit billed as a critical chance to save the world's besieged biodiversity.

The meeting of the Convention on Biological Diversity (CBD) had a welcome sense of urgency, given that even the modest target set in 2002 of reducing the rate of biodiversity loss by 2010 has proved beyond reach. And it produced some useful results, including new targets to expand the coverage of terrestrial areas protected from 10% to 17% and that of coastal areas protected from 1% to 10%, both by 2020.

Unfortunately, while necessary and welcome, these protected-area expansion targets do not address the underlying drivers that are reducing the variety of life on Earth. In addition to putting a band-aid (more protected areas) on the tide of species loss sweeping the planet, delegates should have done more to address the root cause of the problem: the ways in which we meet our need for food.

What does food supply have to do with conserving species? Everything. Farming or fisheries are a leading factor in all five of the principal pressures causing biodiversity loss *(see Chart)*. Given these pressures, it is in working *with* the community focused on food security that the CBD strategy is most likely to be effective in sustaining the ability of ecosystems to provide services for people in the future.

Food production: key factor in biodiversity loss

Habitat conversion
Approximately 43% of tropical and subtropical forests and 45% of temperate forests have been converted to croplands.

Overexploitation
70% of global freshwater use is by agriculture, reducing its availability for other uses.

Invasive species
The introduction of alien aquatic species has led to the extinction of native species in many parts of the world.

Pollution
Only a fraction of nitrogen applied as a fertilizer is typically used by plants, and the rest ends up in inland waters and coastal systems, creating eutrophication and dead zones.

Climate change
Agriculture directly contributed to around 14% of global greenhouse gas emissions in 2005 and drives additional emissions through its role in deforestation.

Policymaker's Paradox

Delegates at the Nagoya meeting faced a paradox. Dramatic increases in food production over the past 50 years have supported significant improvements in human well-being. But at the same time, this trend has diminished Earth's diversity and capacity to provide ecosystem services (including fish, food, freshwater, pollination and water regulation). Scientists worry that this results from a time lag between the degradation of ecosystems and the resulting effects on human well-being. The Brazilian Amazon, for example, could reach a tipping point due to deforestation beyond which it experiences widespread die-back and transitions into savanna-like vegetation. The reductions in rainfall would devastate efforts to raise crops and cattle in the region.

Upping the challenge, population growth and rising per capita income are expected to double the demand for food in the next 40 years, according to the UN's food and agriculture chief, Jacques Diouf.

Implications for 2020 Biodiversity Strategy

Given these challenges, the 2020 global biodiversity strategy agreed in Nagoya needed to focus first and foremost on reducing the pressure of food production on biodiversity and ecosystems. The CBD's priority for the years ahead should be to take a quantum leap in its partnership with food producers, finding ways to change how the world achieves food security before ecosystems reach critical tipping points in the face of climate change and growing demand for food. Three key, practical strategies can help meet the goal of maximizing the use of existing land for food and minimizing further ecosystem loss.

Photo: Flickr/wan_hong

Active replanting of various Rhizophora species for a mangrove restoration project in eastern Thailand

Photo: Flickr/micke-fi

Helsinki, Finland – Algae bloom in Baltic Sea

Photo: Flickr/Sam Beebe-Ecotrust

Amazon forest – original, cleared and planted

Photo: World Resources Institute, Dan Tunstall

Farmer plowing field

Freshwater irrigation in Tambhol Village, India

Irrigation

Animal farming

Restore degraded land

Globally, more than one billion hectares of land are believed to have restoration potential. Restoring even a small part of this for food production would help reduce pressure on ecosystems. In Indonesia, for example, the World Resources Institute is seeking to develop a scalable model for diverting new oil palm plantations that would otherwise replace virgin forests onto degraded land. Similar opportunities exist to divert the expansion of cattle ranches from the Amazon's forests to degraded land. The new Target 15 agreed in Nagoya of restoring at least 15% of degraded ecosystems by 2020 is a welcome start in turning government focus to restoration, but it stopped short of recognizing the need to use some restored land for food production.

Increase productivity on existing farmland

While intensification doesn't immediately come to mind when thinking about conservation, it is nevertheless a key strategy to reduce stress on natural ecosystems. The challenge is to find ways to get more food out of land without the unwanted consequences such as ecosystem service tradeoffs that have dogged intensive production systems. We need to deploy proven technologies that use ecosystem services much more efficiently such as new varieties of seeds, drip irrigation, integrated pest management and conservation agriculture. At the same time, we must make major investments in further innovation and a new generation of technologies. The Nagoya strategy addresses unwanted tradeoffs, with Target 7 aiming to have areas under agriculture, aquaculture and forestry managed sustainably by 2020. But to be successful in reducing agricultural pressure on ecosystems, the strategy also needs to embrace productivity increases.

Manage demand for food

Opportunities for managing demand for food include promoting the use of vegetable protein over meat, reducing food waste – estimated to be around 40% of food produced in the United States – and advancing certification programs and other types of incentives for sustainable food production. For example, Afghan growers earn the Fairtrade mark and get nearly double the going rate for raisins that meet criteria, including the sustainable use of water. The CBD's 10-year strategic plan makes a start on addressing consumption. Target 4 aims to ensure that, by 2020, governments, business and stakeholders at all levels either implement or take steps to achieve plans for sustainable production and consumption, and keep the impacts of natural resource use well within safe ecological limits. Again, however, food needs to be a central focus for this target to be successful.

If, in future decades, the world celebrates success in providing food security *and* in navigating ecological tipping points, it will be because of the ingenuity of farmers and conservationists, agricultural experts and ecologists in finding ways of learning and acting together. The Nagoya plan goes some way toward stimulating that action with the targets on sustainable management of agriculture, restoration of degraded land and sustainable consumption mentioned above.

Also encouragingly, a new Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services was adopted by the convention, recognizing the importance of conducting regular assessments of conditions and trends of ecosystems and biodiversity. In seeking to implement the new biodiversity strategy, governments might employ this brain trust in finding ways around the conundrum of more food supply equaling less biodiversity. Specifically, the IPBES could assemble data on the relationship of ecosystem services to human well-being as well as improve the science around ecosystem tipping points (thus supporting Target 19 in the new strategy.)

Overall, however, while it contains plenty of references to ecosystem services and the interdependence of human and ecosystem health, the Nagoya strategic plan still reads like a road map for protecting ecosystems and biodiversity *from* people rather than investing in the protection and restoration of nature *for* people. Until human well-being and ecosystem health are truly reconciled in the minds, plans and strategies of environment, finance, agriculture and development ministers, it is hard to have confidence that the new biodiversity targets will fare much better than their predecessors. **JS**

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Photo: World Resources Institute, Jon Talbot

Rice field in Madgascar

Photo: Flickr/Two Roses

Rice fields in northern Vietnam

Photo: Dr. Jennifer L. Graham, US Geological Survey

Harmful algal blooms in Binder Lake, Iowa, United States