

Environmental economist says invasive species is part of the price of doing business

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When the sun rides low on the horizon and winter chills wrap us all in down and fleece, global trade brings blueberries from South America, oranges from Israel. But trade in exotic goods also comes with significant local economic costs, explains Charles Perrings, professor of environmental economics at Arizona State University.

In the rush to market, products also bring hitchhikers: invasive species. These exotics often overtake native species, ravage agriculture, fisheries and forestry, and damage ecosystems and, ultimately, economics. Disproportionately so in developing countries' economies, Perrings says. In a presentation at the Association for the Advancement of Science (AAAS) meeting on Feb. 13, Perrings puts forward an issue that, he says, currently attracts more expenditures than any other environmental problem.

How can what seems like only a few zebra mussels and Mediterranean fruit flies (Medfly) have such a large economic effect? Besides obvious direct impacts of pathogens and losses to biodiversity, disrupted ecosystems also lose resilience, the ability to spring back from environmental challenges and human-based insults.

The numbers are staggering. Perrings, whose four-volume "Ecological Economics" has just been published, refers to one estimate that the annual economic damage due to invasive species is equal to 53 percent of agricultural GDP in the United States, 31 percent in the United Kingdom and 48 percent in Australia, but 96 percent, 78 percent and

112 percent of agricultural GDP in South Africa, India and Brazil, respectively.

What is the solution? In a nutshell: thinking locally and acting globally. According to Perrings' study "individual countries need to consider how to contain trade-related species dispersal and international cooperation needs to act to reduce the invasive species risks of trade - especially those stemming from poor country exports."

Perrings' studies in the School of Life Sciences at Arizona State University focus on the role of global drivers of biodiversity change, particularly trade in altering ecosystems services and in developing both institutional and policy responses. He and colleague Ann Kinzig, associate professor in ASU School of Life Sciences, direct the ecoSERVICES group in ASU's College of Liberal Arts and Sciences. This group operates a number of international research programs, including "Advancing Conservation in a Social Context," funded by the MacArthur Foundation. The ecoSERVICES group concentrates on "the causes and consequences of change in ecosystem services - the benefits that people derive from the biophysical environment - and analyzes biodiversity change in terms of its impacts on the things that people care about."

Most recently, a group of researchers from ecoSERVICES, in partnership with the Civil and Environmental Engineering Departments at ASU, were awarded a \$2 million grant by the National Science Foundation. The Sustainable Infrastructure for Water and Energy Supply (SINEWS) project will examine the resilience and sustainability of power and water infrastructures in semi-arid urban settings.

"The principle challenge to building a science of sustainability is the development of predictive models of systems change that enable society to evaluate mitigation options alongside adaptation," says Perrings.

The economic problems posed by invasive species, he believes, will require "measures to 'internalize' the external costs of trade - to confront exporters and importers with the true cost of their actions.

"But, it also requires defensive measures to mitigate import risks, to control established invasive species, and to coordinate international action to regulate trade routes," Perrings adds. "This problem is particularly difficult to contend with in low income countries. They are vulnerable to the effects of invasive species, but also have fewer resources to adopt effective sanitary or other control measures."

What could these insights mean on one's own home turf? The recent move to buy locally, combined with well regulated imports might come with an added pay-off to the pocket book, as well carbon foot print: healthier ecosystems.

Source: Arizona State University

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