Invasive alien species and planetary and global health policy

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment, released in 2019,[1] identified invasive alien species, those introduced by humans into regions beyond their natural distributions, as one of the five top direct drivers of biodiversity loss.[2] Although many cases exist of positive adaptations to the introduction of invasive alien species, they are generally regarded as a severe threat to local ecosystems, wildlife, and human health and overall wellbeing. Once established, efforts to eradicate invasive alien species can raise both public health and ethical concerns because of the unintended effects that control measures can have on the environment and human livelihoods (eg, chemical control and biocontrol agents).

Unfortunately, invasive alien species are widespread across all biomes and geographical regions. These species can be considered as an evolving global health threat and are changing the socio-ecological context in which billions of people live, lowering natural resilience to other perturbations and reshaping local ecology. Indeed, we can plausibly argue that invasive alien species are one of the main signposts of the Anthropocene era.

Although they can also, in specific cases, be a source of societal benefits, the costs of invasive alien species are tremendous: massive losses in agricultural production and related threats to food security; direct and indirect effects on human health through the spread of pathogens, including newly emerging infectious diseases; and cultural loss, as invasive alien species destroy native flora and fauna that has shaped generations of local knowledge, contributing to the process of biocultural homogenisation. On the effect of invasive alien species on disease alone, our knowledge is vast and growing. For example, the invasion of dense stands of lantana (*Lantana camara*) in East Africa has provided new habitat for the tsetse fly (*Glossina* spp), which is a carrier of sleeping sickness. Another example is the introduction in New Zealand of the brushtail possum (*Trichosurus vulpecula*), which transmits bovine tuberculosis to cattle and deer, posing a large economic threat that has led to millions of New Zealand dollars in control costs. Lastly, invasive mosquitoes have exacerbated the spread of yellow fever, dengue fever, and other infectious diseases throughout the Americas and Asia.[3] As one study concluded, the effects of invasive alien species on human health "vary from psychological effects, discomfort, nuisance and phobias to skin irritations, allergies, poisoning, disease and even death."[7]

Many invasive alien species are, in effect, opportunistic hitchhikers, taking advantage of global shipping and other forms of transit, whereas others were deliberately introduced for economic gain or recreational purposes. Global environmental change, including land use and climate change,[6] can increase the rates of establishment and spread of invasive alien species. Illegal logging, fishing, and wildlife trade further exacerbates the problem, and even conservation efforts such as rewilding and assisted colonisation might in turn lead to the introduction of more invasive alien species.

However, and despite the marked increase in our understanding of these species and their multitude of interactions at varying scales, a truly comprehensive, international, and interdisciplinary assessment on the drivers, effects, management, and future scenarios of invasive alien species has yet to be done. Therefore, the first IPBES assessment on invasive alien species, which kicked off in 2019 with a stimulating and productive inaugural authors' meeting in Tsukuba, Japan, is not only timely, but also directly relevance to global health policy and its practitioners and strategists. More than 70 experts—carefully selected to encompass all regions, expertise, and marine and terrestrial realms and to consider gender and equity factors—will be assessing the current status and trends of biological invasions and providing options to promote effective prioritisation, mitigation, surveillance,[4] and adaptation strategies. The completed assessment will be presented to the tenth session of the IPBES plenary, comprising representatives from more than 130 member states. This assessment will cover invasion pathways and drivers; effects[5] on biodiversity, ecosystems, food supply, and human health; and future policy paths. As with all IPBES assessments, special attention will be paid to human dimensions, including the important role of indigenous and local knowledge[8] and of contemporary technology in our evolving understanding of biological invasions. A socio-ecological systems approach will give us a panoramic view that brings the natural and social

sciences together with a range of other knowledge systems for this monumental task.

As co-chairs, we are confident that this international assessment will not only make considerable strides towards more effective strategies, but also reveal conceptual and scientific areas in need of urgent attention. Indeed, we expect to identify many knowledge gaps to inspire the next generation of research and policy design. We have been encouraged by the support of governments and experts alike at this early stage of the assessment, and we believe that the global and planetary health community will also have much to contribute to this landmark study.

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