

Invasive Species in Post-2020 Global Environmental Politics

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Abstract

As goods and people more rapidly traverse our interconnected world, invasive alien species (IAS) are increasingly frequent, ecologically damaging, economically significant, and culturally concerning. Through examinations of IAS, global environmental politics (GEP) scholars can more deeply engage long-standing and newly emerging research problems within the three areas of global governance, global political economy, and environmental security. First, GEP scholars can use IAS research to further develop insights about the impact of problem structure on global governance. Second, examining IAS dispersal risks and associated costs, as well as intercountry variation in management responses, can generate insights about North–South power dynamics in the global political economy and how distributive conflict is likely to shape future invasion risk. Third, notions of environmental security in GEP scholarship can be challenged and further developed by examining the conceptualization and operationalization of “biosecurity” amid increasingly diverse multispecies assemblages. Greater research attention to IAS in GEP is long overdue, and we intend for this article to open novel pathways for GEP interdisciplinary research on IAS.

Recently, Canada and the United States experienced the onset of an “invasion event”: the arrival of the murder hornet (*Vespa mandarinia*). Known for their voracious appetite for pollinators, particularly honeybees, their arrival and the subsequent public panic highlight the destabilizing effects of invasive alien species (IAS) on environmental security. An IAS is a species anthropogenically introduced outside its native range, consequently causing ecological, economic, or social harm (Essl et al. 2020). Growing concern over challenges associated with “invasions” has focused international attention on identifying cooperative and transnational solutions. However, current approaches have been inadequate; without adapting IAS responses at the global scale, researchers expect “a 3- to 20-fold increase in global invasion risk” by the year 2050 (Sardain

* We are greatly appreciative of Kate J. Neville, Anna Sveinsdóttir, Rebecca Laurent, Kealie Vogel, Emily Guske, Fatou Jobe, the editors, and the anonymous reviewers for their time and energy in providing constructive feedback, particularly during a global pandemic.

et al. 2019, 274). This Forum article highlights how greater attention to IAS within GEP can contribute empirically and theoretically to the field, while advancing IAS solutions. Specifically, GEP scholars can use IAS research to further develop insights about the impact of problem structure on global governance, uneven power relations in the global political economy, and how conceptualizations of environmental security shape human and more-than-human vulnerability.

Owing to limited progress in reducing IAS pathways by 2020, the Convention on Biological Diversity (CBD) has developed a “post 2020 global biodiversity framework,” with an expanded focus on IAS management (Essl et al. 2020). Yet, the dominant framing of IAS as an ecological problem (e.g., biodiversity) has obscured broader challenges IAS pose to global political and economic systems (Stoett 2010). Indeed, IAS pose urgent challenges across multiple sectors in the global system, including agriculture, trade, and security. For example, while the murder hornet threatens native honey bees in the United States, the potential impacts of honey bee loss are far reaching, with economic losses to bee-pollinated croplands (USD\$ 11–26 million) and hive-derived products (~USD\$ 11 million) (Alaniz et al. 2021). Moreover, the potential implications of dispersal to neighboring countries demonstrates the simultaneously local and global nature of IAS. Increasing awareness about the sociopolitical and economic dimensions of IAS necessitates a shift in disciplinary perspectives for global research and action (Vaz et al. 2017). This indicates significant potential for GEP to both influence and learn from IAS research.

GEP engagement with IAS, however, remains limited. Previous work on the political/economic dimensions of IAS focuses on policy challenges and differences across scales (García-Díaz et al. 2021; Tzankova 2009), management as a global collective action dilemma (Graham et al. 2019), and the economics of IAS management (Marbuah et al. 2014). We argue more is needed, and this Forum aims to establish generative avenues for such research in the areas of global governance, political economy, and environmental security.

Global Governance

IAS, as a concept, emerged on the global stage during the 1982 Ecology Program coordinated by the Scientific Committee on Problems of the Environment (Simberloff 2011). In response, global institutions governing biodiversity issues, including the CBD, the International Plant Protection Convention, and the International Union for Conservation of Nature (among others), integrated IAS as a key governance issue, effectively subsuming them under the umbrella of biodiversity (Stoett 2010). Yet, IAS have increasingly garnered significant attention across issue areas, leading other global and regional institutions (e.g., the World Trade Organization) to generate rules and norms that impact global action on IAS. Across these bodies, distinct mandates, structures, and norms have emerged to form a patchwork of rules, regulations, and power structures perceived to limit the ability to prioritize IAS, share information across

issue-area silos, and mount a coordinated response (Ormsby and Brenton-Rule 2017). This raises several questions for GEP scholars: What are the consequences, from a governance perspective, of the IAS problem structure emerging squarely within a biodiversity framework? How might these consequences shape IAS governance boundaries within the international system? These questions align with and advance emerging GEP research examining how problem structures and frames in environmental governance shape how, where, and when a problem can or will be governed in international arenas (Stevenson et al. 2021).

While governance fragmentation can generate positive and negative effects within and across issue areas (Bastos Lima and Gupta 2013; Biermann and Kim 2020), it has been perceived as a barrier to effective IAS governance (Perrings et al. 2009). Amid regime fragmentation and IAS' historical framing as a biodiversity issue, the CBD remains at the forefront of global initiatives addressing IAS challenges. Research is thus needed to examine why biodiversity framings in IAS governance predominate even as the problem or concept has been taken up by diverse governance bodies. We hypothesize that the conceptual origins of IAS have entrenched them within biodiversity discourse (Stoett 2010), potentially delimiting alternative governance pathways. Ongoing debates over the definition of what constitutes IAS further complicate these dynamics, potentially allowing international actors greater flexibility in determining what "count" as IAS (Humair et al. 2014). For example, despite similar risks and processes of establishment (e.g., release, spread), genetically modified organisms and IAS are treated distinctly within the international arena, with the former leading to the Cartagena Protocol on Biosafety (Jeschke et al. 2013). Such conceptual splintering may serve to dilute the prominence of IAS as an issue requiring governance beyond existing biodiversity structures and practices. Without consensus on basic underlying principles, IAS governance is likely to entrench or deepen fragmentation. Such challenges will be exacerbated by technological advances, such as gene editing (e.g., "de-extinction"), which complicate how different stakeholders understand IAS, acceptable risk, and associated ethics (Thiele 2020). Therefore, tracing the conceptualization and operationalization of IAS and IAS-adjacent concepts can clarify the role of the IAS' problem structure in shaping IAS and environmental governance.

Few states have demonstrated interest in a convention on IAS, possibly related to autonomy, uncertainty, and commitment costs (Hulme 2021). Absent an international convention, the CBD is viewed as the appropriate body to coordinate a "global approach" to IAS governance. However, it is unclear that the CBD has the mandate, power, or influence to address the multifaceted dimensions of IAS, especially when intersecting with "high politics" issues like trade and security (Perrings et al. 2009; Zhao 2020). Powerful states and organizations may ultimately benefit from this structure, particularly where a "biodiversity approach" enables greater flexibility in addressing politically charged issues (Biermann and Kim 2020). This reinforces the idea that problem entrenchment may "lock in" particular governance approaches, stifling innovation

that could address IAS as a cross-cutting issue. More research is thus required to examine what the CBD's de facto authority in IAS governance enables and/or precludes. Together, such questions and concerns have prompted calls for a more unified and holistic approach to IAS governance (Hulme 2020). However, what form a unified approach might take and whether it is possible or better suited to address IAS remain open questions ripe for study.

Global Political Economy

Trade, magnified by globalization, is a leading vector for IAS dispersal (Sardain et al. 2019). Policies to limit IAS movement include black/white lists, ballast water requirements, cargo inspections, and more (Hulme 2021). These efforts, however, are complicated by contested trade dynamics between and among the Global North and South. This generates key questions for GEP: How do inequalities in the global political economy shape global IAS risk and, consequently, solutions to IAS risk? How will IAS dispersal itself shape a dynamic global political economy?

While some scholars suggest that developing countries act as hubs for IAS dispersal due to limited mitigation capacity (Ricciardi et al. 2017a), others contend that Global North countries drive dispersal as a consequence of trade quantity and global market dominance (van Kleunen et al. 2020). Indeed, present distributions of IAS have been linked to historical trajectories of economic development, including colonialism (Turbelin et al. 2017). We posit that capacity arguments direct attention toward particular players and solutions, potentially circumventing broader structural changes to the global political economy. Thus, power relations may play an outsized role in managing IAS dispersal, especially the Global North's ability to dictate terms of global trade. This suggests a need for GEP research that goes beyond examining IAS as coordination and collective action challenges to incorporate considerations of distributional conflict, which results from the potential of reform to "renegotiat[e] the institutions that structure economic and social activity" within the domestic and global economy (Aklin and Mildenerger 2020, 5). Specifically, work is needed on how divergent economic interests affect IAS risk and the implications for priority setting and policy formation amid a dynamic global political economy.

Disagreement about how to address IAS via trade policy provides a useful entry point for GEP. Historically, global actors have relied on nontariff measures (e.g., inspection protocols) and trade agreements to address IAS trade risks, which theoretically make trade *safer* without necessarily imposing limitations (Margolis and Shogren 2012). Indeed, Jinnah and Morin (2020) argue that environmental norms can be disseminated through trade agreements. Norm diffusion and standard setting, however, raise questions about *who* sets the normative agenda for IAS and determines what constitutes protective/protectionist measures. Furthermore, fluctuations in IAS caused by shifts in global trade or policy may not become immediately apparent due to lags in detection

of species' establishment in new environments, leaving policy makers designing mitigation strategies with a moving target (Epanchin-Niell et al. 2021; Seebens et al. 2015). Despite efforts to address IAS dispersal via trade, intercountry variation in prevention capacity, management capacity, and the implementation of biosecurity standards persists, creating regional interdependencies for risk mitigation (Faulkner et al. 2020). To address such regional interdependencies, the European Union, in 2014, implemented an IAS "polluter pays" policy, which theoretically forces member states to assume liability for IAS dispersal outside their territory and thus incentivizes internal investment in IAS dispersal prevention (Beninde et al. 2015). Alternatively, Ricciardi et al. (2017b) suggest that external investment in global biosecurity is essential for building capacity of IAS management, especially in developing countries.

While not mutually exclusive, choice of approach dictates where funding and attention are allocated. Should resources be pooled into accountability structures like "polluter pays" or into capacity-building measures in the form of investment commitments? Tension between these approaches emerges when considering BRICS countries (Brazil, Russia, India, China, and South Africa), whose capacity to manage IAS dispersal amid growing economic footprints remains in question (Measey et al. 2019). For example, China's Belt and Road Initiative prioritizes environmental conservation; however, its expansive design, connecting more than 120 countries, presents a hazard for IAS dispersal (Liu et al. 2019). Without global "polluter pays" policies to cover the potential costs of invasion events linked to transnational development, China stands to reap the economic benefits of infrastructure development without deeper considerations of the global costs of increased invasion risk. Calculating "global costs of invasion" (e.g., how much, for what, to whom), as well as determining what constitutes "capacity-deficient," is challenging and has only recently been facilitated by the advent of the new InvaCost database (Diagne et al. 2020). Moreover, consideration of capacity deficits amid growing economic footprints shifts the question from defining global cost to theorizing how such costs are shared or allocated in a dynamic economy. Such complexity necessitates research along three lines of inquiry: first, delineating how global invasion costs are constructed; second, determining the relationship between cost attribution and distribution (i.e., are capacity-deficient states or industries less liable for IAS dispersal?); and third, analyzing how the attribution and distribution of costs affect the emergence of IAS policy and priorities. This would elucidate ongoing debates considering capacity versus accountability in IAS governance and the resulting distributional consequences within the global economy.

Environmental Security

If international politics is interspecies politics, as Rafi Youatt (2020) suggests, then security is necessarily interspecies security. Indeed, while GEP scholarship historically focused on the effect of environmental change on conflict risk (and

thus national security), recent work has broadened the field to incorporate issues of *human and more-than-human security* (O'Brien and Barnett 2013; Johnson 2019; Tsing et al. 2021). Such conceptualizations have enabled scholars to better incorporate considerations of power, justice, and scale into security- and IAS-related work. Tsing et al. (2021), for example, deploy a broad understanding of environmental security to examine how complex assemblages interact to undermine or sustain human and environmental well-being. This approach engages global governance to ask “environmental security for who and what?” Following this lead, we ask, How can GEP build on this view of environmental security to address the risks posed by IAS in diverse more-than-human assemblages? More specifically, what can relational thinking unveil about security and about GEP more broadly?

Despite growing awareness that human and environmental health are interconnected, the international community struggles to transcend a siloed approach to human, animal, and environmental health (Davis and Sharp 2020). For example, viruses and nonpathogenic IAS are considered separately because they constitute “distinct” issue areas (health and biodiversity, respectively). However, the emergence of viruses like Ebola and SARS-COV-2 has led scholars to question this separation (Nuñez et al. 2020). Where virus transmission begins and ends is not always clear, as viruses jump between species, expanding assemblages and facilitating the creation of novel associations, hybridizations, and/or mutations (Kirksey 2020). In response, Hulme recently proposed “One Biosecurity,” which aims to provide a “unified framework” to address IAS biosecurity risks beyond bounded conceptualizations of animal, plant, human, and environmental health (Hulme 2020, 541).

The One Biosecurity proposal, despite its universalist appeal, signals a hegemonic approach to environmental security that risks marginalizing or excluding perspectives not encapsulated within dominant security frameworks. However, as Māori scholars Lambert and Mark-Shadbolt (2021, 56) contend, bringing in voices from the margins “is central to rethinking more effective biosecurity approaches.” Anishnaabe teachings, for example, recognize IAS as issues of “invasive ideologies” rather than invading species (Reo and Ogden 2018, 1447). The concept of invasive ideologies demonstrates how questions of power and sovereignty, in addition to science, shape approaches to biosecurity. Indeed, security assemblages interact with social inequities, shaping disease burden and risk more broadly. Questions of scale thus remain—how can security transcend siloed approaches without universalizing the experience of risk and vulnerability? This prompts a need for research on IAS and the politics of difference in security assemblages, as well as the policies and discourses that inform, constitute, and/or shape biosecurity risks and vulnerabilities. Ultimately, how One Biosecurity unfolds in practice remains to be seen, providing GEP scholars an entry point into more inclusive studies of emerging policy (e.g., China’s Biosafety Law), its impact on global IAS risk, and its influence on international biosecurity conversations.

Moreover, the call to engage biosecurity holistically suggests employing the concept of relationality, which emphasizes the interconnections of radiating relationships (Whetung 2019) and can help GEP scholars think about the sociopolitical and material connections between security issues traditionally considered independently (e.g., human health and biodiversity) and/or outside of IAS (e.g., pathogens). What politics might be revealed when scholars use a relational lens to understand IAS–security interactions? We posit that such consideration can highlight how and why IAS policy and politics mitigate insecurity for some connections within an assemblage, while ignoring or amplifying insecurity for others. For example, viewing SARS-COV-2 solely as a public health concern obscures the way the pathogen is leveraged as a mechanism that enables state-sanctioned land grabs, further compounding insecurity for Indigenous and more-than-human communities in Brazil (Menton et al. 2021). Hence, relationality scholarship invites GEP to draw on multispecies approaches to center social justice considerations in environmental security discourse and IAS management, such that security does not come at the cost of human and more-than-human equity. Research might specifically examine where value is placed within security assemblages and how risk is manipulated to leverage safety for some but not others.

Conclusions

Given the current difficulties of governing IAS, the power-laden effects of their distribution, and the nonrelational construction of (in)security, IAS studies need GEP scholars to more comprehensively address IAS as an urgent, cross-cutting, and political issue. Although already familiar with global governance, global political economy, and environmental security, GEP stands to advance theories of problem structure and distributional conflict in studying IAS, while also expanding theorizations of security through incorporations of relationality. While we have done our best to present a research agenda that neatly addresses governance, political economy, and security, the reality is that IAS demand integration. The questions outlined here thus present opportunities to work toward the IAS solutions of more equitable and just futures. This work is not only critical but timely as humans navigate uncertainty in a post-2020 world.

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