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The Economics of Invasive Species in Tropical and Subtropical Regions

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Tropical and subtropical regions face unique pressures from exotic invasive species. Exotic species will travel, as hitchhikers or intended cargo, thousands of miles by land, sea, or air, often enduring harsh conditions en route. The weary visitors arrive in the warm moist climates finding welcome respite in the mild weather and abundant resources. Lucky ones will settle into their new homes with little or no resistance, minimal competition for food and space, and a refreshing dearth of hungry predators and scavenging parasites. While some exotics will establish in a benign fashion, others will multiply rapidly, invoking substantial collateral damage in their wake. Invasive exotic species will disrupt resource-dependent industries and activities, disturb natural ecosystems, and destroy native habitats and species.

This special issue of the *Journal of Agricultural and Applied Economics* comprises a collection of original, unpublished papers on the economics of invasive species in tropical and subtropical areas around the world. The breadth of invasive species includes: a **virus** (Pendell et al.), **fungi** (Alamo et al.; Ranjan), **plants** (Adams and Lee; Alavalapati et al.; Burnett, Kaiser, and Roumasset; Kim et al.), and a **mollusk** (Lee, Adams, and Rossi). **Economic damages** from invasive species quantified in these studies include: diminished **firm income** (Alavalapati et al.; Pendell et al.; Ranjan), reduced **social welfare** (Alamo et al.; Ameden, Cash, and Zilberman), and lost **nonmarket values** (Adams and Lee; Burnett, Kaiser, and Roumasset; Kim et al.; Lee, Adams, and Rossi; McIntosh, Shogren, and Finnoff). Damages are widespread, impairing resources and activities in both the public and private sectors. In the **private sector,** Alamo et al., Pendell et al., and Ranjan examined the impact of invasive species on **agriculture**. Alavalapati et al. estimated the impact of invasive species on **timber production**. Burnett, Kaiser, and Roumasset and Lee, Adams, and Rossi quantified the impact of invasive species on **water supply**. In the **public sector,** Adams and Lee, Kim et al., and Lee, Adams, and Rossi enumerated the impact of invasive species on **outdoor recreation**. Adams and Lee; Lee, Adams, and Rossi; and McIntosh, Shogren, and Finnoff projected the impact of invasive species on **aquatic ecosystems**. Barbier and Burnett, Kaiser, and Roumasset investigated the impact of invasive species on **forest ecosystems**.

Strategies for managing invasive species are described and evaluated in several studies. In uninvaded systems, protective measures can help to mitigate potential damages. Pendell et al. and Lee, Adams, and Rossi examined the economic benefit from **surveillance, rapid detection, and eradication** measures. Alamo et al. and Ameden, Cash, and Zilberman evaluated the efficacy of **trade restrictions.** In invaded systems, Adams and Lee and Kim et al. offered results on optimal **maintenance control**. Alavalapati et al. and Ranjan provided solutions in the form of **optimal response** to periodic invasions. McIntosh, Shogren, and Finnoff and Ranjan assessed the potential benefits from **technology adoption**.

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In large-scale applications, modeling **spatial differentiation** becomes important as demonstrated by Ameden, Cash, and Zilberman, who modeled **multiple ports**; Burnett, Kaiser, and Roumasset and Kim et al., who obtained detail for **multiple regions**; and Adams and Lee, who specified a model with **multiple lakes**.

To capture the plethora of invasive species, scope of private and public sector impacts, and multitude of management options, a broad swath of empirical methodologies was used by the authors. McIntosh, Shogren, and Finnoff used **maximum likelihood estimation**. Burnett, Kaiser, and Roumasset specified an **optimal control model**. Pendell et al. used **stochastic transition** and **input–output modeling**. Lee, Adams, and Rossi used a **Markov** approach. Alamo et al. invoked **equilibrium displacement methods**. Kim et al. and Adams and Lee developed **bioeconomic models**. Barbier laid out an **ecological economic model**.

With this issue we hope to bring greater attention to the problem of invasive species in tropical and subtropical areas. We'd like to send a take-home message to managers on the importance of economics in decision making. We are optimistic that our efforts will stimulate future studies, additional funding, and further publication in this important research area.

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