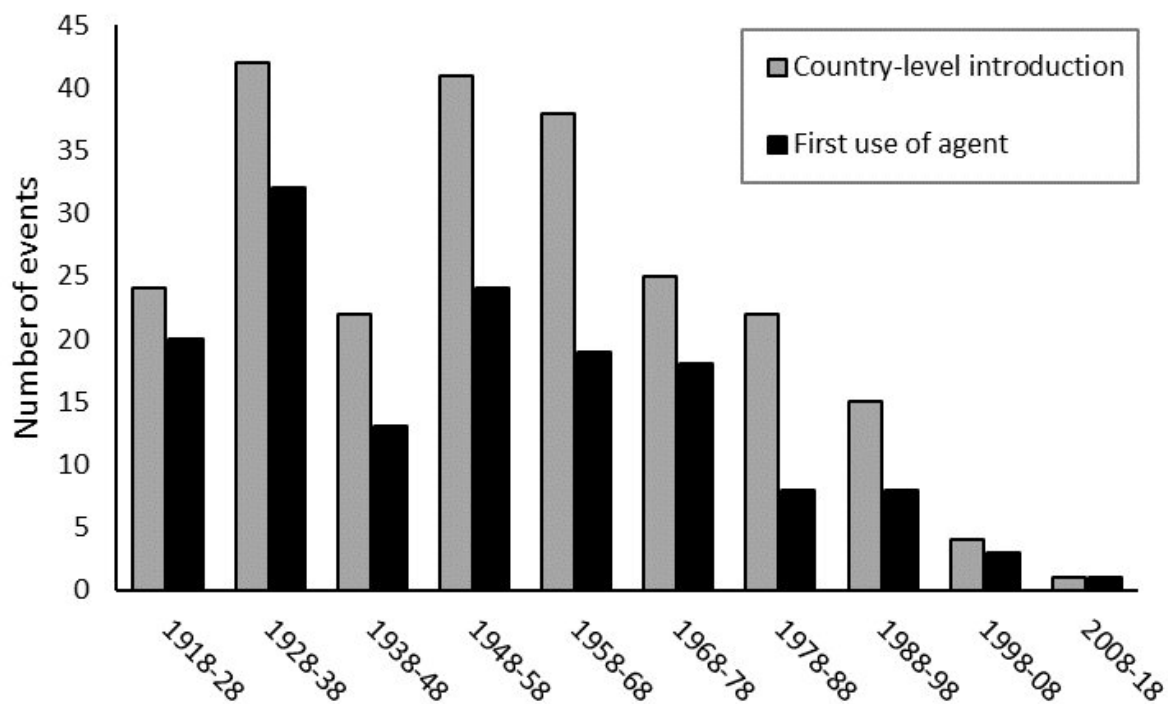


Pesticide-free crop protection yields up to US\$ 20 billion/year benefits in Asia-Pacific

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The total number of country-level introductions and first regional deployments of a given biological control agent is depicted for successive decades, over a 1918-2018 window. For instance, BIOCAT contained two introductions of the larval parasitoid *Psytalia humilis* (Silvestri) against Tephritid fruit flies, i.e., a first regional use in 1927 (Cook Islands) followed by a second country-level deployment in 1935 on Fiji. All introductions pertain to the deployment of insect natural enemies for insect pest management in local food and agricultural production. Records are drawn from CABI's BIOCAT database. Credit: Nature Ecology & Evolution

Scientists have estimated for the first time how nature-based solutions for agricultural pest control deliver US\$14.6 to US\$19.5 billion annually across 23 countries in the Asia-Pacific region.

The new research, published in the journal *Nature Ecology & Evolution*, suggests that non-chemical crop protection (or [biological control](#)) delivers economic dividends that far surpass those attained through improved "Green Revolution" rice germplasm (estimated at US\$ 4.3 billion a year).

The study, led by Dr. Kris Wyckhuys and including contributions from CABI's Dr. Matthew Cock and Dr. Frances Williams on the data collection, unveils the magnitude and macro-economic relevance of biodiversity-based contributions to productivity growth in non-rice crops over a 100-year period between 1918 and 2018.

Scientifically-guided biological control of 43 exotic invertebrate pests allowed for between 73% to 100% yield loss recovery in critical food, feed and fiber crops including banana, breadfruit, cassava and coconut.

Dr. Wyckhuys said, "The Green Revolution is credited with alleviating famine, mitigating poverty and driving aggregate economic growth since the 1960s—enabled through a tripling of rice output. Cornerstone of the Green Revolution were the 'packaged' seed and agro-chemical technologies and biological innovations such as high-yielding, disease-resistant cereal varieties. Our research is the first to gage the financial benefit of using biological control to fight crop pests in the Asia-Pacific region and demonstrates how these ecologically-based approaches promoted rural growth and prosperity in marginal, poorly-endowed, non-rice environments. By thus placing agro-ecological innovations on equal footing with input-intensive measures, our work provides lessons for future efforts to mitigate [invasive species](#), restore ecological resilience and sustainably raise output of global agri-food systems."

The scientists, who show how 75 [biological control agents](#) mitigated 43 pests over a 100-year range, outline how biodiversity-driven ecosystem services underpin food systems and societal well-being in the face of environmental change.

Co-author Dr. Michael Furlong added, "Biological control delivered durable pest control in myriad Asia-Pacific agriculture sectors, permitting yield-loss recoveries up to 73%, 81% and 100% in cassava, banana and coconut crops respectively. The ensuing economic dividends are substantial, as pest-induced losses up to US \$6.8, \$4.3 and \$8.2 billion annually for the above [crops](#) were offset (at respective values of \$5.4-6.8 billion, \$1.4-2.2 billion and \$3.8-5.5 billion/year, for a conservative to high impact scenario range). As many of the underlying programs were run on a shoestring, the rate of return on biological control science is extraordinary. Our work constitutes an empirical demonstration of how insect biological control helped solidify the agrarian foundation of several Asia-Pacific economies and—in doing so—places biological control on an equal footing with other biological innovations such as Green Revolution germplasm. Not only does it spotlight its transformative impacts—especially in light of increasing global reliance on chemical pesticides—but it also celebrates the century-long achievements of dedicated, yet often, unacclaimed insect explorers and biological control pioneers."

More information: Ecological pest control fortifies agricultural growth in Asia-Pacific economies, *Nature Ecology & Evolution* (2020). [DOI: 10.1038/s41559-020-01294-y](https://doi.org/10.1038/s41559-020-01294-y), www.nature.com/articles/s41559-020-01294-y

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