

# **Program of Research on the Economics of Invasive Species Management (PREISM) Review and Workshop**

*August 19-20, 2004      Washington, DC*

## **Workshop Summary**

USDA currently manages programs affecting the entry and spread of agricultural invasive species which can potentially cause economic losses to consumers, producers and other stakeholders. In 2003, Economic Research Service (ERS) initiated a competitive awards program—Program of Research on the Economics of Invasive Species Management (PREISM)—to address economic issues associated with invasive species management. This program focused on national decision-making concerning invasive species of agricultural significance which are affecting, or are affected by USDA programs.

ERS and Farm Foundation co-sponsored a review of the studies funded by the 2003 PREISM on August 19-20, 2004. The objective of the workshop was to review progress made by cooperators who received PREISM funding, and provide a forum for dialogue on economic issues associated with agricultural invasive species. (Information on the PREISM competitive awards program is available on the ERS Invasive Species briefing room:

<http://www.ers.usda.gov/Briefing/InvasiveSpecies/>.) The review and workshop brought together academic researchers, as well as representatives from a variety of federal agencies concerned with various economic aspects of preventing, monitoring and managing invasive species. About 90 people attended the workshop.

The 2003 PREISM funded studies in three broad areas: 1) Resource implications of alternative policies for invasive species exclusion, monitoring, management, and compensation; 2) Bio-economic integration and risk assessment; and 3) Economics of trade and invasive species. Within each of these areas, the funded studies exhibited extensive heterogeneity in analytic approaches as well as in the invasive species and agricultural commodities selected for case studies (see below for a brief description of the various funded activities). Since these projects are completing the first year of a two- or three-year study, the presentations focused on accomplishments to date and/or preliminary results.

In addition to progress reports by PREISM cooperators, Dr. Charles Perrings from the University of York (UK), gave the keynote address, “Globalisation and Invasive Species: Economic Insights from Theoretical Ecology.” The wrap-up panel discussed new research topics that PREISM should consider funding in 2005.

Presentations from the 2004 PREISM workshop are available at the Farm Foundation Web site, [www.farmfoundation.org](http://www.farmfoundation.org). The workshop is posted under the Environmental and Natural Resources Program area.

## **RESEARCH ACTIVITIES FUNDED BY THE 2003 PREISM**

The 2003 PREISM funded a variety of activities within three broad research areas related to the economics of invasive species management. Here is a brief synopsis of the objectives, methods and target invasive species (in parenthesis) of the studies funded by PREISM.

### **I. Resource implications of alternative policies for invasive species exclusion, monitoring, management, and compensation**

Examining the economic issues associated with design and operation of a voluntary or mandatory check-off plan (i.e., indemnification fund) and insurance program to manage invasive species—(karnal bunt, citrus canker and Canadian thistle or soybean rust).

Using a dynamic optimization framework to characterize key invasive species bio-economic factors (i.e., control costs, damages, and rate of invasive species growth and spread) which favor a particular invasive species policy including prevention; eradication of established invasive species; maintenance/management of established invasive species; or private control—(generic invasive species).

Developing and testing methodologies to evaluate pest risk-reducing import regulations which are less trade-restrictive than an import ban. The potential impacts on production, consumption, trade and welfare will be estimated using a spatial partial equilibrium model—(avocado pests).

Assessing the regulatory and institutional framework needed for using assurance bonds to promote an economically efficient release of a non-indigenous bio-control organism—(black carp).

Employing a dynamic optimal control model to address an integrated policy for new and established invasive species which minimizes expected damages and costs of prevention, control, and eradication—(*Miconia calvescens* and brown tree snake).

### **II. Bio-economic integration and risk assessment**

Estimating a threshold model for optimal treatment timing which incorporates a damage function, control options, and commodity price cycles that will help policy-makers understand how producers act to mitigate pest losses and how private control impacts a regional or area-wide management of a pest—(whitefly).

Developing economic decision support tools to compare: benefits of treatment (damage avoided), probability of restoration, and costs of treatment which vary by location, time and scale of analysis—(cheatgrass).

Developing and estimating a combined biological and economic optimal control model that jointly determines how a transmittable wildlife disease, wildlife ecosystems, cattle sector, and human economic activities interact. The analysis examines the economic factors, including disease control options and farmer and hunter behavior, which can affect the spread of disease—(bovine tuberculosis).

Integrating three bio-economic modeling approaches to improve invasive species risk assessments and policy responses: stochastic programming; optimal control; and general equilibrium ecosystems models—(leafy spurge).

### **III. Economics of Trade and Invasive species**

Examining the welfare incidence of invasive species and related policies when agricultural markets are distorted through such government programs as commodity payment programs, price supports, crop insurance, marketing orders, and trade barriers—(karnal bunt, foot-and-mouth disease in dairy, and citrus canker).

Developing a dynamic modeling framework that generates an optimal resource allocation scheme for alternative invasive species prevention measures (i.e., reducing the probability of establishment) and/or control policies (i.e., increasing the probability of invasive species detection and elimination) while incorporating production functions, tree or animal stocks, consumer demand, and international trade—(foot-and-mouth disease and codling moth).

Estimating import demand elasticities (own- and cross-price) and flexibilities which are critical to quantifying the impacts of sanitary-phytosanitary (SPS) trade restrictions—(demand elasticities for mandarins, oranges, tangerines).

Using a spatial partial equilibrium model to estimate: 1) the losses incurred by producers and consumers due to an invasive species-induced timber supply reduction and 2) the effects of SPS regulations and forest product import bans on producer and consumer welfare—(forest pests).

Developing a partial or general equilibrium model to assess domestic welfare impacts (e.g., consumer surplus, tariff revenue, invasive species damage, etc.) of selected trade-related measures to control invasive species including tariffs, bans, domestic port inspection, and foreign certification—(generic invasive species).

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