

CABI'S EXPERIENCES OF TRANSBOUNDARY PLANT PEST MANAGEMENT: STRENGTHENING PLANT HEALTH SYSTEMS AND THE IMPORTANCE OF ADVISORY SERVICES

Ulrich Kuhlmann

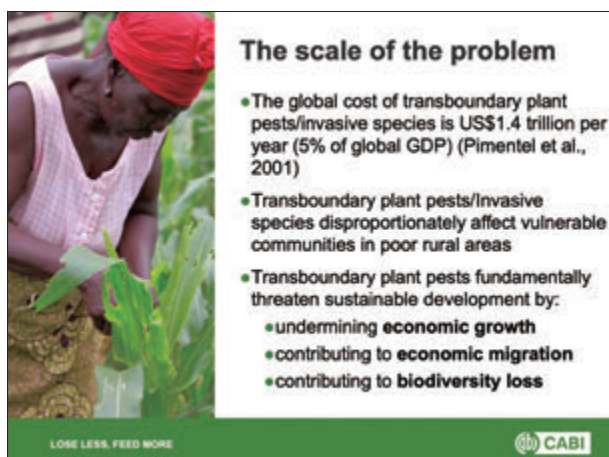
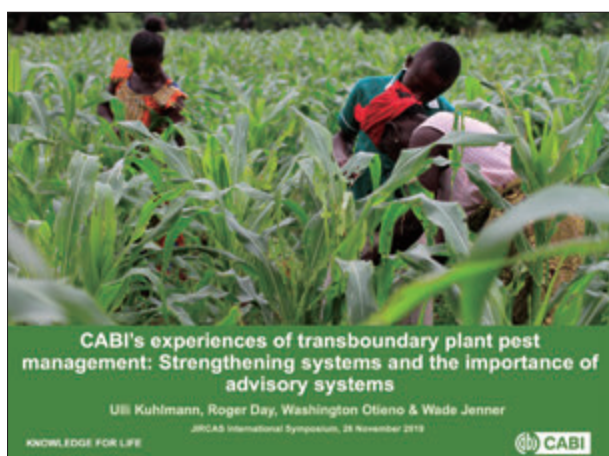
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Ulrich Kuhlmann is the Executive Director, Global Operations of CAB International (CABI). He is responsible for fostering collaborations between CABI centres and international partners and developing new opportunities to improve agricultural production, alleviate poverty and enhance nutrition and food security. He is also responsible for overseeing the strategic direction and delivery of CABI's scientific programmes. CABI is an international, inter-governmental, not-for-profit organization that improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment.



ABSTRACT

Five hundred (500) million smallholder farmers in developing countries in Asia, Africa and Latin America are at risk from environmental shocks, crop pests and other threats to food and nutrition security and food safety. There is continuous emergence and rapid spread of new invasive species (e.g. fall armyworm, tomato leaf miner) and ongoing transboundary pest threats (e.g. banana fusarium wilt, citrus greening, Asian fruit fly), driven by climate change and global movement of goods. Particularly in medium- and low-income countries, there is often no consistent mechanism for surveillance, rapid detection (including technical support for confirming causes) and response with effective solutions. Poorly planned and ill-timed reaction to new outbreaks often leads to the indiscriminate use of pesticides, in some cases highly toxic products, which poses environmental and health risks and decreases the resilience of land use systems to pests. Another attribute of medium- and low-income countries is that the opportunity to detect new pests is at the farming community level and therefore the role of public extension and community-based advisory services is instrumental. These rural advisory services play a key role in technology and management information transfer. Some of the most relevant and appropriate information isn't high-tech or innovative, but that doesn't mean the farmer knows about it. A number of complementary CABI-led programmes, such as Action on Invasives and Plantwise have established a strong foundation of experience, partnerships and infrastructure to respond to the above-mentioned threats. The Action on Invasive programme focusses on strengthening national and regional capacity to respond to emerging invasive pests. This includes identifying and managing risks before invasion occurs, and improving coordinated response to invasions through effective communication and deployment of sustainable technologies. In terms of technologies, (classical) biological control must be considered and promoted in integrated pest management approaches. Action on Invasives champions an environmentally sustainable, cross-sectoral and regional approach to dealing with transboundary plant pests. The programme is building national and regional capacities to prevent, detect and control invasive species in order to protect and restore agricultural and natural ecosystems, adapt to climate change, remove trade barriers, and reduce degradation of natural resources and vulnerable areas. Plantwise aims to provide a data-driven rapid response network connecting farmers with advisors and other support services, enabling early detection, diagnosis and management of pest problems at farm level. Over the past few years, Plantwise has built the resilience of smallholder farmers in coping with emerging plant health threats, enabling them to produce and earn more while being less dependent on high-risk pesticide-based plant protection practices. For example, in Rwanda, advisory service advice has led to a 5% reduction in the likelihood of a household falling below the poverty line of USD 1.25 per day. In Kenya, Plantwise demonstrated a benefit/cost ratio > 2.0 (internal rate of return on investment $> 50\%$). This success has, in turn, enhanced farmers' confidence in public and private advisory services. A key focus of Plantwise is to put research into use, translating scientific knowledge into actionable best practice, delivered through simple, practical methodologies that are accessible at community levels. The efficiencies, delivered through digital development and the promotion of equity in accessing services, are additional factors that have helped to strengthen interactions between farmers and local advisory service providers.



Invasive species are a specific SDG target...



"By 2020 introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems, and control or eradicate the priority species."

– SDG 15.8

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...but they impact almost all SDGs



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The challenges.....

- Transboundary plant pests/ invasives species have to be tackled collaboratively across the Environment, Trade and Agriculture sectors but the enabling communications, structures and evidence to prioritise action are lacking
- Concerted actions are needed at a local and national level but also at a regional one but the mechanisms for this are missing, or weak
- Effective products and technologies must be made available but this requires overcoming prohibitive regulatory setups, and lack of engagement from stakeholders
- Lack of access in developing countries/ regions to information and expertise

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Taking action



CABI's Action on Invasives programme adopts a systems-based approach to managing biological invasions:

- **Prevention:** developing and implementing biosecurity policies and raising awareness of potential threats
- **Early detection and rapid response:** developing surveillance and emergency action plans for detecting and eradicating new invasions
- **Control:** scaling up existing invasive species management solutions, embedding them in policy and making sure that rural communities have access to them

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Implementation approach of CABI's Action on Invasives programme

Each work package includes strong elements of **gender** and **youth** involvement, and **monitoring and evaluation**:



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Invasive Species Compendium



www.cabi.org/isc

Content

- Species "portals"
- Improved mapping
- Toolbox
 - Horizon scanning
 - Pest risk analysis (PRA)
- Resources
 - Diagnostics
 - Communication materials
 - Data
 - Abstracts
 - News

Around 240,000 hits in one month (October 2019)!

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Invasives Species Compendium

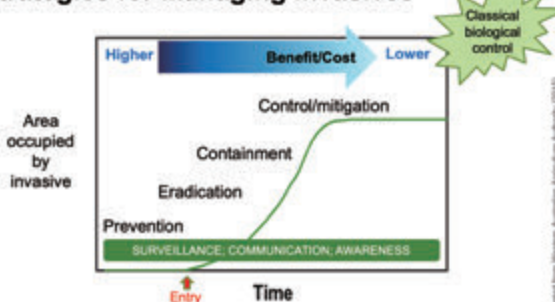
Decision support tool use



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Strategies for Managing Invasives



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CABI's classical biological control database



- BIOCAT is a simple database of all classical biological control introductions using insects to control insects (literature to end 2010)
- Originally compiled by David and Annette Greathead; updated to 2010 by CABI with additional support from IOBC and USDA-APHIS
- Data on the agent, the target pest(s), the origins of both, the source country (district), the target country (district), the year(s) of release, whether established, degree of impact (standardised: None, partial control, substantial control, complete control), source reference(s)

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BIOCAT analysis until 2010

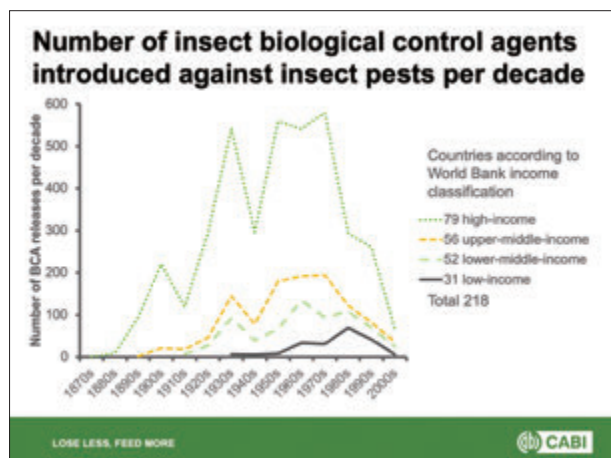
	BIOCAT 2010
No of introductions	6,158
No of establishments	2,007 (33%)
No of pest targets	588
No of agent species	2,171
No of countries	148
No of satisfactory controls	620 (10%)
No of different pest species controlled	172

Trends in the classical biological control of insect pests by insects: an update of the BIOCAT database

Matthew S. W. Clark, Peter F. Stepien, Susan E. B. Baker, Emma Thompson, Rebecca J. Stepien, Suzanne M. Fricker

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Low-income country	At least two partial or better success programmes	Start year
Madagascar	Eucalyptus weevil, <i>Gonipterus scutellatus</i>	1948
	Spotted borer, <i>Chilo sacchariphagus</i>	1960
	African pink stem borer, <i>Sesamia calamita</i>	1968
	Potato tuber moth, <i>Phthorimaea operculella</i>	1968
	Coconut hispine, <i>Gestronella lugubris</i>	1976
Tanzania	Orthesia scale, <i>Orthesia insignis</i>	1953
	Sugarcane scale, <i>Aulacaspis tegalensis</i>	1971
	Cassava mealybug, <i>Phenacoccus manihoti</i>	1988
	Diamond back moth, <i>Plutella xylostella</i>	2001
Benin	Mango mealybug, <i>Rastrococcus invadens</i>	1988
	Larger grain borer, <i>Prostephanus truncatus</i>	1992
	Diamond back moth, <i>Plutella xylostella</i>	1996
Togo	Mango mealybug, <i>Rastrococcus invadens</i>	1987
	Larger grain borer, <i>Prostephanus truncatus</i>	1991
DR Congo	Cassava mealybug, <i>Phenacoccus manihoti</i>	1982
	Mango mealybug, <i>Rastrococcus invadens</i>	1989
Uganda	Orthesia scale, <i>Orthesia insignis</i>	?
	Woolly whitefly, <i>Aleurotrixus flocosus</i>	1996
Zimbabwe	Apple woolly aphid, <i>Eriosoma lanigerum</i>	1961
	Potato tuber moth, <i>Phthorimaea operculella</i>	1965

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BIOCAT Conclusions



- There have been some substantial successes for classical biological control of insect pests in low income countries
- Cost : benefit ratios can be significant, e.g. 170-1592 for cassava mealybug across Africa, 145 for mango mealybug in Benin
- Millions of farmers are able to continue to grow important crops because of the action of classical biological control
- However, these successes have been based on donor funding and using knowledge transfer from international experts

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The value of extension




- In developing countries, the opportunity to detect new pests is at the farming community level
- Therefore the role of extension and community based advisory service is instrumental.
- Some of the most relevant and appropriate information isn't high tech or innovative, but that doesn't mean the farmer knows about it
- Direct evidence linking extension and productivity increases is thin, but existing studies show positive returns

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Farmer access to extension



Vast majority of smallholders have little access to public extension agents...

Public extension agent to farmer ratio (per 10,000 farmers)

Country	Ratio
Ethiopia	21
China	16
Indonesia	6
Tanzania	4
Nigeria	3
India	2

...or any source of information overall

Only 38% of smallholders have access to any information!

And women have even less access...

Smallholder access to extension in 1 year (Ethiopia, 2014)

31% ♂ 21% ♀

Source: Transforming Rural Advisory Services to a Digital World, Agriculture Development Programme, Bill & Melinda Gates Foundation 2017

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A need for CABI's Plantwise global programme



- Extension systems often suffer from chronic understaffing, limited operational funds, and weak linkages to other players
- Therefore, the Plantwise plan is to give farmers better access to practical and research based knowledge at village level to help them enhance productivity and food safety (in particular reduction of pesticide residues)

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