

**Unclassified**

**ENV/JM/MONO(2012)32/ANN**

Organisation de Coopération et de Développement Économiques  
Organisation for Economic Co-operation and Development

**17-Oct-2012**

**English - Or. English**

**ENVIRONMENT DIRECTORATE  
JOINT MEETING OF THE CHEMICALS COMMITTEE AND  
THE WORKING PARTY ON CHEMICALS, PESTICIDES AND BIOTECHNOLOGY**

**Report of the OECD Workshop on INTEGRATED PEST MANAGEMENT (IPM)  
Strategies for the adoption and implementation of IPM in agriculture contributing to the sustainable use  
of pesticides and to pesticide risk reduction Berlin, Germany, 16-19 October 2011**

**Series on Pesticides  
No. 70**

*ANNEX 6 – PRESENTATIONS*

**JT03329039**

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This document only contains Annex 6 of the report of the IPM workshop. Annex 6 includes slides of all presentations made during the workshop.

The main part of the workshop report, as well as Annexes 1 to 5, is published under the reference ENV/JM/MONO(2012)32.

## ANNEX 6: SLIDES OF SPEAKERS' PLENARY PRESENTATIONS

### DAY 1

#### INTRODUCTION

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**Welcoming address**

*By Georg F. Backhaus, Julius Kühn Institute (JKI)*



**Welcome**

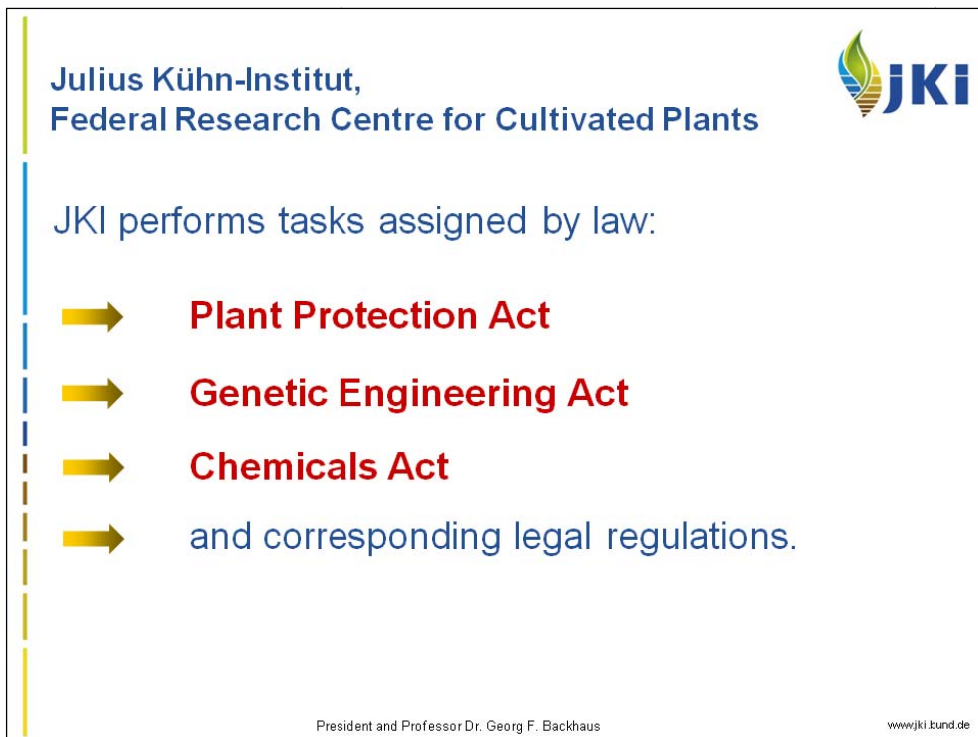


**Julius Kühn-Institut**  
Bundesforschungsinstitut für Kulturpflanzen  
Federal Research Centre for Cultivated Plants

**OECD-Workshop on Integrated Pest Management**  
**"Strategies for the adaption and implementation of IPM**  
**in agriculture contributing to the sustainable use**  
**of pesticides and to pesticide risk reduction"**

**16 – 19 October, 2011**

[www.jki.bund.de](http://www.jki.bund.de)



**Julius Kühn-Institut,**  
**Federal Research Centre for Cultivated Plants**

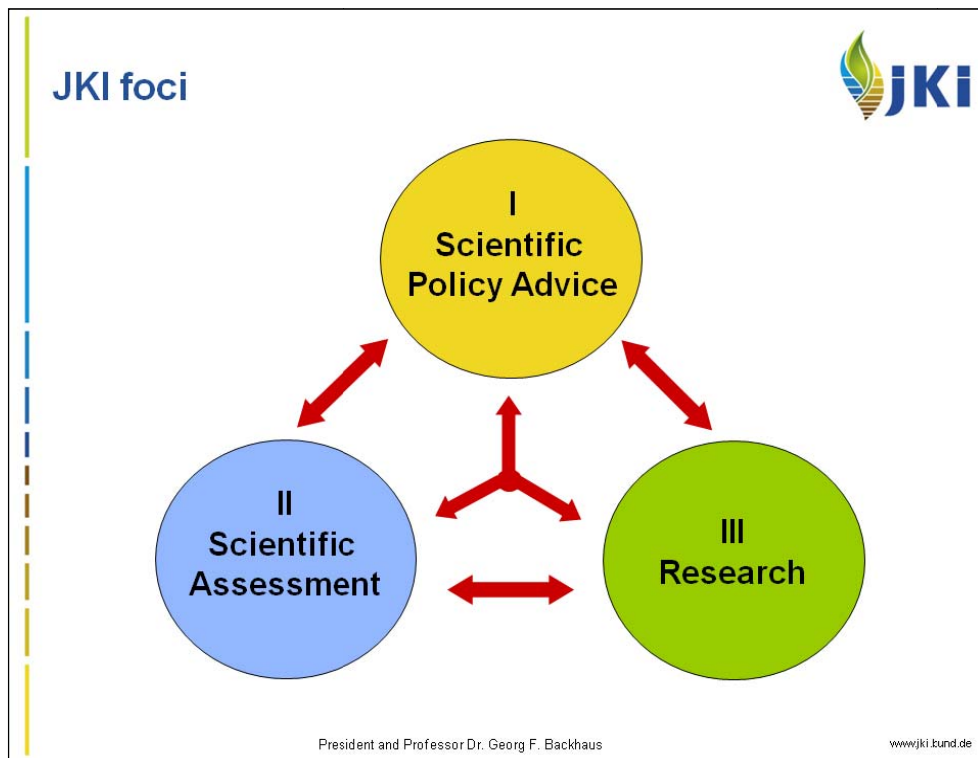


JKI performs tasks assigned by law:

- ➔ **Plant Protection Act**
- ➔ **Genetic Engineering Act**
- ➔ **Chemicals Act**
- ➔ **and corresponding legal regulations.**

President and Professor Dr. Georg F. Backhaus

[www.jki.bund.de](http://www.jki.bund.de)



**I. Scientific Policy Advice**

**Providing information and advice to the German federal government**

**Major fields of competence:**

- plant genetics, plant breeding research
- plant cultivation and production
- plant nutrition and soil science
- plant protection and plant health

President and Professor Dr. Georg F. Backhaus

www.jki.tund.de

## II. Scientific Assessment



- **Plant protection products**
  - Scientific evaluation of plant protection products and their active substances
- **Examining and analysing bees for damage caused by plant protection products**
- **Evaluating the resistance of plants to harmful / pathogenic organisms**
- **Plant protection equipment**
  - Testing
  - Maintaining a list of authorized equipment
  - Harmonisation of technical frameworks for plant protection equipment on European and international level
- **Plant health**
  - Analysing and assessing risks associated with the introduction and spread of harmful organisms
  - Cooperation in and monitoring of programmes and measures to prevent the introduction and spread of harmful organisms
  - Elaboration of national and international standards of plant health
- **Genetically modified plants**
  - Scientific assessment in the GMO approval process for experimental release and placing on the market

President and Professor Dr. Georg F. Backhaus

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## III. Research



### ➔ Research in the fields of

- plant genetics and breeding
- plant cultivation, grassland management and plant nutrition
- plant protection and plant health



President and Professor Dr. Georg F. Backhaus

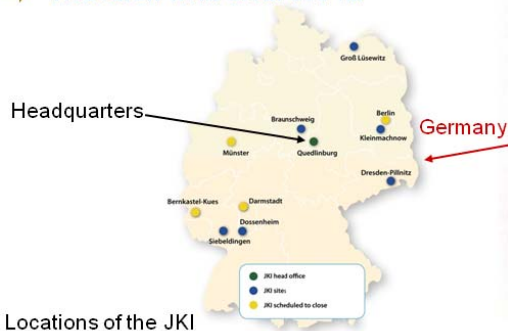
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## Organisation



- ➔ Headquarters: **Quedlinburg**
- ➔ **15 institutes**
- ➔ **Staff (1 January 2011):**  
 Permanent positions (federal budget): 806  
 Total staff (including third-party funds): 1150  
 - **Scientists:** about 240
- ➔ **Research field area: 600 ha**



Research fields for Integrated Plant Protection in Dahnsdorf



# Thank you for your attention

President and Professor Dr. Georg F. Backhaus

[www.jki.tund.de](http://www.jki.tund.de)

## Locations

**Quedlinburg**  
with **Groß Lüsewitz** and **Dresden-Pillnitz**:

- 4 Institutes
- breeding research, resistance and stress tolerance, biosafety of genetically modified plants

**Braunschweig:**

- 6 Institutes
- crop and soil science, plant protection, plant health, diagnostics

**Berlin/Kleinmachnow:**

- 2 Institutes
- strategies, technology assessment, ecological chemistry, plant analysis, stored product protection

**Dossenheim:**

- 2 Institutes
- fruit crops, biological control

**Sieboldingen:**

- 2 Institutes
- viticulture, grapevine breeding

www.jki.kund.de

President and Professor Dr. Georg F. Backhaus

## Julius Kühn-Institut, Federal Research Centre for Cultivated Plants

➔ established on 1 January 2008

as a research institution and an independent higher federal authority subordinated to the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)

➔ JKI is in charge of networking all important departmental tasks relating to cultivated plants – whether grown in fields, in the glasshouse or in an urban environment – and it develops integrated concepts for plant cultivation as a whole, ranging from plant production to plant usage and plant care.

www.jki.kund.de

President and Professor Dr. Georg F. Backhaus



## JKI tasks – Fields of research:



- Plant genetic resources
- Improving resistance and tolerance of plants to pathogens and abiotic stress
- Breeding of fruit and grapevine cultivars
- Plant cultivation systems
- Soil science and soil fertility
- Diagnostics
- Biology, population dynamics and epidemiology of harmful/pathogenic organisms and weeds
- Pest risk management
- Biological and other sustainable methods for an integrated plant protection
- Biosafety of genetically modified plants
- Information

President and Professor Dr. Georg F. Backhaus

[www.jki.bund.de](http://www.jki.bund.de)

## The OECD Pesticides Programme

*By Sylvie Poret, OECD*



**The OECD Pesticides Programme**

**Sylvie Poret**  
OECD Secretariat (Paris, France)  
Environment Directorate

OECD Workshop on Integrated Pest Management  
*Berlin, Germany, 16-19 October 2011*

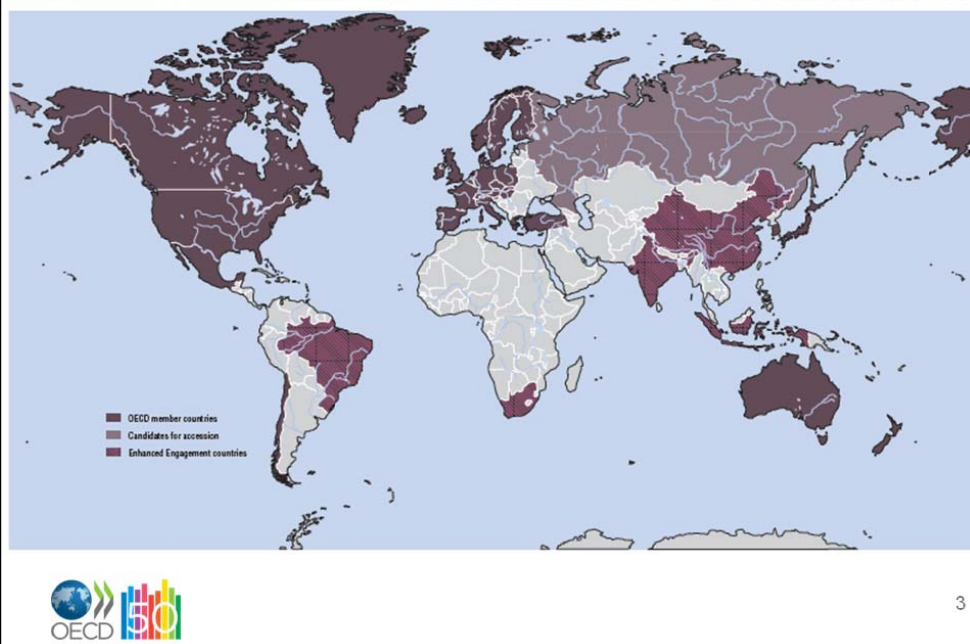
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## What is the OECD?

- A **forum** in which governments:
  - work together and with representatives from **business and civil society**
  - compare and share **policy experiences** (social, economic, environmental)
  - seek answers to common problems & **identify good practices**
  - **promote decisions and recommendations**
- Key words at OECD:  
**dialogue, consensus, peer review & pressure**



## The OECD: A global outreach



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## OECD's Work on PESTICIDES Where does it fit?

### OECD

agriculture, development co-operation, education, employment, **environment**,  
taxation & trade, science & technology, industry and innovation, energy, etc.

### ENVIRONMENT

climate change, biodiversity, water, eco-innovation, outlooks, **chemicals**, etc.

### SAFETY of CHEMICALS

Testing, hazard assessment, GLPs, HPV, biotechnology, nanomaterials, **pesticides**,  
biocides, chemical accidents, Pollutant Release & Transfer Registers, etc

### PESTICIDES



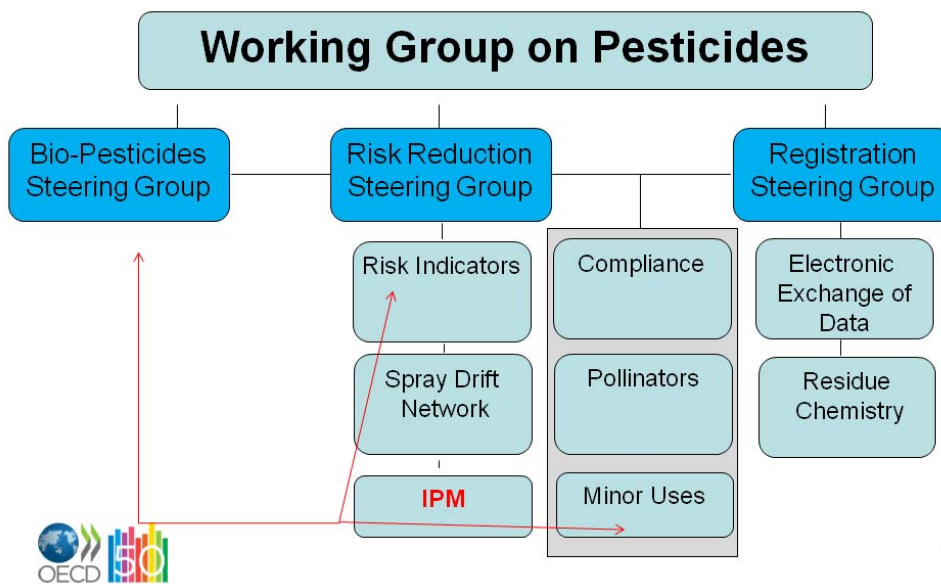
## OECD Pesticides Programme

### Objectives & Scope

- **Helps OECD governments to co-operate in assessing and reducing the risks of agricultural pesticides**, by sharing the work of pesticide registration, and developing tools to monitor and minimise risk to human health and the environment
- **Focuses on agricultural pesticides** (chemical and biological). Non-agricultural pesticides are dealt with separately (Biocide Programme).



## OECD Pesticides Programme *Structure*





## OECD Pesticides Programme

### A Global Approach to the Regulation of Agricultural Pesticides



### A Vision for the Future


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## OECD Pesticides Programme

### A Global Approach to the Regulation of Agricultural Pesticides

- High Level of Protection (man, animals, environment), minimise risks
- Harmonise Regulatory System (Monograph-, Dossier-Guidelines)
- In order to co-ordinate Submissions and aid Work-sharing Arrangements between OECD and partner Countries (Global Joint Reviews)
- On Chemical and **Biological** Pesticides



### A Vision for the Future


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## OECD Pesticides Programme

### OECD Strategic Approach in Pesticide Risk Reduction (2009)

1/ National Plans

2/ Instruments for RR



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## OECD Pesticides Programme

### OECD Strategic Approach in Pesticide Risk Reduction

1/ National Plans

National action plans or programmes are aiming at setting targets, measures and timetables to reduce risks and impacts of pesticide uses to human health and to the environment and at encouraging the development and introduction of IPM as well as alternative approaches or techniques.



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## OECD Pesticides Programme

### OECD Strategic Approach in Pesticide Risk Reduction

#### 2/ Instruments for Risk Reduction

- Registration (biological and chemical products)
- **Integrated Pest Management (IPM)**
- Extension services
- Hot-spot management
- Record keeping
- Research & development
- Information programmes



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## OECD Pesticides Programme

### New programme of work for 2013-2016

- New activities for OECD are being currently discussed among governments and members of the Pesticides Programme
- New possible elements of a “Vision” were suggested
- One of them: Help better balance risks and benefits of pesticides in view of sustainable agriculture as well as public health and environment protection goals



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## OECD Pesticides Programme

### New programme of work for 2013-2016

- New activities may include **IPM** components and projects that would contribute to fulfilling the Vision elements
- This workshop: your opportunity to contribute!



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## OECD Pesticides Programme

### New programme of work for 2013-2016

Objective of the workshop:

To make recommendations for OECD, for the governments and for the other stakeholders on:

- how to promote and facilitate the adoption and implementation of IPM strategies
- how to encourage all stakeholders to use IPM tools and measures

Focus: practical measures, tools and mechanisms to be developed



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<http://www.oecd.org/env/pesticides>

We count on your ideas and  
suggestions!

Thank you very much  
for your attention!

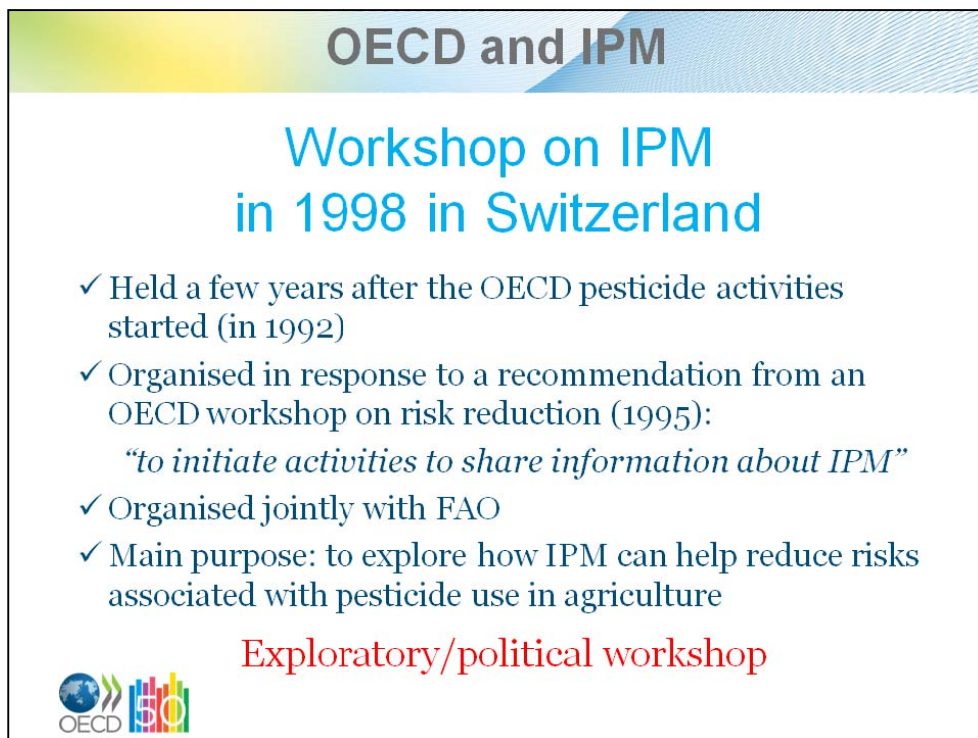
Sylvie Poret  
OECD Secretariat



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## OECD and IPM

*By Beatrice Grenier, OECD*



## OECD and IPM

### Workshop on IPM in 1998 in Switzerland

#### Reviewed definitions of IPM

- 24 definitions provided by participants
- No workshop-agreed definition

#### Addressed four questions

1. Role of IPM in pesticide risk reduction
2. What makes IPM projects successful
3. Barriers and incentives for implementing IPM
4. How to measure progress



→ Workshop list of priority recommendations

## OECD and IPM

### Since 1998 ...

- ✓ New legislative developments on IPM  
E.g. in EU with SUD, at national levels, at FAO,  
government policies, structures or mechanisms are generally in place
- ✓ New groups in OECD looking at bio-pesticide issues and at  
minor uses issues
- ✓ Activities on risk indicators in OECD (aquatic and  
terrestrial) and in EU (HAIR)
- ✓ New techniques, new farming methods, more IPM friendly  
pest control products
- ✓ Increased acreage in IPM



More/new IPM guidelines (crop or sector-specific)



## 2011 Workshop

Focus on practical measures and recommendations  
to **facilitate adoption and implementation**  
of IPM

- ✓ Case studies / plenary presentations
- ✓ Posters
- ✓ BOG sessions → exchange experience and work!
- ✓ 4 Issues



## 2011 Workshop

Thanks to the Workshop Planning Group



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## Issues for the OECD workshop

*By Silke Dachbrodt-Saaydeh, JKI, Germany and OECD*



## Issues for the workshop

### **Pre-workshop survey (2010-2011)**

#### **The objectives were**

- to support the identification of the main issues to be addressed at the workshop and to design the workshop agenda,
- to provide background on recent information about achievements, main barriers and possible solutions in IPM in OECD countries, and
- to collect information on successful IPM projects



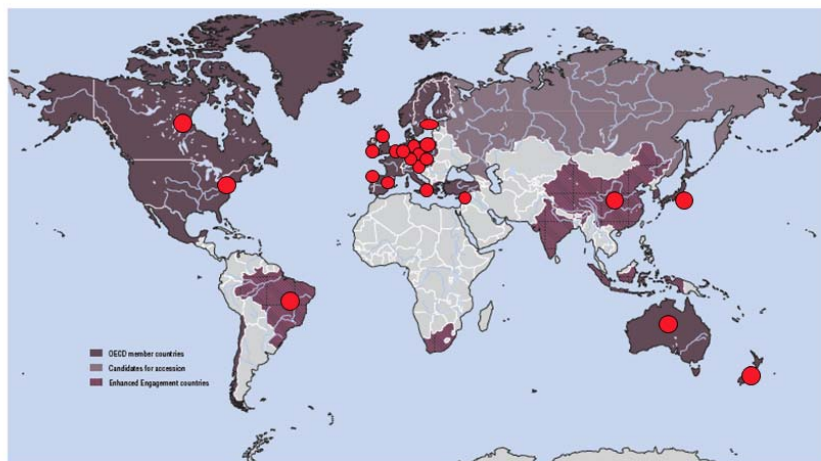
## Issues for the workshop

### **Pre-workshop survey (2010-2011) – main areas of focus**

- Background information about the state and progress of IPM
  - National structures,
  - Stakeholders and their roles
  - Crop or sector-specific IPM guidelines
- Main drivers and main barriers and what is needed to promote IPM adoption and implementation
- Information, measures and indicators of IPM adoption
  - Information about economic impact
  - Measures and indicators of IPM adoption
  - Contribution of IPM to pesticide risk reduction



- Responses from 20 OECD countries, Brazil and China, Crop Life International, IBMA and IOBC



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## Summary: Main Drivers

- **Market and the food retail industry**
  - Food safety requirements
  - Export and trade standards
  - Market access
- **Grower involvement and training**
  - Support of decision making processes, Access to information
  - Adoption of technologies and tools
  - Extension services, Research on IPM driven by farmer needs
- **Economical feasibility of IPM implementation**
  - Premium prices for IPM products
  - Communication of economic benefits
  - The role subsidies or incentives



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## Summary: Main Barriers

- **Farmers' lack of knowledge**
  - Adoption of new technologies and Change of farming practices.
  - Insufficient advisory services, the lack of extension
- **Risk perception of farmers with regard to yield losses is another barrier**
  - Lack of robust IPM tools
  - Availability or reliability of a broad spectrum of non-chemical measures
- **IPM implementation entails higher production costs (perception and/or reality?)**
- **Requirements of the market and food retail industry**



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## Summary: Measurement & Impact

- Very little quantitative and/or qualitative information on the economic impact of IPM.
- IPM adoption is rarely directly measured
- A few indicators for IPM adoption are used (mainly risk indicators)
- Contribution of IPM to pesticide risk reduction is usually not to assessed.



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## Four workshop issues



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## Four Issues

|                                                                                                                                                                            |                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Technology &amp; Information</b> <ul style="list-style-type: none"> <li>– Tools and technologies</li> <li>– Research</li> <li>– Extension &amp; Education</li> </ul> | <b>3. Policies/Strategies</b> <ul style="list-style-type: none"> <li>– Regulatory, legislation</li> <li>– Retailers, traders</li> <li>– Certification</li> </ul> |
| <b>2. Economics &amp; Market access</b> <ul style="list-style-type: none"> <li>– Farm level, Extension</li> <li>– Government</li> <li>– Economic Research</li> </ul>       | <b>4. Measurement and impacts</b> <ul style="list-style-type: none"> <li>– Uptake (users, programmes, survey)</li> <li>– Impact (risk, models)</li> </ul>        |

**Different perspectives for parallel session:  
Farmer, Consumer, Regulators**

- Address stages of development of IPM
- Achievements in short-term and long-term solutions


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## FAO's New Strategy

*By Peter Kenmore, FAO*



## Save and Grow

- **Grow** (> 70%) MORE food by 2050
- **Save**
  - **Save** money by greater EFFICIENCY
    - Reduce unnecessary inputs: chemicals, energy, labor,
  - **Save** food by reducing WASTE
  - **Save** NATURAL RESOURCES
    - Water – quantity and quality
    - Biodiversity - provides seeds & ecosystem services
    - Land -



3

## OECD Issues and Themes

- **Technology & Information**
- **Economics & Market Access**
- **Policies/Strategies**
- **Measurement and impacts**



4






## Why do yield growth rates matter?

- A 33% rise in food prices lowers standard of living by 3% in developed countries and by 20% in developing countries (Gary Becker, Nobel Laureate, University of Chicago)
- During 1961-2008, cereal yield growth rates in developed countries was 1.5%, and in developing countries 2.1%
- 2050 projected growth rate 0.8%



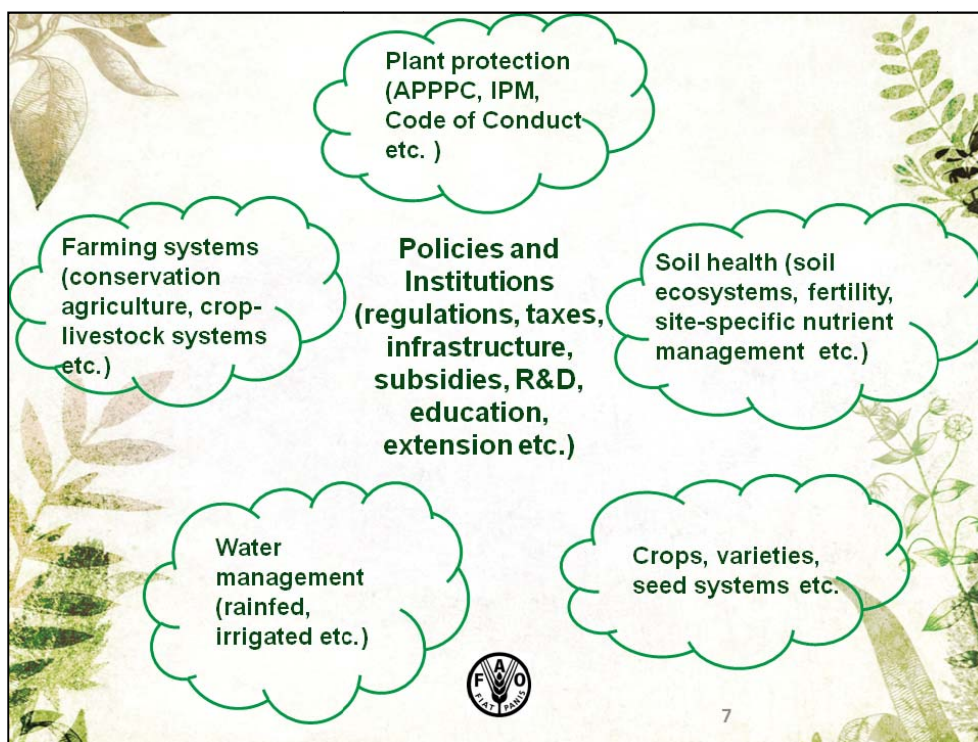
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## FAO Supports Twin Track Approaches to Food Security: Availability and Access

### Accelerating a twin-track strategy to eliminate hunger



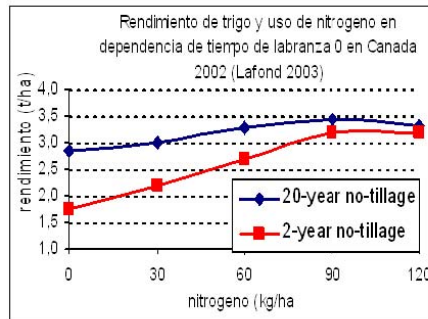
Source: FAO



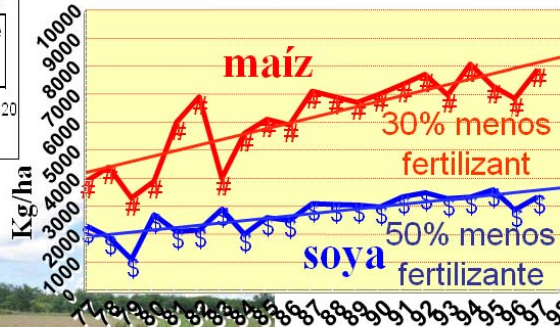

## Farming systems

- conservation agriculture practices
- use of good seed of high-yielding adapted varieties
- plant nutrition based on healthy soils
- efficient water management
- integrated pest management
- integration of crops, pastures, trees, livestock

## Conservation Agriculture



More yield with less fertilizer through soil life as:  
rhizobia  
mycorrhiza  
organic acids....



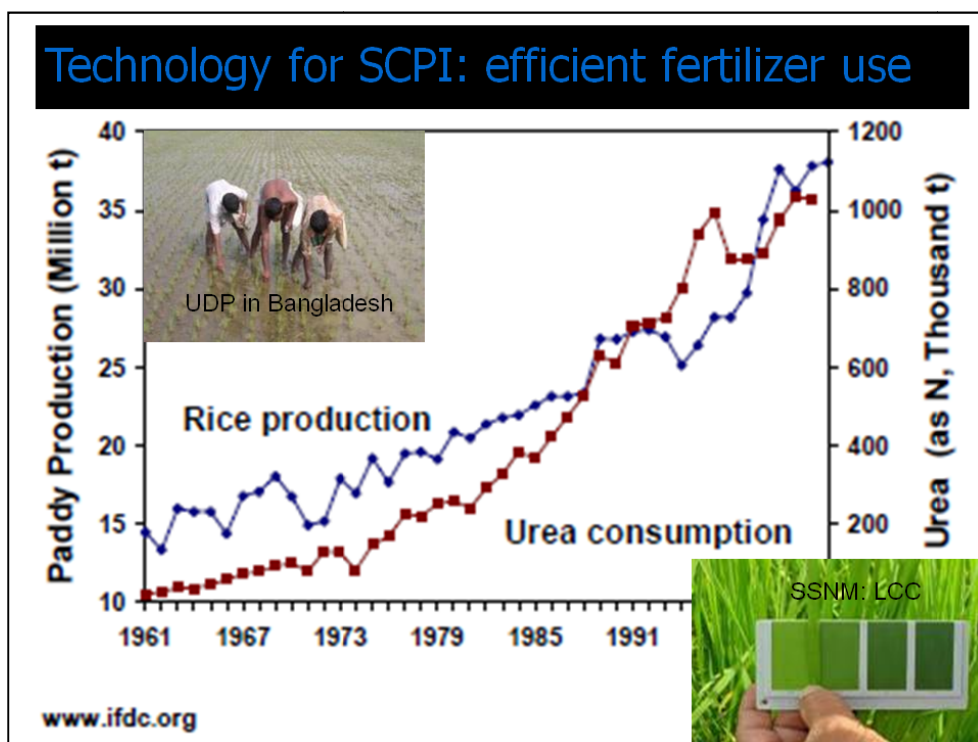
[Finca Frank Dijkstra, Ponta Grossa, Brasil, 1998]



## Soil health

- soils rich in biota and organic matter
- a mix of mineral fertilizers and natural sources
- conservation agriculture, crop-livestock, agroforestry
- remove incentives that waste fertilizer
- farmers adapt precision approaches





## Crops and varieties

- genetic improvement: 50% of yield growth
- increase support to PGR collection, conservation and use
- revitalize public plant breeding programmes
- link formal and farmer-saved seed systems
- foster local seed enterprises



## What can be done (G)

- Improved varieties the only possibility in developed countries, and a high possibility in developing countries
- 30% area in developing countries under improved varieties, so seed systems essential



## Water management

- management practices that harvest and save water
- conservation agriculture holds water better
- use improved, drought-tolerant varieties
- knowledge-based precision irrigation, deficit irrigation, wastewater-reuse
- pressure on irrigation to reduce environmental impact
- eliminate perverse subsidies that waste water

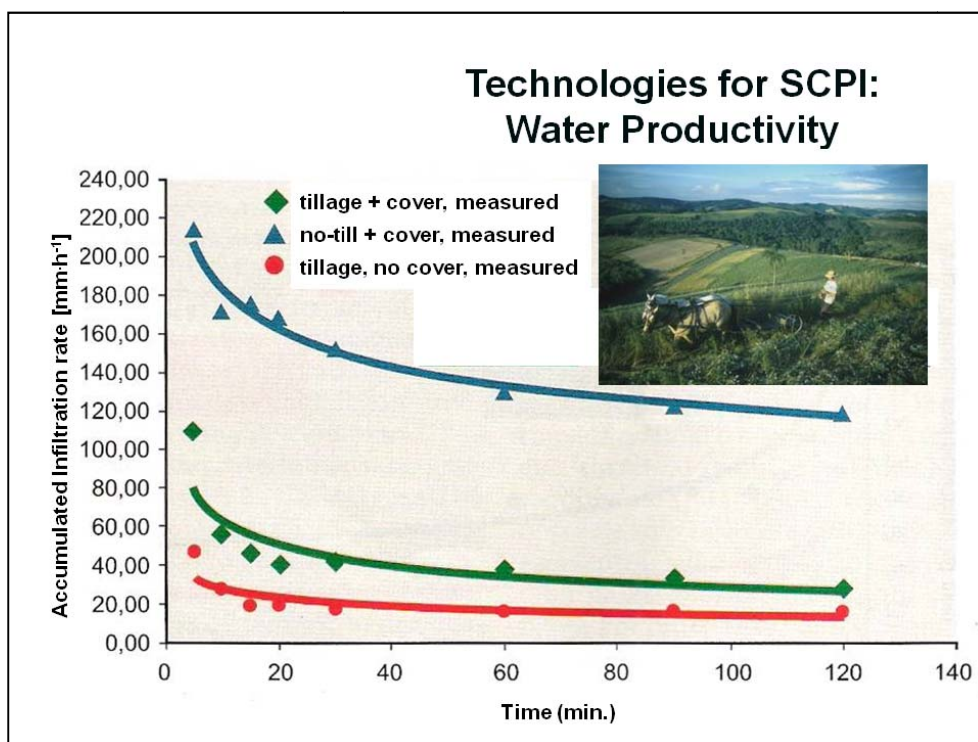


## What can be done (E)

- 40% agricultural area in Asia irrigated and much water wasted
- Less than 4% agricultural area in sub-Saharan Africa irrigated
- Poor drainage







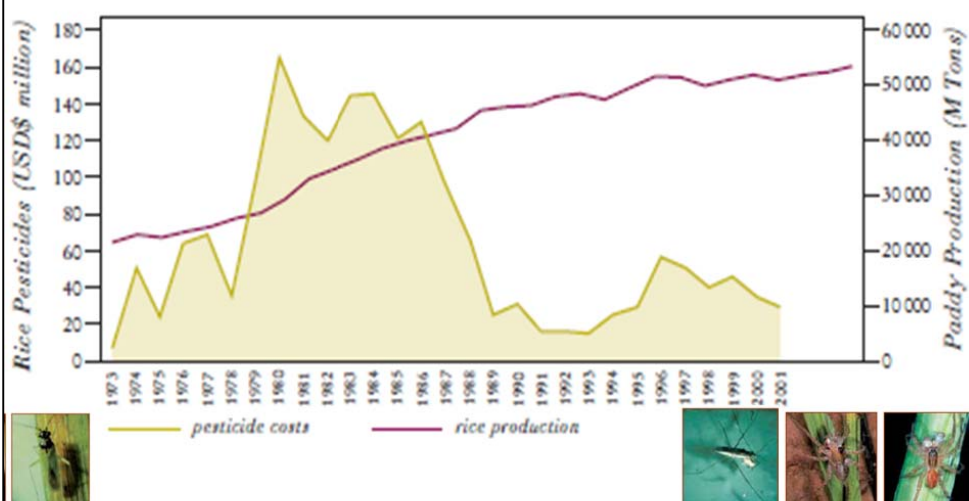


## Plant protection

- resistant varieties, conserve predators, manage crop nutrient levels
- clean planting material and crop rotations
- manual weeding, minimized tillage, surface residues
- lower risk synthetic pesticides for targeted control
- farmer field schools, local production of biocontrol agents, strict pesticide regulations

## Integrated Pest Management

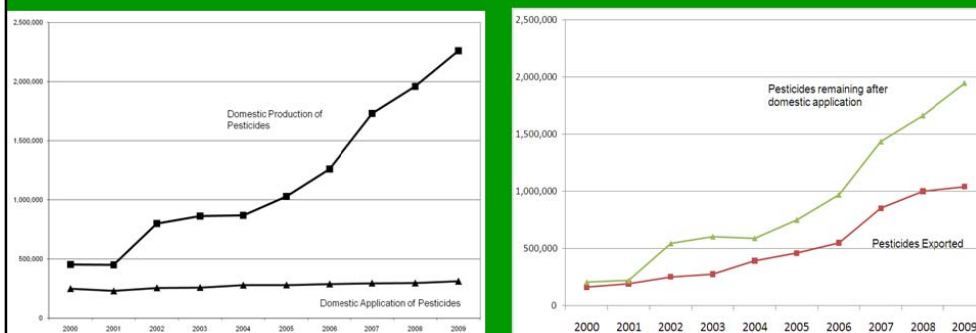
INDONESIA: RICE PRODUCTION VS. PESTICIDE COSTS (1973–2001)





## UN HQs Comtrade Statistics

- After China became the world's largest pesticide exporting country, 27 out of more than 100 importing countries received over 60% of China's pesticide exports, each year from 2005 -2009
- Thailand, Viet Nam, and Malaysia received from 16% to 24% of China's GLOBAL pesticide exports from 2005-2009



- China ban 5 highly toxic organophosphate insecticides in 2005, following 7 years of careful preparation and many meetings from international Rotterdam Convention to national to provincial to country to township levels.
- This was a major achievement even by OECD standards.
- Now similar achievements are needed, by China and other APPPC Members, to stop the rice planthopper outbreaks



## IPM and National Policies

- Reduce insecticide load by > 50% while food production grows with population
- Reduce Highly Toxic Pesticides that are available in country
- Strengthen Institutional Bases for IPM: Remove constraints (insecticide subsidies) and improve incentives (certification & environmental service payments)

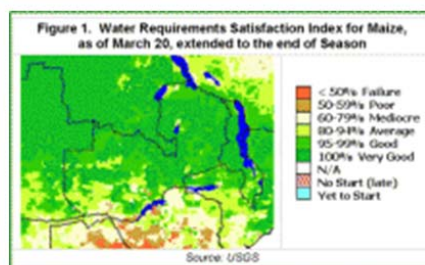


## Policies and institutions

- minimum prices for commodities
- “smart subsidies” to low-income producers in right place
- reduce transaction costs of credit
- rebuild research and technology transfer capacity
- enhance skills through farmer field schools
- incentives to use natural resources wisely (pes)

## Maize Policies in Zambia:

South to North – Save and Grow



Kenya to import maize from Malawi and Zambia

June 2011 "The government has announced that it will import maize from Zambia and Malawi in the next five days....."



## Benin's Farmers save and grow: scaling up

| Practice                          | Before IPPM           | After IPPM                             |
|-----------------------------------|-----------------------|----------------------------------------|
| Seeds                             | Not quantified        | 20% to 25% of what was used previously |
| Chemical fertilizers (NPK + Urea) | up to 400 kg /ha      | 150 kg / ha                            |
| Pesticides                        | none                  | none                                   |
| Use of rice straw                 | sold in Niger markets | buried prior to transplanting          |
| Yields                            | 2.3 t/ha              | 5.6 t/ha                               |

Net benefit: \$1,190 / ha

Total benefit: \$476,000 per annum



## Farmers and SCPI: skills and knowledge

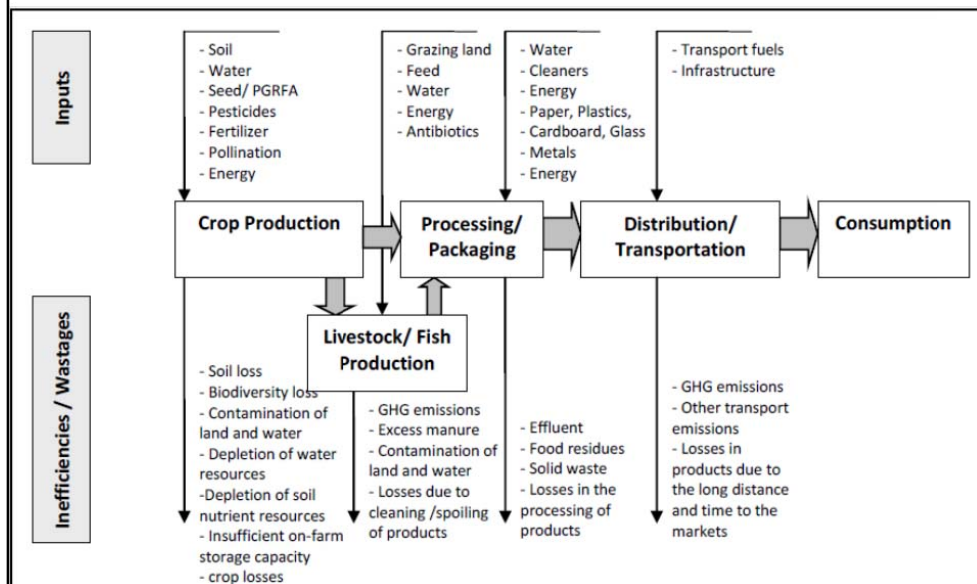
“The most successful approach of training farmers to incorporate different types of sustainable natural resource management practices into their farming systems is the extension methodology known as Farmer Field Schools (FFS). . .”

(B. Swanson and Rajalahti, 2010, *Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems*. World Bank.)

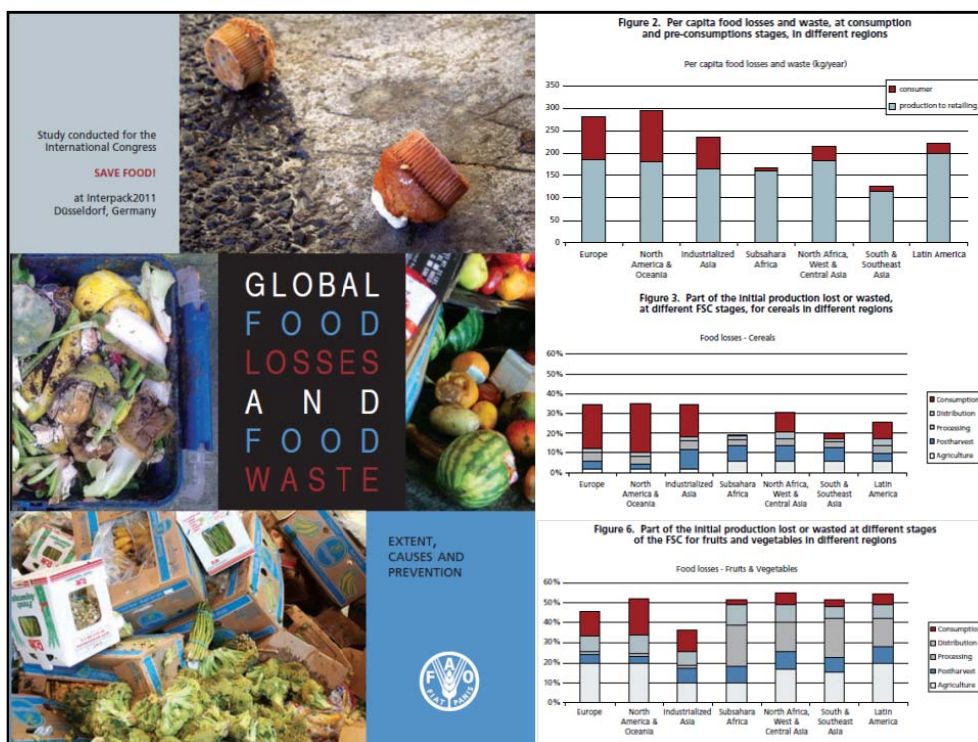
Dr. Keith Warner: Communities of Practice



## Policy for Save and Grow: Along the Food Chain







## IPM – Successes, Challenges and Visions

*By Franz Bigler, IOBC*



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Federal Department of Economic Affairs FDEA  
Agroscope Reckenholz-Tänikon Research Station ART



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# IPM – successes, challenges and visions

*Franz Bigler \**  
*President of the International Organization for  
Biological and Integrated Control (IOBC)*

\* Agroscope Reckenholz-Tänikon Research Station ART  
Zurich, Switzerland

OECD Conference, Berlin, October 17-20, 2011

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## Outline

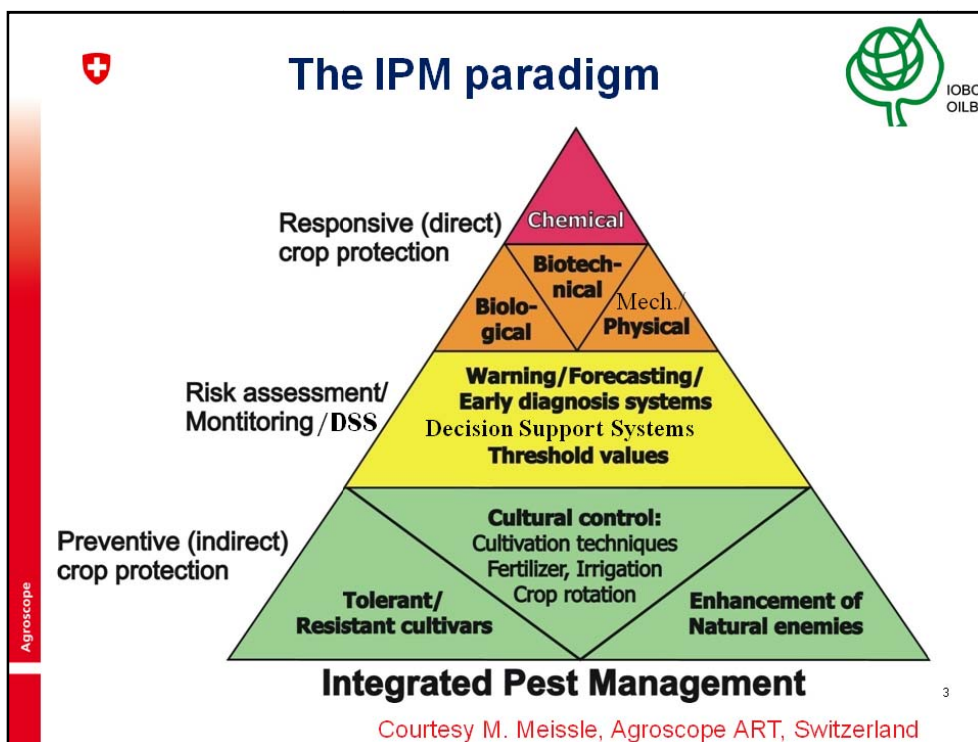


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- The IPM paradigm
- Four IPM case studies – successes and bottlenecks
- Lessons learned
- Actions needed and visions

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**Case studies with successful IPM**

- USA cotton
- Brazil sugar cane
- European apple orchard
- Protected crops (greenhouses)



## Reduction of insecticides in cotton of the USA with IPM strategies

- Cotton receives traditionally high pesticide loads
- Cotton has a large complex of insect and mite pests
- Pink Bollworm (key-pest) eradication programme successful (pheromone-based mating disruption, GM *Bt* cotton, SIT, insecticides)

Bollworms:

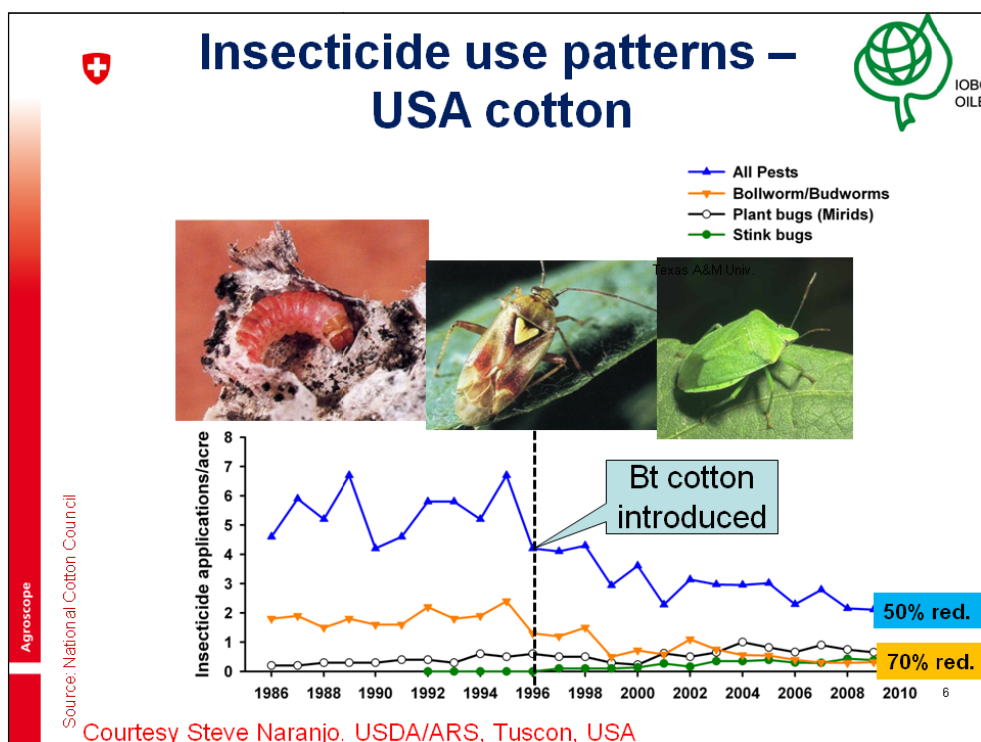
*Heliothis virescens*  
*Helicoverpa zea/armigera*  
*Earias spp.*

Pink Bollworm:

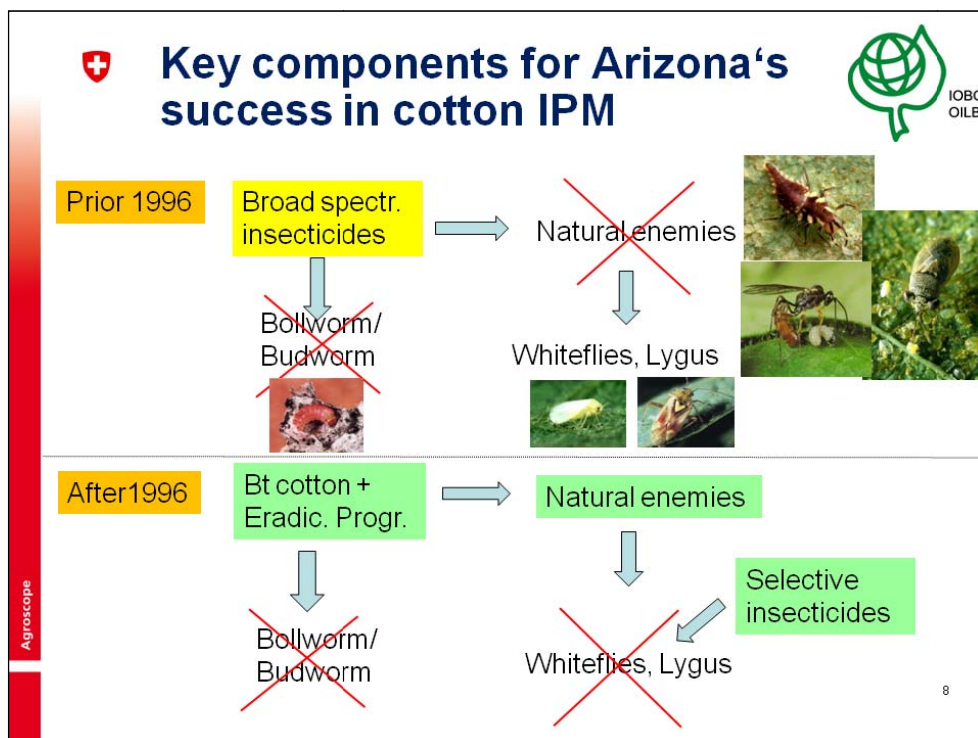
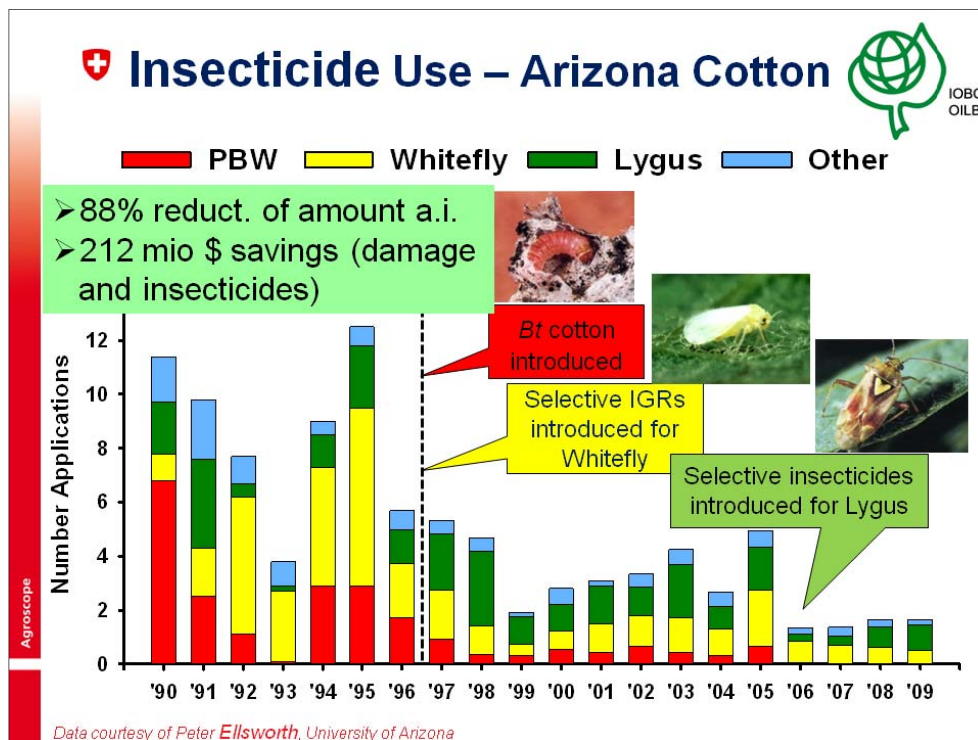
*Pectinophora gossypiella*

17+ other lepidopteran pests

Courtesy Steve Naranjo, USDA/ARS, Tuscon, USA







## **IPM of sugarcane pests in Brazil**

- Low efficacy of insecticides against borers
- Pesticides (insecticides) kill natural enemies
- Resistant cultivars available against diseases
- Pheromone mass-trapping of *Migdolus* sp.
- Biocontrol of sugarcane borers & leafhoppers

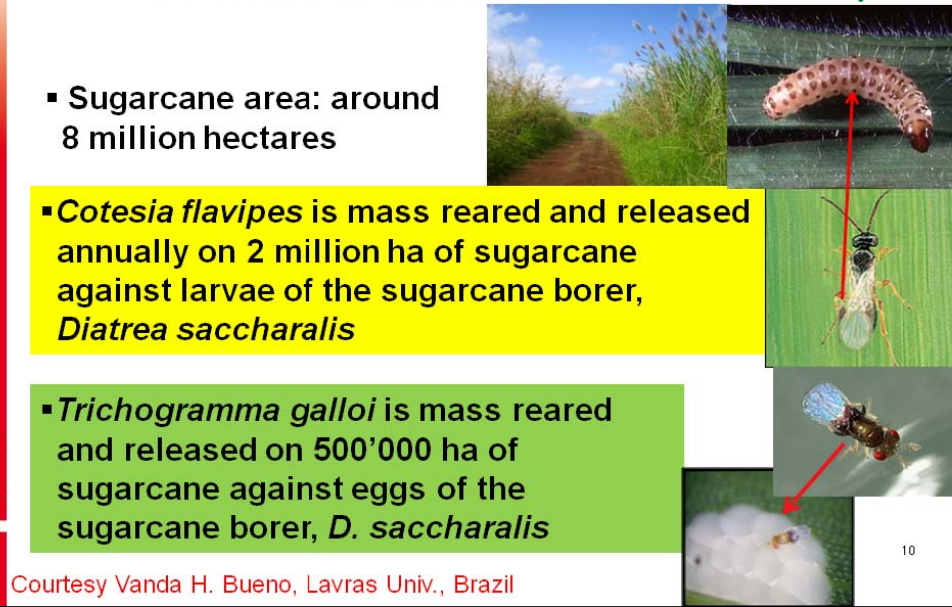



Courtesy Vanda H. Bueno, Lavras Univ., Brazil

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## **Biological control of sugarcane borer *Diatrea saccharalis***

- Sugarcane area: around 8 million hectares
- *Cotesia flavipes* is mass reared and released annually on 2 million ha of sugarcane against larvae of the sugarcane borer, *Diatrea saccharalis*
- *Trichogramma galloi* is mass reared and released on 500'000 ha of sugarcane against eggs of the sugarcane borer, *D. saccharalis*

Courtesy Vanda H. Bueno, Lavras Univ., Brazil

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## Biological control of leafhopper *Mahanarva fimbriolata*

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The fungus *Metarhizium anisopliae* is mass produced and released annually on 1 million ha against leafhopper nymphs and adults



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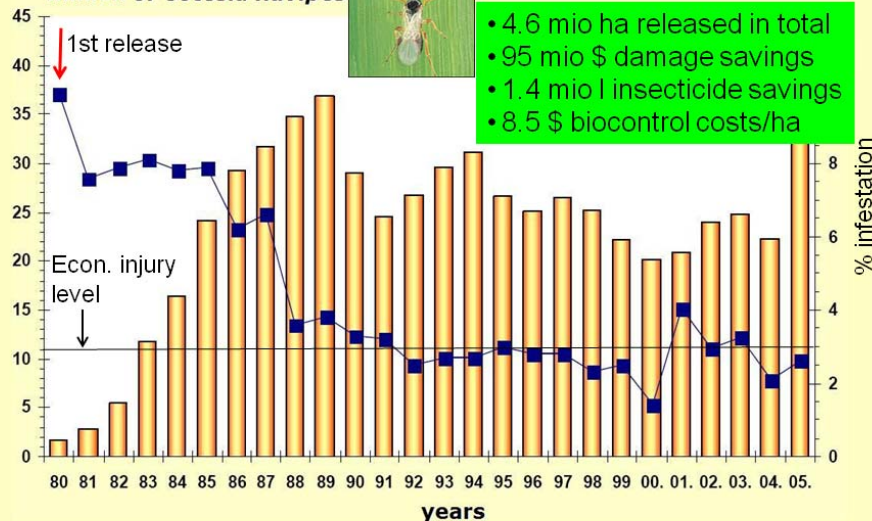
Courtesy José P. Parra, Univ. S. Paulo, Brazil



## Application of *Cotesia flavipes* against the sc. borer by CTC

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million of *Cotesia flavipes*



Courtesy Vanda H. Bueno, Lavras Univ., Brazil





## IPM in European apple production



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Courtesy Heinrich Höhn, Agroscope ACW, Switzerland



## Re-thinking the system



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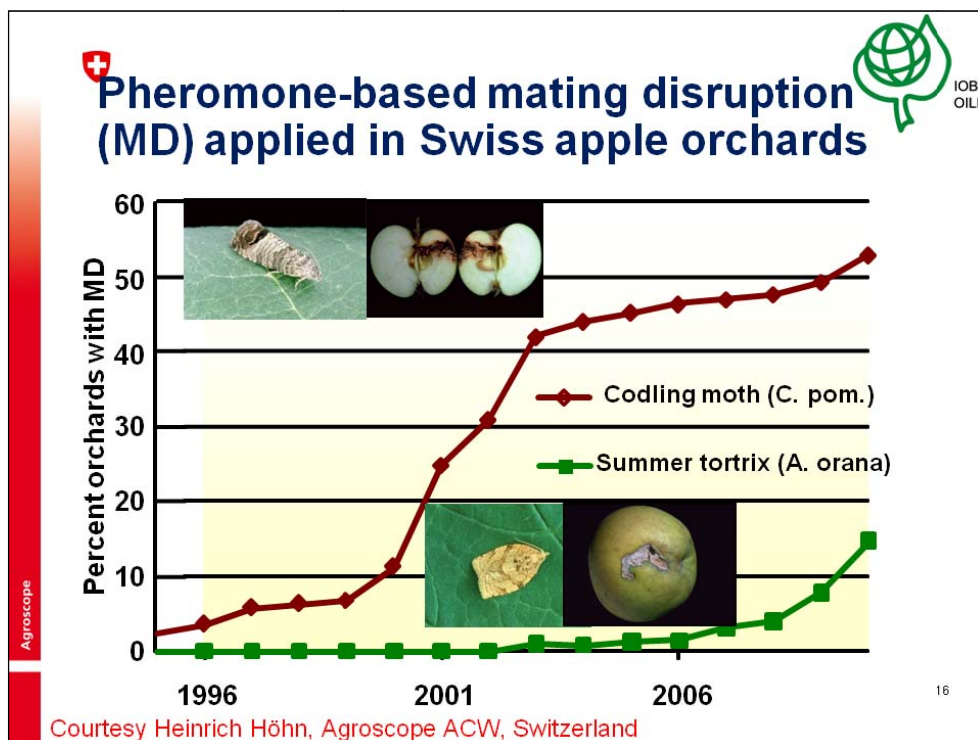
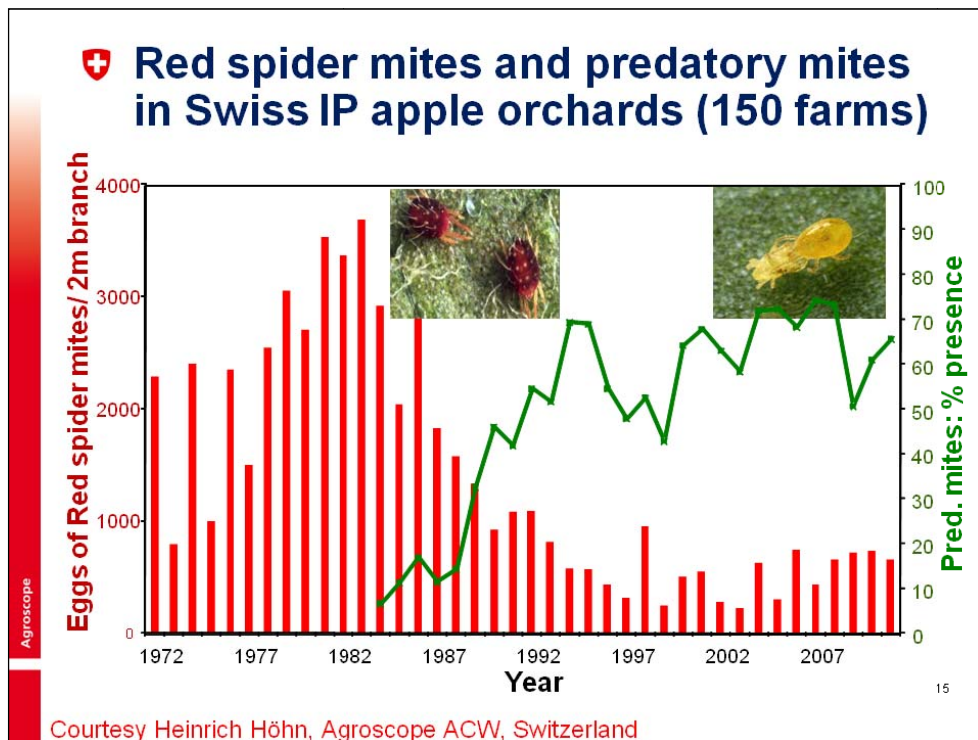
- Since 1950 organic fungicides and broad spectr. insecticides → intensification of apple production
- From 1958 problems with Red spider mite (*P. ulmi*) after repeated use of organic fungicides and insecticides (e.g. OP's, later pyretroids)
- Resistance problems with spider mites against acaricides

1959: 1st IOBC WG  
IPM in orchard



Courtesy Heinrich Höhn, Agroscope ACW, Switzerland







## IPM in protected crops - a multi-pest approach



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Courtesy J.C. van Lenteren, Wageningen Univ., NL

- Intensive production of high value crops requires high protection level
- Uniform environment offers optimal conditions for pests
- Large areas of glasshouses concentrated in same location



Courtesy J.C. van Lenteren, Wageningen Univ., NL



## IPM programme for tomato in North Europe



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10 insect / mite pests

2 nematode pests

5 fungal diseases

1 bacterial disease

2 virus diseases

Pollination by bumble bees

15 natural enemies

resistant cultivars, soil-less culture

biocontrol (antagonists), climate management, resistant cultivars

pathogen free seed, soil-less culture

resistant cultivars, biol. vector contr.

Courtesy J.C. van Lenteren, Wageningen Univ., NL





## From pesticides to IPM and biocontrol





### Advantages of IPM and Biocontrol

- No pest resistance to pesticides
- Grower/worker safety
- Less phytotox and higher yield
- Use of pollinators
- No waiting period for harvest, no residues

Courtesy J.C. van Lenteren, Wageningen Univ., NL



## Common challenges/bottlenecks in IPM



- Information on **adverse effects of pesticides** on natural enemies is not available/sufficient (public funds!)
- Growers and consultants are not (sufficiently) **familiar with non-pesticide methods** (knowledge often lacking, training needed)
- Non-chemical methods have **higher costs**. Costs for **monitoring and sampling** of pests and nat. enemies
- **Public funding** of IPM programmes decreased and lack continuity (long-term)
- **Regulatory systems** expensive (for niche products), slow, high requirements, not harmonized
- **Barriers in international exploration** and exchange of natural enemies through international treaties (CBD)



## Actions to promote IPM and visions

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### Governments/policy

- Create **incentives, reward** private investments in IPM by farmers and enterprises (subsidies, tax reduction, funding of advisory services for IPM training/education, feedback) (see e.g. IOBC poster for performance feedback)

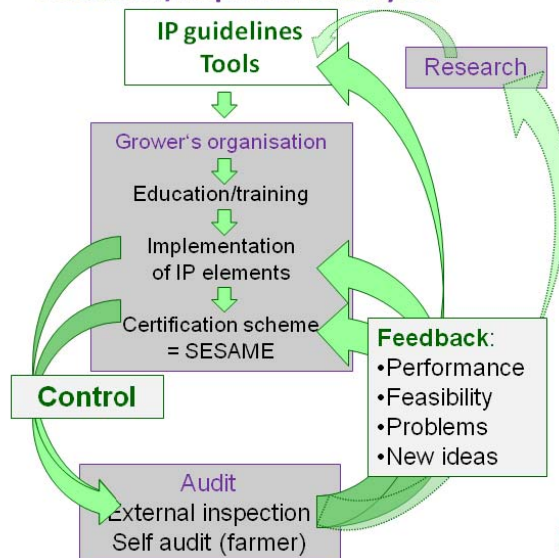
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## The feedback/improvement cycle: a tool to tackle challenges in IPM/IP

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### Feedback/improvement cycle

See poster of  
IOBC

IOBC, 2004

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## Actions to promote IPM and visions



### Governments/policy

- Create incentives, reward private investments of farmers and enterprises in IPM (subsidies, tax reduction, funding of advisory services for IPM training/education, feedback) (see IOBC poster)
- **Ban worst pesticides** and apply **substitution principle**. Tax pesticides (according to environmental and toxic. footprint)
- Reshape **funding system** of agricultural research to bridge the gap of „research-advisory service-enterprises-farmers“ (new criteria for project funding)
- Create **awareness** of IPM for society (e.g. media, campaigns in schools)

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## Actions to promote IPM and visions



### Farmer's organisations/farmers

- Set IPM on **high priority** in agendas
- Create **networks**, participatory knowledge groups on IPM
- **Engage (more) in appl. R&D** to best satisfy farmer's needs (e.g. IPM innovation levy on products)

### Advisory services, consultants

- **Prioritize IPM activities** that will most benefit farmers
- Create **IPM fora** open to all actors. E.g. tell research people what farmers need to know
- **Reorganisation** of structures and **harmonisation** of activities across borders needed (e.g. certified IPM advisor)

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## + Actions to promote IPM and visions

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### Researchers/Science

- Tell and show consultants and growers **what you can offer** (be practical and open to listen to growers and consultants)
- **Adapt existing knowledge** and develop **innovations** in collaboration with partners (growers) (**see e.g. IOBC poster for performance assessment**)

### Pesticide industry and suppliers

- Selective pesticides are needed that create less **problems**. Provide **better information** on impact on natural resources and ecosystem services (e.g. natural and biological control).

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## + Actions to promote IPM and visions

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### Food enterprises and retailers

- Set **realistic levels of IPM** with clearly defined requirements
- Don't push the **level of quality** for farmer's products to the infinite
- **Reward growers** for IPM investment and „added value“ to the environment and product

### Media

- **Talk about IPM in the public** and „added values“ of IPM to environment and consumers

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 **Hm, how to use all the good advice?**

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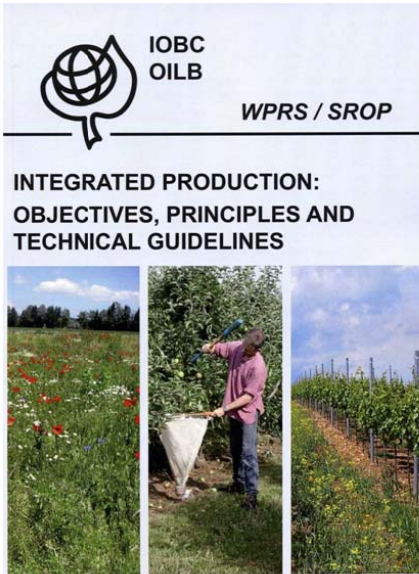


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 **IP/IPM booklet published by IOBC**

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**INTEGRATED PRODUCTION:  
OBJECTIVES, PRINCIPLES AND  
TECHNICAL GUIDELINES**

**€ 30.-, order now**

**[www.iobc-wprs.org](http://www.iobc-wprs.org)**

International Organisation for Biological and Integrated Control of Noxious Animals and Plants  
Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuissables  
West Palearctic Regional Section / Section Régionale Ouest Paléarctique

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**Thank you for your attention**

Material and information was provided by:

- Members of the IOBC IP/IPM Commission: Drs. C. Malavolta (Convenor), R. Baur, F. Wijnands
- Dr. S. Naranjo, USDA/ARS (cotton)
- Prof. V.H. Bueno, Univ. Lavras, Brazil (sugarcane)
- Prof. J.P. Parra, Univ. S. Paulo, Brazil (sugarcane)
- Prof. J.C. van Lenteren, Univ. Wageningen, NL (glasshouses)
- Drs. H. Höhn and J. Samietz, Agroscope ACW, Switzerland (apple production)

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**DAY 1 - PRESENTATIONS ON ISSUE # 1: *TECHNOLOGY AND INFORMATION***

**Role and scope of forecasting models and decision support systems within IPM systems**

*By Erich Jörg, Germany/Ministry of Agriculture in Rhineland-Palatinate*

**OECD – Workshop on IPM**  
**Berlin, 16.-19. October 2011**



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2. Dezember 2011

Folie 1

**Structure**



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Folie 2

## 1. FM/DSS and their purposes (1)

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**FM (forecasting models)**

- simulation of pest/disease population dynamics
- forecast the start/development of epidemics

**DSS (decision support systems)**

- simple / complex tools (consist of simulation models/FM, thresholds, other decision criteria, information on plant protection products....)
- help in taking decisions in crop protection

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## 1. FM/DSS and their purposes (2)

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**Purposes for employing DSS within IPM systems**

- estimation of disease/pest risk**
- estimation of necessity for treatments**
- forecast of the optimal timing of field assessments**
- forecast of the optimal timing of treatments with control agents**
- recommendations on pesticide use (product, dosage rates..)**

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## 1. FM/DSS and their purposes (3)



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### DSS – availability

- for **key pests and diseases**
- in the **main arable and horticultural crops**

- **40 FM/DSS** have been developed
  - 25 in practical use
  - 15 in advanced status
  - in addition: 10 under construction

- main gaps:** DSS for weeds/weed control  
DSS for soil pests / diseases



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## 2. Infrastructure, elaboration, validation and use of DSS (1)



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### Infrastructure

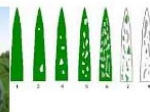
- Meteorological network



Quality assurance:

- complete, plausible data
- automatic recording, administration

- Monitoring network for crop/pest/disease recordings, comprehensive databanks



### Elaboration, validation

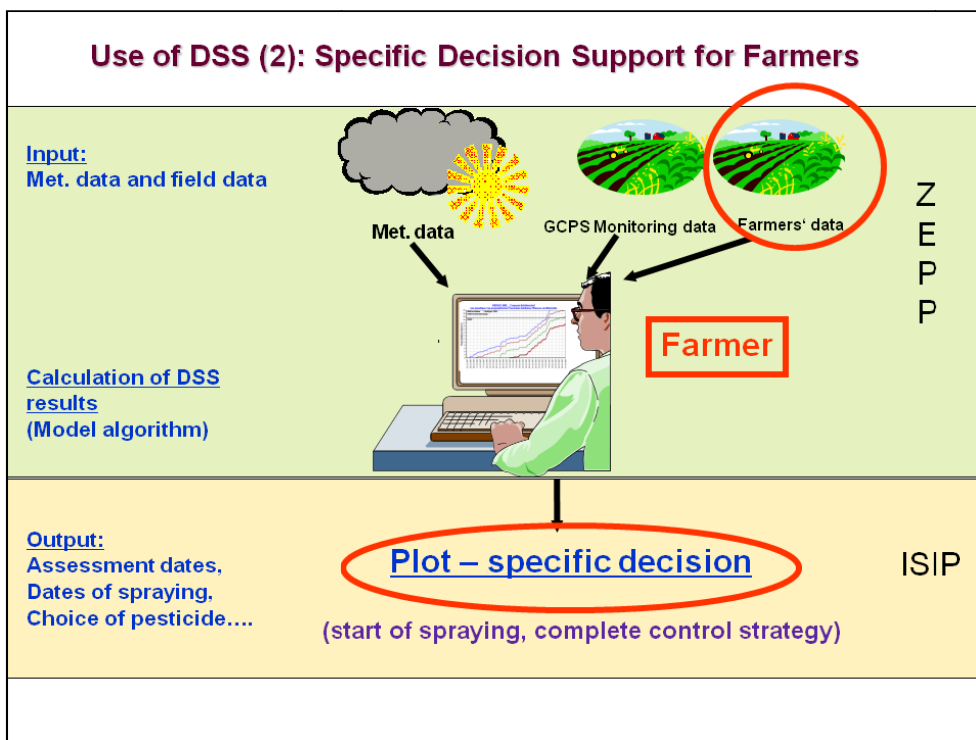
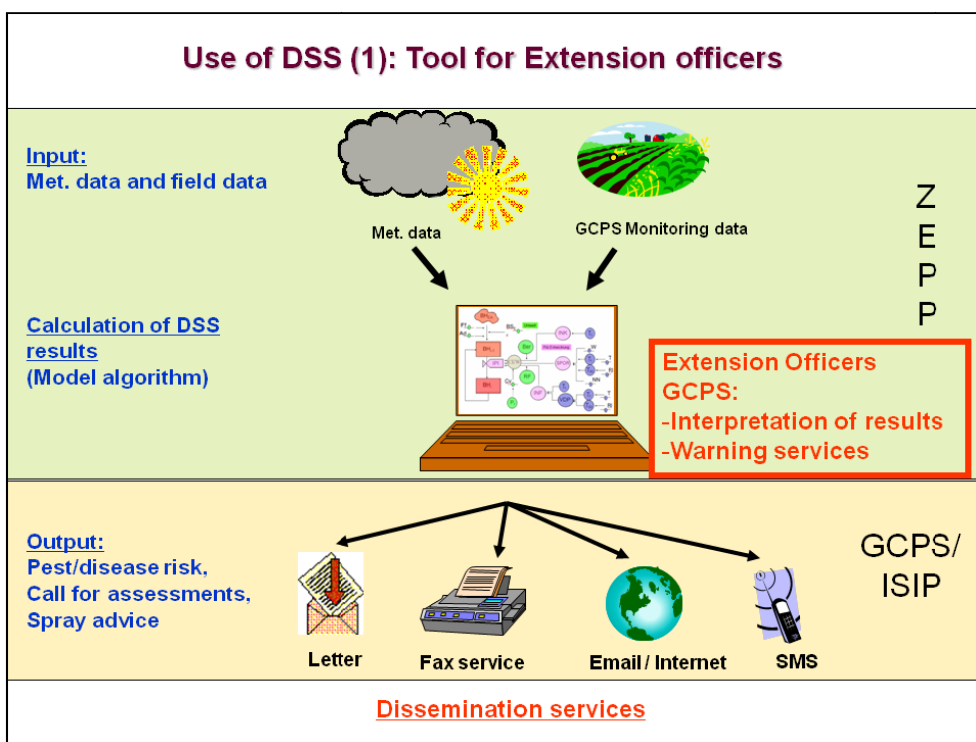
- a permanently available central working unit  
(ZEPP: data acquisition, projects, r&d, communication)
- DSS: verification → test → pract. DSS → validation (trials, experience) → improved DSS → validation....(to be repeated); working group (1 per year)

**Always take care for your DSS, and keep them alive!!**

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Folie 6



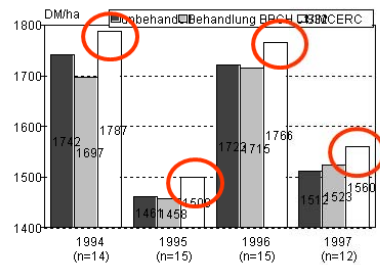


### 3. Results/benefits for IPM systems (1)

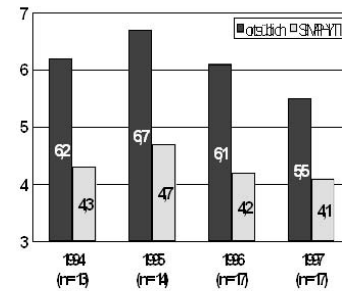


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**Eye spot control in winter wheat:  
SIMCERC strategy was more profitable.**



**Late Blight control:  
SIMPHYT saved 1 - 4  
fungicide treatments**



**Late Blight control in organic production:**

with the use of ECO-SIMPHYT on average 0.6 applications were saved and the reduction of copper was 535g/ha.

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Folie 9

### 3. Results/benefits for IPM systems (2)



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**Main benefits from the use of DSS within IPM systems:**

**save time for field assessments (labour costs)**

**reduce numbers of applications**

**optimise efficacy of treatments (susceptible pest stages)**

**help with the introduction of biological control agents/biopesticides**

**minimise application dosage rates**

**increase the acceptance of action thresholds**

**help with the selection of less harmful pesticides**

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Folie 10

## 4. Further developments in DSS (1)

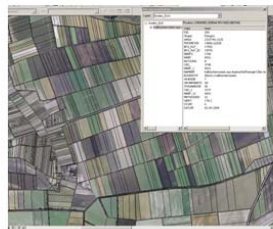


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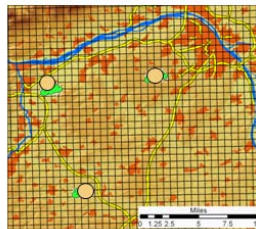
- DSS become mobile; use of services and DSS anywhere and anytime (mobile internet; spread of smartphones and apps)



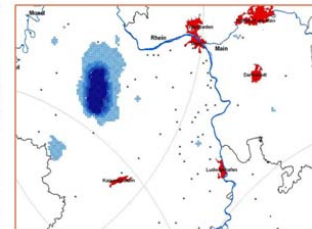
- DSS become more plot - specific



plot data: administration  
and DSS supply via GIS



interpolation of met. data and use of radar data  
for precipitation (GIS use)



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Folie 11

## 4. Further developments in DSS (2)

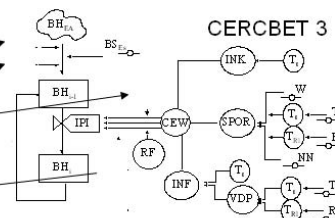


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- DSS become more complex

additional factors:

crop rotation  
prevalence of crop  
irrigation  
efficacy of fungicides  
cultivar resistance



- DSS more and more are integrated into management systems and communicate with machines.



Decision



Management area



Application map



Equipment

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Folie 12

## Recommendations



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### To facilitate the use and increase acceptance of DSS...

- start with a solid infrastructure
- try to achieve the maximum degree of automatic data supply for the DSS
- use, validate and improve them in a developer - user dialogue
- communicate the power and the limits of DSS
- don't forget: your DSS is a part of a more comprehensive IPM system
- take the changes in the whole agricultural production system into consideration

**..then you may end up with a sustainable use of your DSS!!**

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# Thanks a lot for your attention !

**...and good discussions later on!**

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Folie 14

## Stimulating Use of Professional IPM Consultants in Agriculture, Benefits for Farmers and Society

*By Frank Zalom, US /University of California, Davis*

*OECD Workshop on IPM  
Issue #1, Technology and Information  
Berlin, 17 October, 2011*

### Stimulating Use of Professional IPM Consultants in Agriculture, Benefits For Farmers and Society

Frank G. Zalom  
Dept. of Entomology  
University of California  
Davis, CA USA



### Who are 'Crop Consultants'?

Professionals who work to with clients in agricultural systems, forests, and urban landscapes by educating them about risks, and informing them of their legal and ethical options.





## Benefits of crop consultants

A number of studies indicate that the IPM consultant's knowledge of pest biology and management strategies together with the real-time information on pest abundance and crop status that they provide result in positive economic return to farmers...

So why are they not used by all farmers?

... and how do you know that they practice IPM?

I'll address the second question first...

## Professional Certification or Licensing

Certified crop adviser (CCA) -



American Society of Agronomy  
Over 13,000+ nationally

<https://www.certifiedcropadviser.org/>

Certified professional crop consultant (CPCC) -

National Alliance of Independent  
Crop Consultants - 500+ nationally

<http://www.naicc.org/>



Pest control adviser (PCA) -

California Department of Pesticide Regulation  
3,800+ licensed in California

[www.cdpr.ca.gov/docs/license/adviser.htm](http://www.cdpr.ca.gov/docs/license/adviser.htm)

## Professional Certification or Licensing

Certification requirements -

- Pass comprehensive examination(s)
- University degree and/or specified university coursework with documented experience
- 'Code of Ethics' (CCA and NAICC)

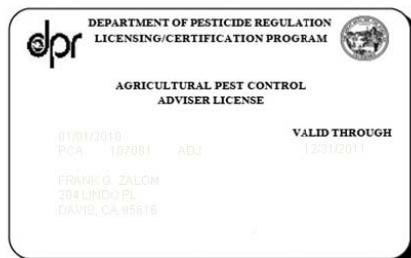
Continuing education (to maintain certification of license) -

- 20 to 36 hours every year

## Pest control adviser (PCA) - California

### Who needs it?

An Agricultural Pest Control Adviser (PCA) License is required by any person who offers a recommendation on any agricultural use of a pest control product or technique. When a pesticide is used, a written recommendation must be provided to the property owner, the pest control dealer, and the applicator prior to application.



**Pest Control Recommendation**

1. Operator of the Property \_\_\_\_\_ 2. Recommendation Expiration Date \_\_\_\_\_

Address \_\_\_\_\_ County \_\_\_\_\_

3. Location to be Treated \_\_\_\_\_

4. Commodity to be Treated \_\_\_\_\_ 5. Acres or Units to be Treated \_\_\_\_\_

6. Method of Application: ☐ Air ☐ Ground ☐ Fumigation ☐ Other \_\_\_\_\_ 7. Pest(s) to be Controlled \_\_\_\_\_

8. Name of Pesticide(s) \_\_\_\_\_ Rate Per Acre or Unit \_\_\_\_\_ Dilution Rate \_\_\_\_\_ Volume Per Acre or Unit \_\_\_\_\_

9. Hazards and/or Restrictions: ☐ 1. Highly toxic to bees ☐ 2. Toxic to birds, fish and wildlife ☐ 3. Do not apply when irrigation or run-off is likely to occur ☐ 4. Do not apply near desirable plants ☐ 5. Do not allow to drift onto humans, animals or desirable plants ☐ 6. Keep out of lakes, streams and ponds ☐ 7. Birds feeding on treated area may be killed ☐ 8. Do not apply when foliage is wet (dew, rain, etc.) ☐ 9. May cause allergic reaction to some people ☐ 10. This product is corrosive and reacts with certain materials (see label) ☐ 11. Closed system required ☐ 12. Restricted use pesticide (California and/or EPA) ☐ 13. Hazardous area involved (see map and warnings) ☐ 14. Other (see attachment)

10. Schedule, Time or Conditions \_\_\_\_\_

11. Surrounding Crop Hazards \_\_\_\_\_

12. Proximity of Occupied Dwellings, People, Pets or Livestock \_\_\_\_\_

13. Non-Pesticide Pest Control, Warnings and Other Remarks \_\_\_\_\_

14. Criteria Used for Determining Need for Pest Control Treatment: ☐ Sweep Net Counts ☐ Leaf or Fruit Counts ☐ Preventative ☐ Field Observation ☐ Personnel or Other Trap ☐ Soil Sampling ☐ History

15. Crop and Site Restrictions: ☐ 1. Worker reentry interval \_\_\_\_\_ days ☐ 2. Do not use within \_\_\_\_\_ days of harvest/laughter ☐ 3. Posting required ☐ Yes ☐ No ☐ 4. Do not irrigate for at least \_\_\_\_\_ days after application ☐ 5. Do not apply more than \_\_\_\_\_ application(s) per season ☐ 6. Do not feed treated foliage or straw to livestock ☐ 7. Plantback restrictions (see label) ☐ 8. Other (see attachment)

16. I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.

Adviser Signature \_\_\_\_\_ Date \_\_\_\_\_

Adviser License Number \_\_\_\_\_

Employer \_\_\_\_\_

Employers Address \_\_\_\_\_

**Recommendation - Unique to California**

**Owner info**

**Commodity or site**

**Justification**

**Pest**

**Pesticide**

## About California pest control advisers \*

Employment: Conflict of Interest?

| Employer             | 2010 | 1999 |
|----------------------|------|------|
| Distributor/retailer | 29%  | 26%  |
| Independent/Private  | 18%  | 14%  |
| Government           | 11%  | 25%  |
| Manufacturer rep.    | 14%  | 10%  |
| In-house             | 17%  | 14%  |

\* CAPCA member survey, 2010

## Conflict of interest?

### Independent PCA vs distributor-affiliated PCA \*

- Independent PCAs monitored orchards more frequently
- Independent PCAs used more precise monitoring practices
- Independent PCAs were more likely to provide written reports to growers
- Growers were more likely to follow the advice of independent PCAs
- Growers with independent PCAs were more likely to use recommended IPM cultural practices

\* Brodt, S., F. Zalom, R. Krebill-Prather, W. Bentley, C. Pickel, J. Connell, L. Wilhoit, and M. Gibbs. 2005. Almond growers rely on pest control advisers for integrated pest management. *California Agriculture*. 59(4):242-248.

### Grower incentives for using IPM-certified crop consultants

#### Profitability issues:

- Input costs
    - Pesticides
    - Production practices
  - Risk reduction
    - Pests and diseases
  - Crop value
    - Value added (ecolabeling certification)
    - Organic (organic certification)
- } Traditional IPM incentives

Crop consultant use of IPM practices could be linked to farmer profitability



Grower incentives for using IPM-certified crop consultants

**Compliance issues:**

- Food safety
  - Pesticide residues
  - Microbial contaminants
- Health and safety
  - Worker exposure to pesticides
  - Buffer zones
- Maximum residue levels (MRLs) for exports
- Invasive species - phytosanitary certification

Crop consultant use of IPM practices could be linked to regulatory compliance

Grower incentives for using IPM-certified crop consultants

**Environmental issues:**

- Water quality
  - Ground water
  - Surface water
- Air quality
  - Volatile organic compounds (VOCs)
- Nontarget effects
  - Pollinators
  - Endangered species
  - Natural enemies

Crop consultant use of IPM practices could be linked to conservation programs

## IPM implementation...



The key to a successful IPM program is the way in which pest management decisions are made.



## IPM-certified crop consultants...



Help farmers make better pest management decisions.



## Considerations for IPM implementation

- Shortage of IPM-certified crop consultants
  - Aging demographics/loss of experience
  - IPM degree programs/curriculum development
  - IPM scholarships or internships for students, sponsored by government and agricultural industry
  - Certification/licensing programs
    - Third-party certification
    - Government licensing

## Considerations for IPM implementation

- Grower incentives
  - Profitability
    - Reduced input costs and pest risk
    - Increased crop value
      - Organic certification
      - Ecolabelling
  - Regulatory compliance
    - Food safety, health and environmental regs.
    - MRLs
    - Phytosanitary certification
    - Allow use of certain restricted products
  - Conservation
    - Link to government incentive programs
    - Certified use of Best Management Practices

## Considerations for IPM implementation

- Incentives for IPM-certified crop consultants
  - Enhanced professional status
  - Contribution to society
  - Mitigation of liability
    - Availability of liability insurance
    - Crop insurance for growers using recommended IPM practices

*OECD Workshop on IPM  
Issue #1, Technology and Information  
Berlin, 17 October, 2011*

## Stimulating Use of Professional IPM Consultants in Agriculture, Benefits For Farmers and Society

Frank G. Zalom  
Dept. of Entomology  
University of California  
Davis, CA USA





## ENDURE and its tools relating to IPM-implementation

By Jens Erik Jensen, ENDURE/Denmark/The Knowledge Centre for Agriculture – VFL

FOOD  
QUALITY  
AND  
SAFETY




# ENDURE and its tools relating to IPM implementation

by Jens Erik JENSEN, Knowledge Centre for Agriculture, Denmark, e-mail [jnj@vfl.dk](mailto:jnj@vfl.dk)




FOOD  
QUALITY  
AND  
SAFETY




Leaflet  
in poster  
area








Providing information, tools and services to scientists, policy and farm advisers, and trainers concerned with Integrated Pest Management

IPM is a sustainable approach to managing pests by combining biological, cultural and chemical tools in a way that minimises economic, environmental and health risks

[www.endure-network.eu](http://www.endure-network.eu)

2007

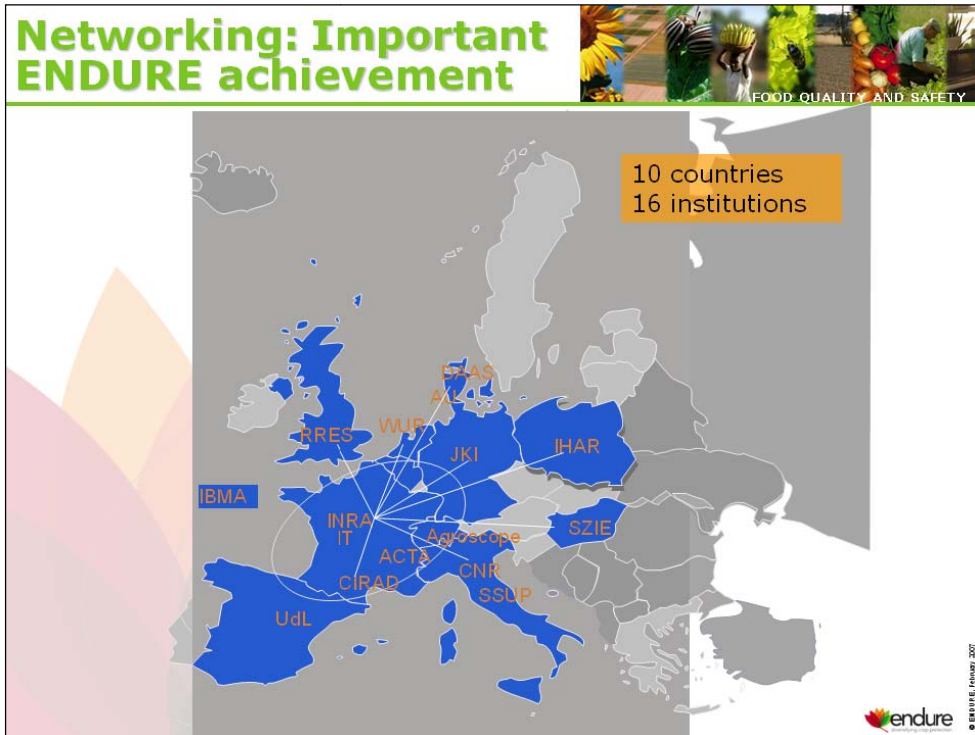
4 years of EC financial Support




2010

ENDURE ERG: self funded Network (14 founding members)





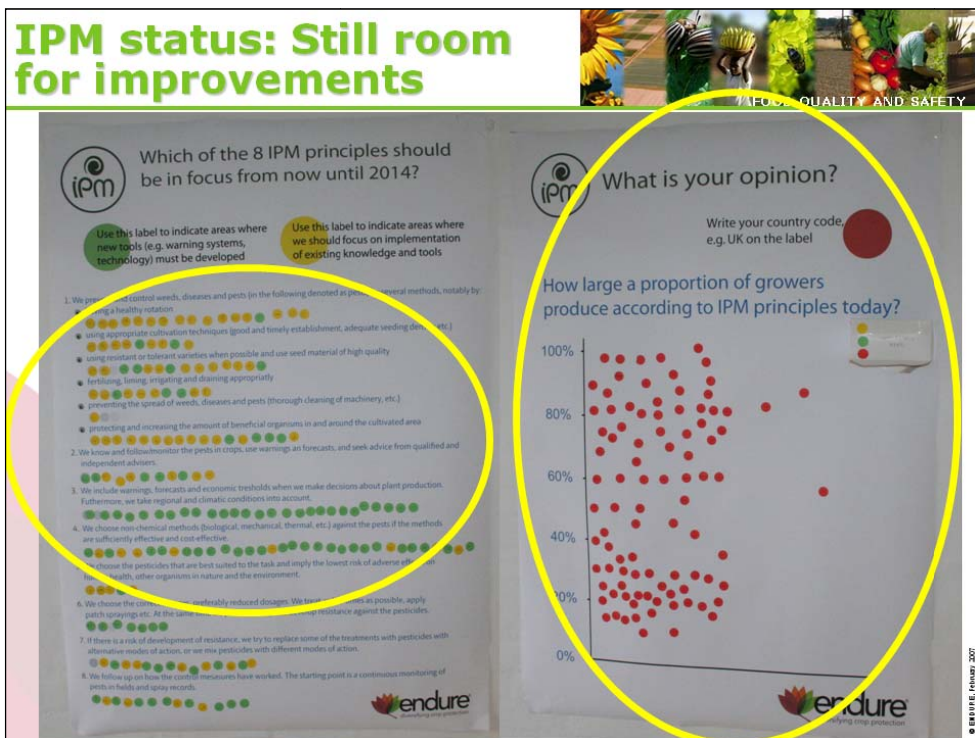
### Challenge: Farmers must adopt IPM

- Framework directive 2009/128/EC on sustainable use of pesticides
- Member states must implement IPM = Integrated Pest Management by 2014
- IP – What!??
- Still today many growers and advisers in EU have not heard about IPM

FOOD QUALITY AND SAFETY

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## EuroWheat – [www.eurowheat.org](http://www.eurowheat.org)



Home Project information Pathogens Fungicides Cultivars Wheat IPM Public documents

17 October 2011

### Comparison of Fungicide efficacy across countries



Find information on the efficacy of the most important compounds against cereal diseases across countries in Europe. [Read more...](#)

Find presentations and conclusions from EPPO's septoria workshop held at Rothamsted, December 2010 [here](#)

### Survey on the use of disease thresholds

New guideline on monitoring of diseases in wheat and a survey on control thresholds used in different countries [Read more...](#)

### Welcome to EuroWheat

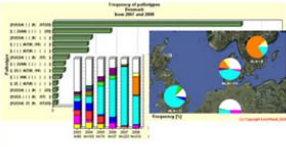
EUROWHEAT is an Internet based platform aiming at collating and displaying host - and pathogen characteristics, and pesticide efficacy on a European scale. Bringing together existing information from national programs and ensuring that these data are in a format, which can be readily understood trans-nationally, are expected to provide significant added value on a European scale. New disease - and resistance data will be published on the platform as soon as possible to support effective disease control, deployment of host resistances and breeding programs.

Present information available are:

- Virulences in the yellow rust population
- Ranking of wheat cultivars for susceptibility to Fusarium and different testing methods
- Disease names in six different languages
- Effectiveness of fungicides ranked in different countries
- Fungicides international trade names
- Fungicide resistance as present in Europe
- Survey on pesticide use and yield responses to fungicides in EU countries
- Yield level and yield losses from specific diseases in 8 EU countries
- Information on disease thresholds and DSSs used in Europe
- Cultural practices impact on disease development
- National documents on disease management

EuroWheat is funded by the ENDURE project and Aarhus

### Yellow rust pathotypes in Europe



Most important pathotypes in Europe 1993-2009...  
 Evolution of pathotypes over years and countries  
 Pathotypes on Europe map  
 Track single, rare virulences on Europe map

### Publications about EuroWheat

[EuroWheat.org : A support to integrated disease management in wheat. Outlooks on Pest Management, Vol 21, No 4 - August 2010, p 173-176](#)

[EuroWheat.org: a new research-based](#)



## EuroBlight [www.euroblight.net](http://www.euroblight.net)



Home Partners Pathogens Fungicides Cultivars Potato IPM Publications

17 October 2011

### Login

Login name:   
 Password:   
  
[Forgot your password?](#)

### Workshop in St Petersburg 9-14 October 2011



The EuroBlight 2011 Workshop will be held between October 9th - 14th, 2011 in historical St. Petersburg.

### News

**03 October 2011 Updated programme and participants list**  
 The 13th EuroBlight Workshop, 9-12 October 2011 is hosted by N.I. Vavilov Research Institute of Plant Industry, St Petersburg, Russia. The Workshop will be attended by 91 persons from 20 European countries, Russia, Israel, Chile, Argentina and United States of America. Representatives from all countries will present information on the late blight epidemic in 2010 and 2011 and recent research results regarding integrated control, decision support systems, resistance of varieties and population biology of the late blight pathogen in potatoes. Since early blight is an increasing problem in Europe reports on this disease are also included.

The papers and posters presented at the Workshop and discussions in the subgroups will be published in the Proceedings, PPO-Special Report no. 15. The current and previous Proceedings are also available on the EuroBlight website [www.EuroBlight.net](http://www.EuroBlight.net).

Please find the updated programme and participants list on this web page

EuroBlight Coordinators:  
 Alison Lees, The James Hutton Institute (UK)  
 Jens G. Hansen, Aarhus University (DK)  
 Huub Schepers, Wageningen University (NL)

**16 August 2011 Scientific program for St Petersburg workshop**  
 Please find the scientific program for the St Petersburg workshop [here](#)

Jens G. Hansen

**23 July 2011 New link for hotel booking**  
 The local organisers inform that the confusion with on-line hotel booking has been

### Blight surveillance 2011



[Blaedemateriale @2011 - Vlees for anverdes](#)

**Norway.** Early blight attacks in Norway from Mid June. First blight recorded in more fields after June 28 in the UK. See detailed results from: [DK](#) [NO](#) [SE](#) [FI](#) [All](#)  
[Nordic countries](#) [Infection pressure DK](#)

Surveillance in other countries:  
[Fight against Blight \(UK\)](#)  
[DaCom/Masterplan \(NL\)](#)  
[PhytoPre+2000 \(CH\)](#)  
[Phytophthora Model/Welkensteinphan \(DE\)](#)  
[QASSO Blight-Net \(Northern Ireland\)](#)





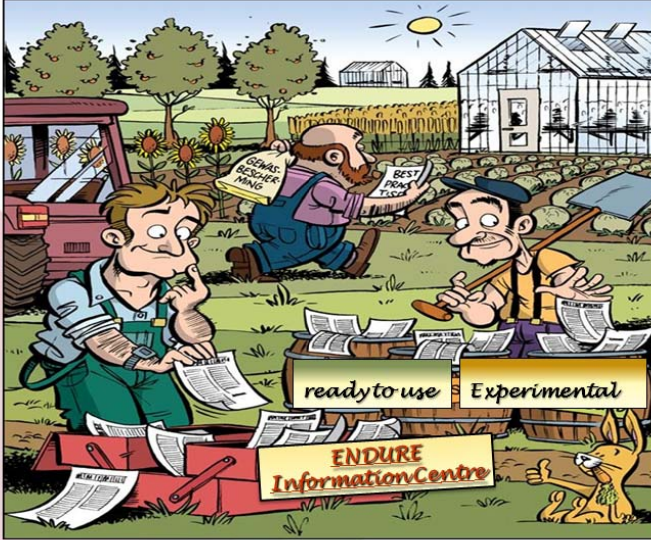
**endure** diversifying crop protection

**ENDURE INFORMATION CENTRE**

English | German | French | Spanish | Dutch | Danish | Polish | Italian

About Search Login

[www.ENDUREinformationcentre.eu](http://www.ENDUREinformationcentre.eu)



Modified Farming with future, NL

- 1200 documents
- For advisers & extension service
- Linking between researchers & crop protection advisors
- Access to practical IPM-relevant information
- A wide range of countries and cropping systems
- Validated by ENDURE staff

**endure** diversifying crop protection

**ENDURE INFORMATION CENTRE**

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About Search Login

septoria tritici Search

**Crop**

Wheat

Triticum sp.

TRZSS

Clear

**Pests**

Septoria

Septoria

ISEPTG

Clear

**Measure**

variety/cultivar choice

Clear

**Country**

Common Name

NUTS Code

Clear

**Search**

**'Google-like' search or structured via boxes**







English | German | French | Spanish | Dutch | Danish | Polish | Italian

About Search Login

## ENDURE IC - numbers

| crops                 | entries | measures                                 | entries |
|-----------------------|---------|------------------------------------------|---------|
| arable                | 600     | preventive measures                      | 380     |
| cereals               | 220     | decision support/ control                | 185     |
| maize                 | 85      | non-chemical control                     | 310     |
| potato                | 180     | chemical control                         | 340     |
| oil seed rape         | 70      | legislation                              | 93      |
| pome- and stone fruit | 110     | training material                        | 80      |
| vegetables            | 170     | assessment of crop protection strategies | 6       |
| grapevine             | 67      |                                          |         |

Total approx. 1200 documents


© ENDURE, released 2007

## ENDURE Tools: IPM Training Guide



- ✿ **IPM is a continuously improving process**
- ✿ **IPM needs a more participatory approach**
- ✿ **Trainers need tools to adapt their trainings**
- ✿ **ENDURE has much to offer**





© ENDURE, released 2007

## ENDURE Tools: IPM Training Guide



**Composed of:**

- sheets,
- leaflets,
- recommendations and links,

**Following four main topics requested by trainers:**

- arguments,
- methodology,
- tools,
- contents




FOOD QUALITY AND SAFETY

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diversifying crop protection

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## ENDURE Tools: ENDURE Network of Advisors



FOOD QUALITY AND SAFETY

EUROPEAN UNION

endure  
diversifying crop protection





### Wanted: New members

| Country                                                                                             | Members |
|-----------------------------------------------------------------------------------------------------|---------|
| Estonia          | 1       |
| Latvia           | 0       |
| Lithuania        | 1       |
| Poland           | 0       |
| Czech Republic   | 0       |
| Slovak Republic  | 0       |

 © ENDURE, released 2007



## First annual meeting coming up!



FOOD QUALITY AND SAFETY



- ✿ Paris, December 7-8, 2011
- ✿ Meeting and hotel costs will be covered
- ✿ Please refer to the newsletter or [www.endure-network.eu](http://www.endure-network.eu)



endure

## Network of Advisers: The outlook is good!!



FOOD QUALITY AND SAFETY



**It is also your network –  
Please get involved!!**

© ENDURE, February 2007

# Challenges



FOOD QUALITY AND SAFETY

- ✿ Sustain activity level with reduced funding
- ✿ Defragmentation of advisory services
- ✿ Overcome language barriers
- ✿ Ensure involvement of farmers, advisers, industry and other stakeholders
- ✿ Time is limited – 2014 is not so far away



© 2011/12, release 2012

# IPM must happen in the field!



FOOD QUALITY AND SAFETY



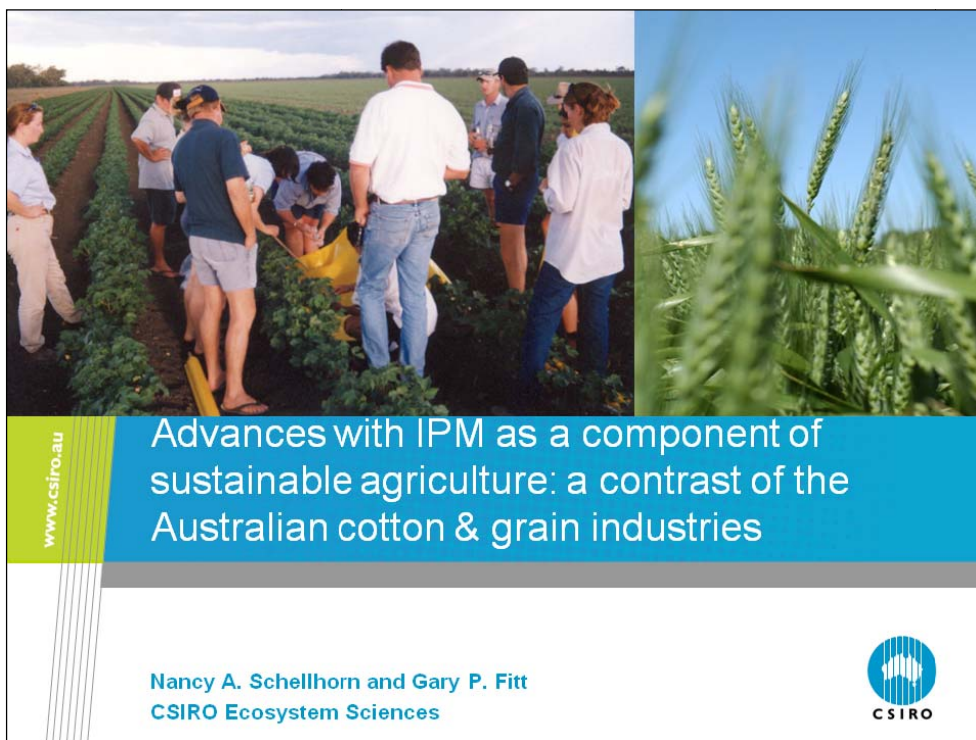
© 2011/12, release 2012





## Advances with IPM as a component of sustainable agriculture: a contrast of the Australian cotton and grains industries

*By Nancy Schellhorn, Australia /CSIRO*



### Cotton and Grain in Australia

Two agricultural sectors at different stages of IPM implementation

- I. *New Industry - advanced IPM implementation – Cotton*
  - A. *Example of an effective structure, drivers, tools & technologies supporting the adoption and implementation*
  - B. *Measures of impact*
  - C. *Social and economic implications*
- II. *Old Industry – beginning IPM implementation - Grains*
  - A. *How is it progressing?*





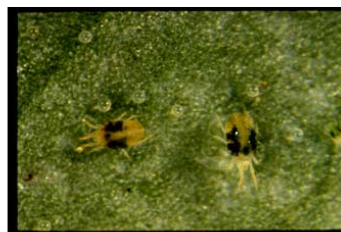
## Features - Australian Cotton Industry / Sector

- *new industry / sector – 1970s*
- *few growers (~800), high level of expertise, well organised*
- *high quality product, efficient production system*
- *crop management by professional consultants*
- *strong commitment to research*
- *receptive to new technology*
- *responsive to environmental concerns and committed to implementing management strategies*



## Insect Pests – the challenge ....

- ***Helicoverpa* spp. – main pests**
- **Sucking pests – mirids, mites**
- Pesticide reliance
- ~ 40% variable costs
- \$200 million/yr – mid 1990s



## Consequences of pesticide dependence



**Resistance**



**Secondary pests**

**Resistance**



**Beneficial disruption**



**Environmental pollution**

**Community concerns**

**Legislation**



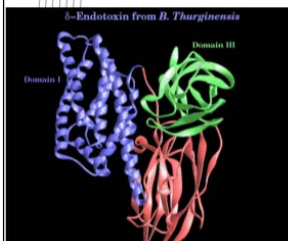
## Science responses....

- Understanding System Ecology
  - crop, pests, beneficials – interactions
- Early investment in thresholds and **Decision Support Tools** - SIRATAC followed by EntomoLOGIC
- Manipulating the crop
  - Yield potential and Compensation capacity
  - Host plant resistance – conventional and GM
- Integrated Pest Management
  - Sampling linked w/ thresholds
  - Pests, agronomy, year round focus
  - Multiple control options
- Manipulating Cropping systems – field, farm, landscape
  - Managing and valuing ecosystem services to support pest management
  - Enhanced on-farm diversity
  - Spatial integration with wider environment





## Host plant resistance

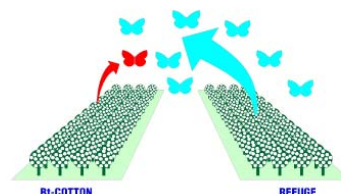


- Initial focus on conventional HPR traits – incremental gains
- Transgenic Bt cotton INGARD, BOLLGARD II – transformational gain
- Cry IAc, Cry 2Ab – highly specific insecticidal proteins to *Helicoverpa* spp
- similar yields and fibre quality
- Not a silver bullet – opportunity for IPM



## Pre-emptive resistance management strategy

- GM cotton – INGARD commercialized 1996; BOLLGARD in 2002
- Effective refuges on every farm
- Defined planting window
- Crop residue destruction
- Monitoring of Bt resistance
- + cap on area at 30% for INGARD, 90% for BOLLGARD II





## Maximising biotic mortality....



a diversity of insects - 450+ spp.  
Numerous predators and parasitoids  
Higher abundance in Bt cotton  
Significant value for IPM



## Enhanced on-farm crop diversity

- Using, managing, enhancing the ecosystem service of pest control
- encourage and maintain predators and parasitoids (nectar sources, alternative prey)
- enhance biological control
- provide trap crops for key pests
- Bt cotton refuge crops add crop diversity

Nursery  
strips of  
lucerne in  
Cotton  
Ord River  
Irrigation  
Area





## Integrating cropping with the landscape...

- Using, valuing managing the ecosystem service of pest control through remnant native vegetation.....



## Changing Pesticide Options

### Old Chemistry (\$)

- relatively inexpensive
- broad spectrum
- resistance problems
- generally disruptive
- environmental issues
- incompatible with IPM

### New Chemistry including biologicals (\$\$)

- expensive (2-5 x)
- more selective
- new modes of action
- less disruptive
- reduced environmental residues
- more compatible with IPM



## Education and training responses....

- Information – appropriately packaged
  - Crop advisors, farm managers & growers
- Educational opportunities
- Extension - communication and support
- **Confidence building**



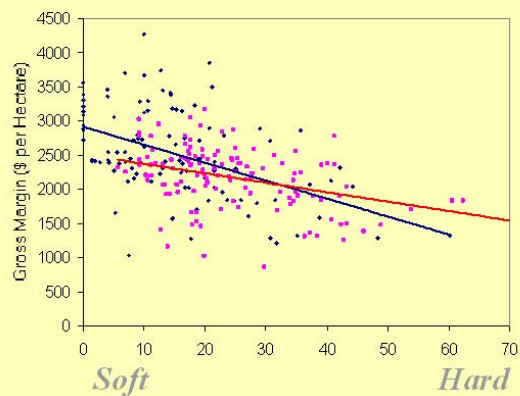
## Information PAKS & Decision Support Tools



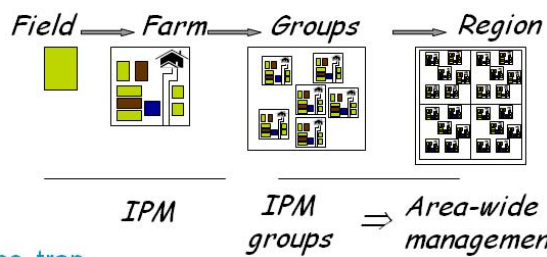
## Building confidence.....

- Can IPM be economic ?
- Yes, soft – more selective insecticides = increased gross margins
- Beneficial insects – identity and abundance
- Pesticide sprays – disruption of beneficials
- \$\$\$\$\$

*“Spray soft,  
Earn hard”*



## IPM .... to Area-Wide Management

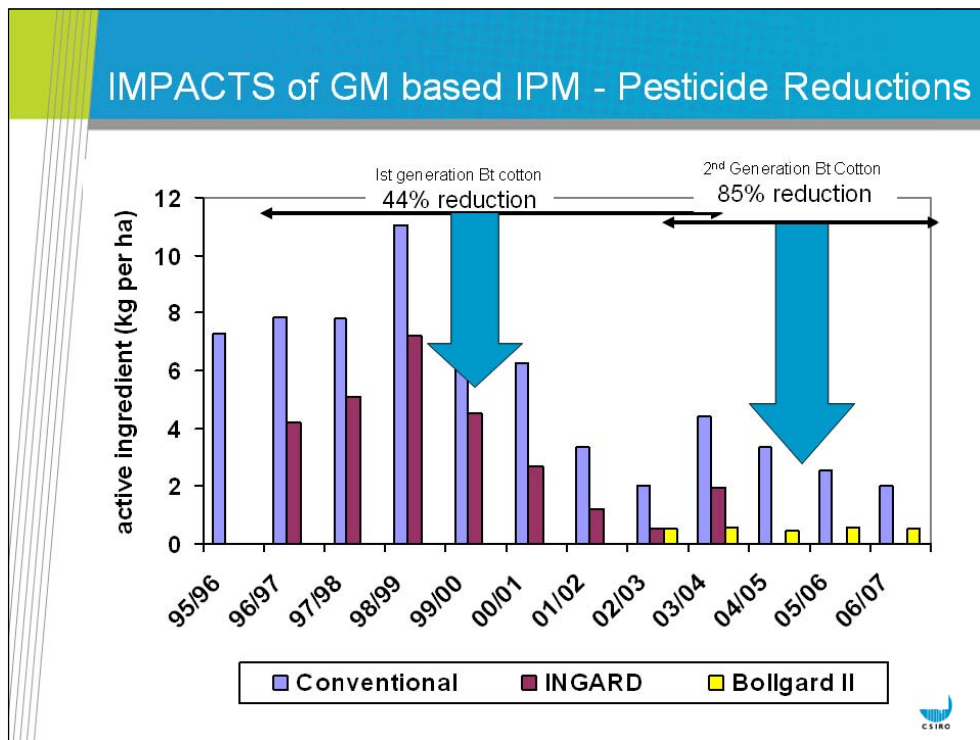


Co-ordinated use of:

- “soft” option chemistry
- Transgenic Bt cotton
- companion crops (refuges, trap crops, nurseries)
- crop residue management
- communication within grower groups









## Environmental benefits

- increased abundance of beneficial insects
- elimination of endosulfan residues in cattle from cotton areas – no cases since 2000
- elimination of endosulfan residues in the Namoi and Gwydir rivers
- 95% reduction in total complaints to environmental regulators about “cotton” – 03/04)



## Social benefits

- IPM knowledge
- communication among growers
- less spraying – improved quality of life (celebrate Christmas)
- improved practices
- less community complaints



## A comparison - Grains



- 'Old' Industry – since settlement
- Major industry (~ 20000 growers??)
- National industry
- Several crop types (eg. wheat, lupin, canola)
- Insect pests not the main threat, but lost production
- Insect pest management a distraction
- No or very limited experience of insecticide resistance
- No environmental pressure
- No-till & low-till predominate, herbicide is primary weed control
- Large production areas, spray for weeds, might as well put on a prophylactic insecticide
- Majority of crop advisors are also chemical resellers
- Cheap pesticide pricing
- Many pest species
- **Limited incentive to adopt IPM**



## NIPI – National Invertebrate Pest Initiative



*Since 2005 - Brings together scientists from state gov't, universities, farmer groups and CSIRO to address insect pest management issues in Australian grain – lead by Dr Gary Fitt*

**Science and Education Responses** specific to grains:

- Training farm advisors on grain pest identification and IPM options
- Quantifying economic impact of invertebrate pests
- Developing thresholds to link with DST
- Area-wide management options for key pests
- Capacity building of pest management advisors



## How is it progressing?

- *perception that pest management still relies heavily on a prophylactic pesticide based approach*
- *Adoption will be a challenge - Invertebrate pests are not the major limiting factor on production in many regions, systems and crops*
- *BUT insect pests and their management do bring risks for industry – environmental contamination, resistance etc – particularly in the context of a changing regulatory environment*
- *There are sound opportunities in environmental sustainability through reduced reliance on pesticides... economic sustainability?? Cheap insecticide pricing makes this challenging*





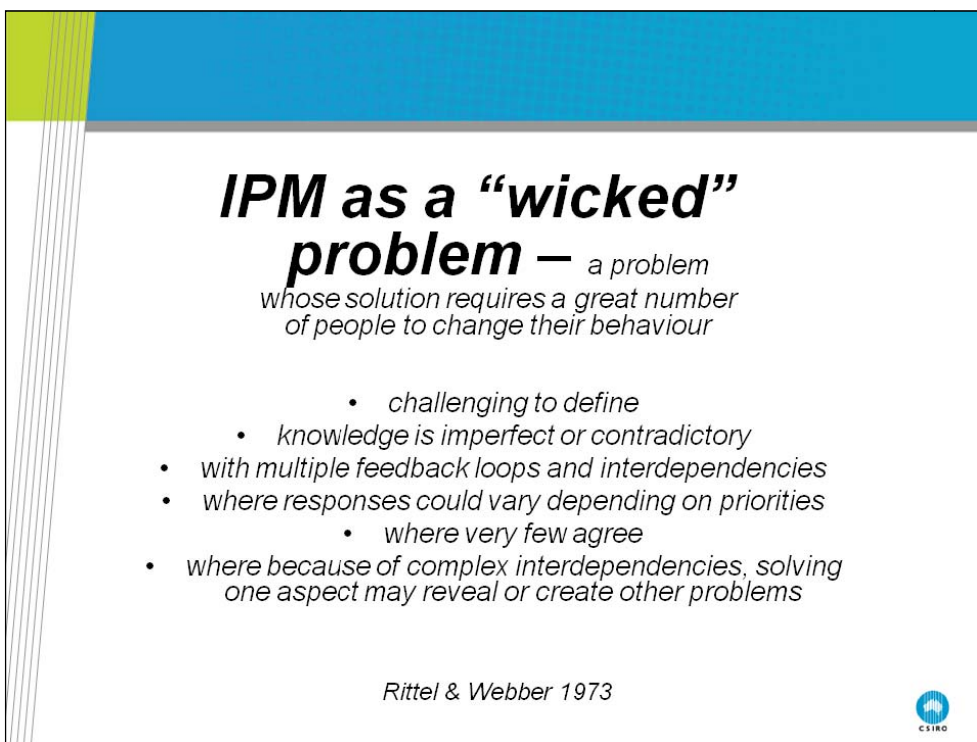
## IPSOS gives positive message

*2010 IPSOS Grower Survey of 1200 Grain producers indicates that awareness of IPM and levels of current or future adoption is growing :*

- *69% say they are aware of IPM, significantly up on 2008*
- *31% had changed practice in insect management in the last 5 years*
- *40% say they currently apply an IPM approach, up 10% on 2008*
- *a further 38% say they are likely to adopt IPM in the future.*
- *96% of growers felt that GRDC investment in integrated management of pests, weeds and diseases was “very important” (65%) or “fairly important” (31%)*
- *Top reasons for not adopting were confidence in current techniques (25%) or lack of knowledge, training or information (22%)*
- *We believe NIPi aligned activities underlie this improvement.*



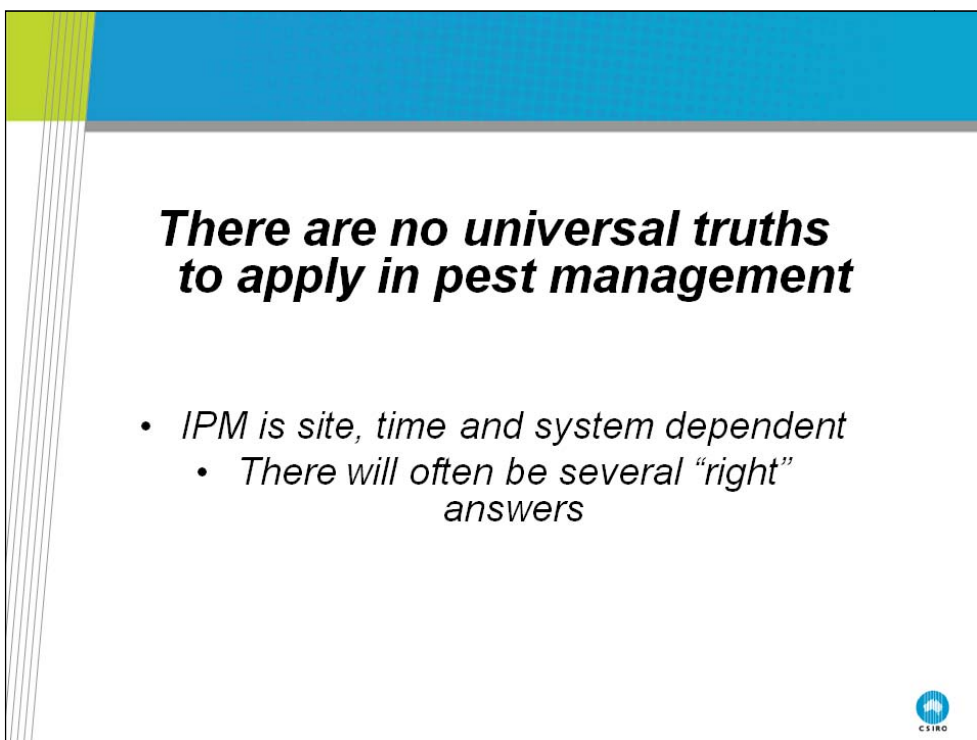




## ***IPM as a “wicked” problem*** – *a problem whose solution requires a great number of people to change their behaviour*

- *challenging to define*
- *knowledge is imperfect or contradictory*
- *with multiple feedback loops and interdependencies*
- *where responses could vary depending on priorities*
  - *where very few agree*
- *where because of complex interdependencies, solving one aspect may reveal or create other problems*

*Rittel & Webber 1973*



## ***There are no universal truths to apply in pest management***

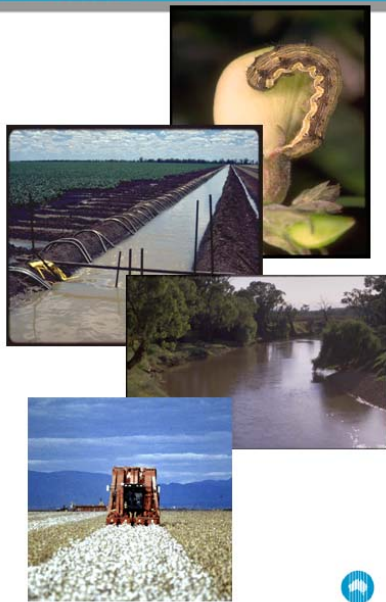
- *IPM is site, time and system dependent*
  - *There will often be several “right” answers*





## Successful IPM has these elements....

- Confidence
- Communication
- Commitment
- Cooperation
- Knowledge and People



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CSIRO Ecosystem Sciences  
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Dr. Nancy Schellhorn  
Team Leader – Spatial Ecology  
CSIRO Ecosystem Sciences  
[Nancy.schellhorn@csiro.au](mailto:Nancy.schellhorn@csiro.au)

## Thank you

[www.csiro.au](http://www.csiro.au)

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Email: [enquiries@csiro.au](mailto:enquiries@csiro.au) Web: [www.csiro.au](http://www.csiro.au)



**DAY 1 - PRESENTATIONS ON ISSUE #2 : *ECONOMICS AND MARKET ACCESS***

**Implementing IPM at farm level: the farmers' perspective**

*By Eugenia Pommaret, COPA-COGECA /European Farmers*

PHY(11)7749

**copa\*cogeca**  
european farmers european agri-cooperatives

**Implementing IPM at farm level: the farmers' perspective**

**Pommaret Eugénia** – member of the Phytosanitary working party

OECD Conference  
Berlin 17 October 2011

**Outline**

1. Who are Copa and Cogeca ?
2. Is IPM a new concept?
3. What does IPM mean for EU farmers and agri-coops?
4. Implementing IPM at farm level
5. Crop and sector specific IPM guidelines
6. Economic situation at farm level
7. Conclusions

---

Copa-Cogeca | The voice of European farmers and their cooperatives | 2

**copa\*cogeca**  
european farmers european agri-cooperatives

## Who are Copa and Cogeca?

- **Copa – European farmers**
- Bringing together 60 EU farmers' organisations
- **Cogeca – European agri-cooperatives**
- Bringing together 35 EU agricultural cooperative organisations
- representing 13 million farmers and their families
- as well as around 38,000 cooperatives
- among the biggest and most active interest representations in Brussels

Copa-Cogeca | The voice of European farmers and their cooperatives | 3

**copa\*cogeca**  
european farmers european agri-cooperatives

## Is IPM a new concept ?

IPM is not a new concept and but is based on good farming practice that has evolved over time

Its techniques are widely used all around the world

What is new in Europe is that following general IPM principles becomes mandatory for all farmers by 1 January 2014 as provided by the Framework Directive on the Sustainable Use of Pesticides

Copa-Cogeca | The voice of European farmers and their cooperatives | 4

**copa\*cogeca**  
european farmers european agri-cooperatives

## What does IPM mean to European farmers and agricooperatives ?

### There are many definitions of IPM

e.g. FAO: IPM means managing, in a given situation, populations of plant pests, diseases and weeds by the **combination of all appropriate agricultural practices** (preventive measures, cultural, mechanical, biological and chemical practices), with a **holistic approach** that reduces the impact of pests and damage to an acceptable level and at the same time ensures the protection of human health and the environment

## Implementing IPM at farm level

IPM is an on-farm management tool which is implemented by the farmer

IPM is part of integrated crop management (ICM) and is advocated by farmers' organisations

IPM/ICM are the cornerstone of sustainable farming systems, as long as both are based on **economic viability, social acceptance and environmental friendliness**

**IPM is not about definitions but practical interpretation in the field taking into account economics, risks and labour costs**



## What does IPM mean to European farmers and agricoooperatives ?

As the FAO definition shows, the objective of IPM is not to minimise pesticide use, but to minimise the risks to human health and the environment

The skills required for IPM are high and ensuring that qualified advice and extension services are available and accessible is important to allow support for the decision-making process

Some of the measures for prevention and/or suppression of harmful organisms such as rotation, variety choice, sowing date and even planting density, are out of the control of the farmer as they are often dictated by the buyer

**There must be market for the crop**

## Solutions for growers must be available at all times

- A range of control options are needed
- Resistance management is at risk due to the limited availability of PPPs on the market
- The number of active substances available to farmers has fallen from over 1000 in 1991 to only around 400 actives currently authorised in the EU
- It is not just the number that is important but also a range of modes of action

## Important to remember

Measures suggested must be cost effective and not subject farmers to unnecessary additional paperwork. The positive effect might even be undermined if farmers are disincentivised

A lot of useful tools are not in the farmers' control (e.g. access to early warning system, weather databases, etc)

**There is real concern for the implementation of IPM principles if tools are unavailable or missing. This could lead to distortion of competition at EU level and vis-à-vis third country imports**

## IPM and the role of National Authorities

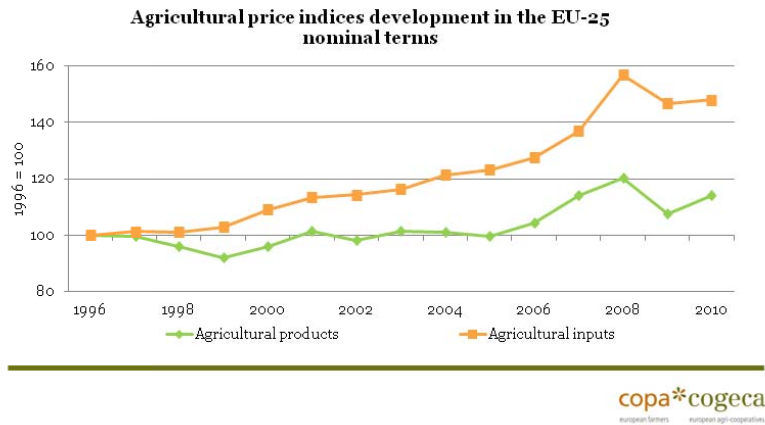
**The role of National authorities should be to provide relevant information and not to approve specific rotations or cultivation methods based on specific guidelines**

A more practical approach is needed:

1. Demonstration trials and fields
2. on-farm research and experimentation
3. extension services
4. practical applied research on preventive measures

## Some concrete facts to keep in mind

The “cost-price squeeze”: since 1996, agricultural output prices have increased on average by 1.1% each year while input prices have increased by 2.9% in nominal terms



## Important to remember

The market dictates a lot of the requirements which restrict the farmers' options e.g. the market is usually looking for zero tolerance, on areas like skin quality, in the interest of product quality

The economic threshold for certain products is often zero. The market allows no room for manoeuvre. Failure to meet this can result in a much lower price

Hence, it is unfeasible to expect farmers to wait for even slight visual damages before spraying if it reduces crop value

### Some concrete facts to keep in mind

1. 65% of EU farms are unable to cover all their production costs (i.e. remuneration of own factors included)
2. CAP support represents two-thirds of farmers' incomes
3. Excessive price volatility for agricultural products severely hampered by the competitiveness of the sector
4. Farmers' incomes equate to less than half an average salary

**No additional costs at farm level**

## 8. Conclusions



## (1) Conclusions

Farmers and growers rarely make the decision to use a crop protection product without first weighing up the various options available

**IPM has to be economically sustainable. IPM needs to consider the economics of pest management and the economic viability of the crop, as the crop has to remain profitable**

Squeezed economic margins for crop production are in conflict with the aims of the thematic strategy and the growers' priority to remain competitive

## (2) Conclusions

Guideline must be developed together with farmers' organisations since farmers are the final users

Guidelines are useful if practical, not restrictive, easily adaptable to the specific situation and provide flexibility for site specific management decisions

Ensuring a common playing field at EU where farmers can compete with equal tools, while avoiding extra costs and distortion of competition

As long as imports from third countries do not meet EU environmental, plant protection and consumer protection standards, this will further reduce the competitiveness of EU Farmers

Let's work together to defend, develop and  
promote the European Model of Agriculture

THANKYOU !!!

[www.copa-cogeca.eu](http://www.copa-cogeca.eu)



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european farmers european agri-cooperatives

**The introduction, practice, successes and difficulties of IPM in New Zealand pome fruit: a case study**

*By Mike Butcher, New Zealand/Pipfruit NZ Inc.*



## The Introduction, Practice, Successes and Difficulties of IPM in New Zealand pome fruit : a case study

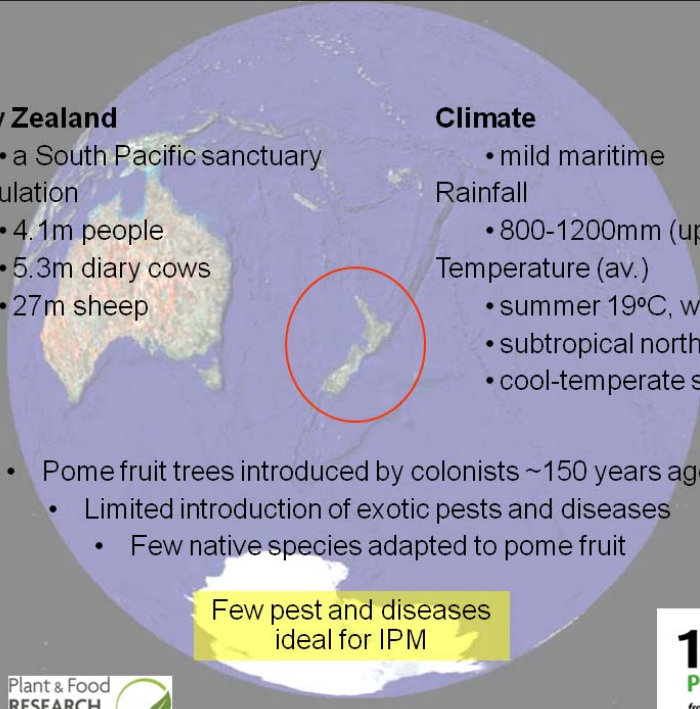
Dr M R Butcher  
Technical Manager  
Pipfruit New Zealand Inc.

Dr J T S Walker  
Senior Entomologist  
NZ Institute for Plant and Food Research



To Cover:

- Introduction to NZ pome fruit sector
- History of IPM in pome fruit sector
- Introduction style
- Progress in GAP and pesticide risk reduction
- Successes – Apple Futures and the EU
- Difficulties – private MRL standards and IPM
- Conclusion



### New Zealand

- a South Pacific sanctuary
- Population
  - 4.1m people
  - 5.3m dairy cows
  - 27m sheep

### Climate

- mild maritime
- Rainfall
  - 800-1200mm (up to 7m)
- Temperature (av.)
  - summer 19°C, winter 7°C
  - subtropical north
  - cool-temperate south

- Pome fruit trees introduced by colonists ~150 years ago
  - Limited introduction of exotic pests and diseases
    - Few native species adapted to pome fruit

Few pest and diseases  
ideal for IPM

Image © 2007 NASA

- 9000 ha in two main production regions
  - Hawke's Bay and Nelson
  - 500 growers, ~500,000 tonnes
  - 122 kg per citizen!
- Focus on exports
  - 340,000 tonnes exported
  - 65+ international markets
- Crop production system
  - Integrated Fruit Production (IFP) = 95%
  - Organic = 5% by volume, 8% by area

100% IPM-based production



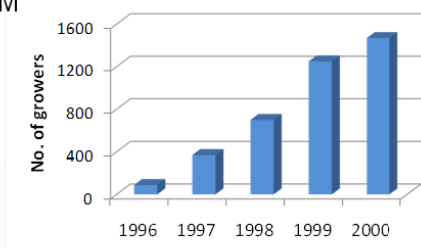


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- **Integrated Pest Management (IPM)**
  - research started in late 1960's
  - little uptake, no market drivers for IPM
- **Integrated Fruit Production (IFP)**
  - development commenced in 1990's
  - EU/UK supermarket drivers
- **IFP introduced in spring 1996**
  - focused on IPM strategies
  - initial trial group of 88 orchards
  - supported by facilitated discussion groups
  - highly successful, 100% adoption in 5 seasons



| Year | No. of growers |
|------|----------------|
| 1996 | ~100           |
| 1997 | ~400           |
| 1998 | ~800           |
| 1999 | ~1200          |
| 2000 | ~1500          |

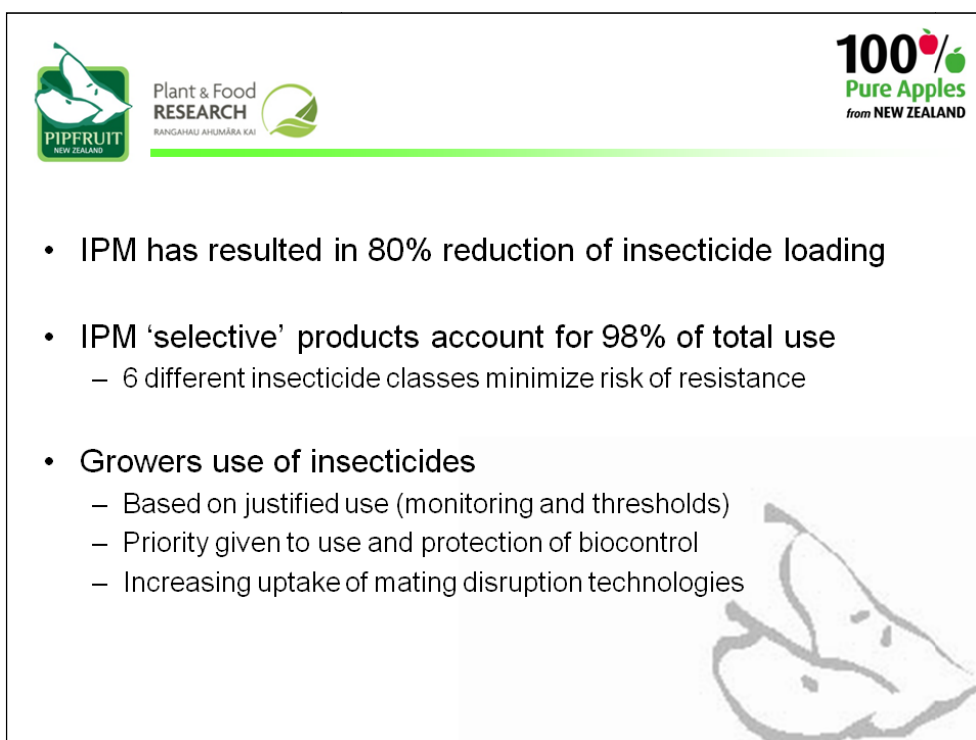
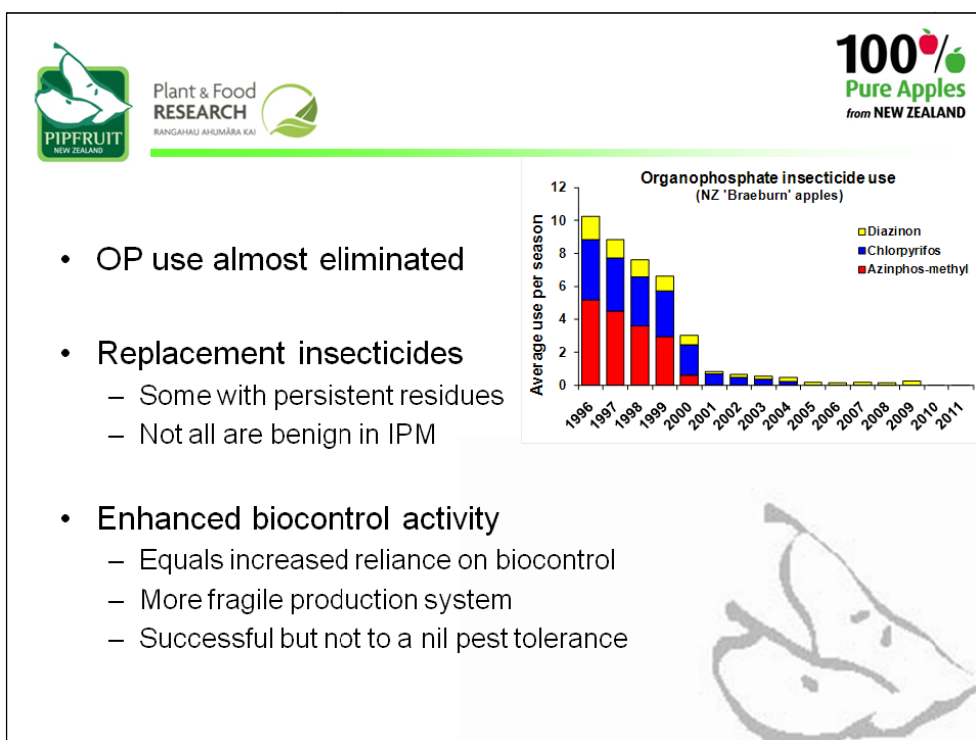


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- **IPM/IFP programme 'success'**
  - measured against goals annually (and still is)
- **The IPM Goals**
  - eliminate use of broad spectrum insecticides
  - enhance biological control of all pest groups
  - reduce the impact of phytosanitary pests
  - reduce use of specific fungicide groups
  - minimize pesticide risks to:
    - to growers, workers, communities
    - to environment (soils, surface & ground water)
    - consumers and markets

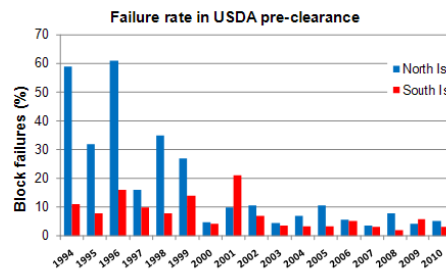




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100%  
Pure Apples  
from NEW ZEALAND

- IPM/IFP programme exceeds all regulatory requirements
  - 65+ export markets
  - All phytosanitary pests
  - All residue tolerances
  - plus customer assurance programmes.



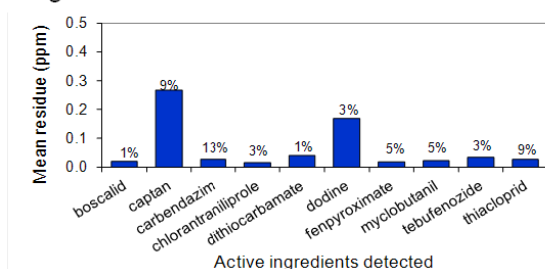
- But IPM is finely balanced
  - Increased pest/beneficial organism load
  - System sensitivity to disturbance by product changes or new pests



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- IFP – IPM outputs consistently exceed most commercial / private requirements
  - Ultra-low residue production system
  - Target <10% of EU residue tolerances



No insecticide residues in ~70% of tests

- Supermarket demands dominate production
  - reluctance by governments to interfere



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- Increasingly restrictive and unfounded commercial demands on producers
- Games supermarkets play for commercial advantage
  - Threat to fruit production
  - Threat to food supplies?

- Max 80% EU MRL
- Max 80% ARfD
- Max 3-5 ai (subject to product)
- Max 70% EU MRL
- Max 70% ARfD
- Max 3-5 ai (KT, subject to product)
- Max 50% EU MRL
- Max 100% ARfD
- Max 33.3% EU MRL
- Max 33.3% ARfD
- Max 25% EU MRL






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- Commercial restrictions are the biggest single threat to sound IPM programmes being developed and successfully implemented







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- Supermarkets are demanding more than GLOBAL-GAP and similar programmes
- Supermarkets are usurping regulators and regulatory MRLs in their 'dance' for commercial superiority
  - Placing food production systems, ultimately food supply, at risk
- The biological science underpinning IPM is forced to a 'back seat' as products are removed or PHIs have to be extended



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- Regulatory practices are also not without implications for IPM
- **EU Parliament Regulations (2009-2011)**
  - 'Sustainable Use of Pesticides'
  - 'Plant Protection Products in Market'
  - potential to eliminate many active ingredients
- **Developing market technical restrictions**
  - 'Spurious' placing of organisms on actionable pest lists
  - Requirements for strong intervention programmes



- On the basis of our IPM / IFP success the NZ pome fruit sector introduced an ultra low residue programme to meet the EU commercial demands

**APPLE *futures***





- APPLE *futures*** when practiced orchard-wide resulted in success for EU markets but created difficulties with meeting IPM phytosanitary requirements for other global markets





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- Restrictions forced on IPM practices by the EU commercial MRLs limit global food producer's (e.g., NZ) ability to respond and manage their unique production risks
- Weather patterns can influence pest and disease incidence annually –changed climate patterns are already bringing about changed pest and disease patterns



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- IPM based on sound science and implementation is a sustainable production practice
- IPM is specific to the production environment
  - Commercially restricted Euro-centric view of GAP in production systems
  - Often inappropriate or incorrect for other producers
- IPM relies on good knowledge of pest and beneficial population dynamics
- Intervention at optimum pest timing may be required to prevent crop loss



- If this audience is committed to IPM as a pest management strategy then:  
  
Ensure that growers of the world have:  
The 'right to farm' within the legal framework & the opportunity to practice IPM correctly
- Remove unscientific, commercial MRLs and stop unfounded product removals and artificial actionable pest barriers that require increased inputs to be met

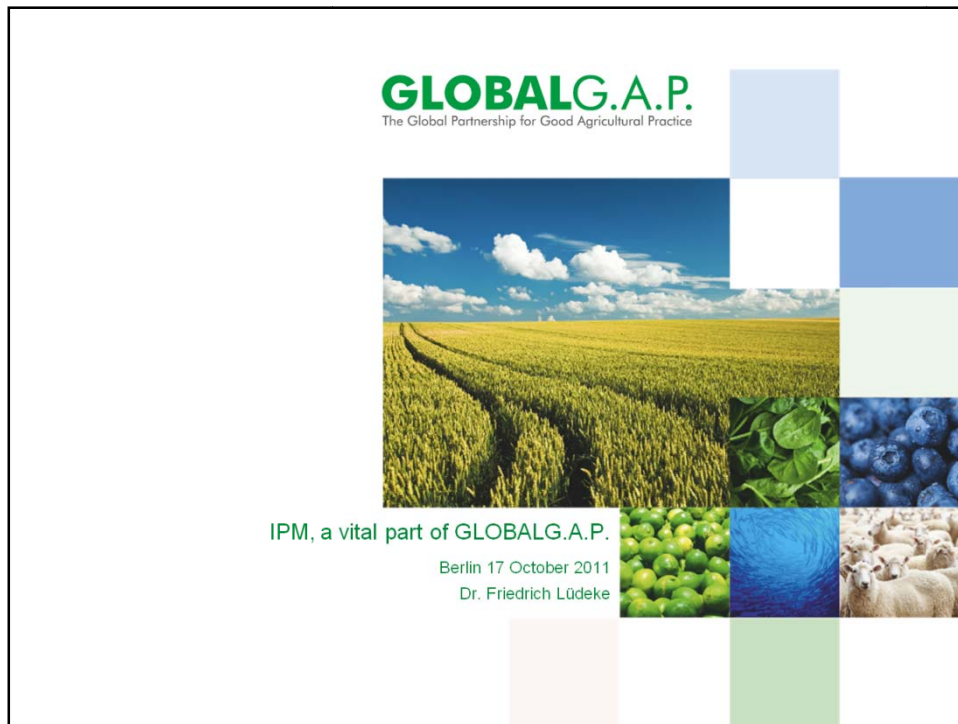
Or

ultimately jeopardise reliable and abundant global food supplies



## IPM, a vital part of GLOBAL G.A.P.

*By Friedrich Lüdeke, GLOBAL G.A.P. / retailers association*



| INTRODUCTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| What is GLOBAL G.A.P.?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>GLOBAL G.A.P. is a private sector body that sets voluntary standards for the certification and implementation of Good Agricultural Practice around the globe</li> <li>The GLOBAL G.A.P. Standard is primarily designed to reassure consumers about how food is produced on the farm by minimising detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare</li> <li>The GLOBAL G.A.P. Standards are pre-farm gate or on-farm standards</li> </ul> | <ul style="list-style-type: none"> <li>GLOBAL G.A.P. is a business to business initiative</li> <li>GLOBAL G.A.P. covers the certification of the whole agricultural production process of the product from before the plant is in the ground (origin and propagation material control points) or from the animal enters the production process to non-processed product (no processing, manufacturing or slaughtering is covered, except for the first level in Aquaculture)</li> </ul> <p><b><i>"The Global Partnership for Good Agricultural Practice"</i></b></p> |



**GLOBALG.A.P.**  
The Global Partnership for Good Agricultural Practice

## GLOBALG.A.P. MEMBERS

### PRODUCER AND SUPPLIER MEMBERS

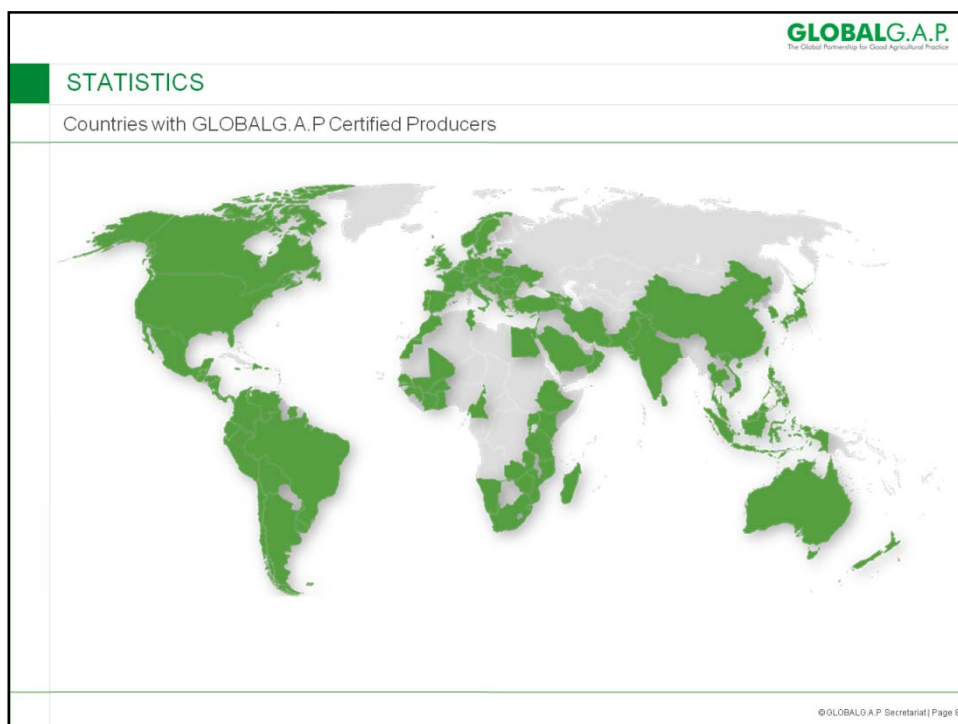
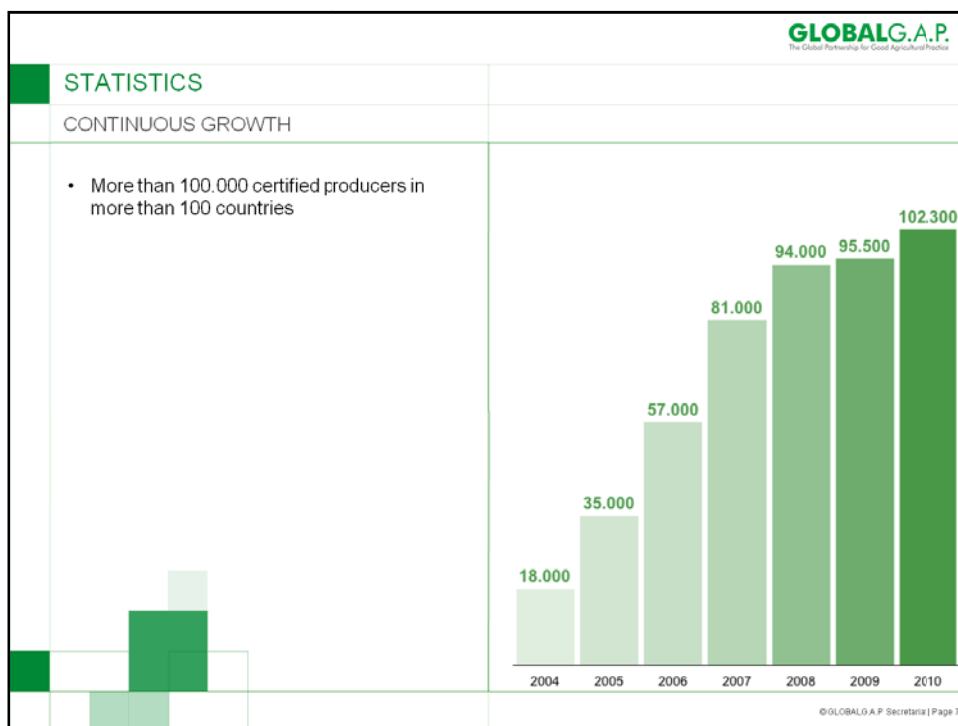
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## GLOBALG.A.P. MEMBERS

### Associate Members

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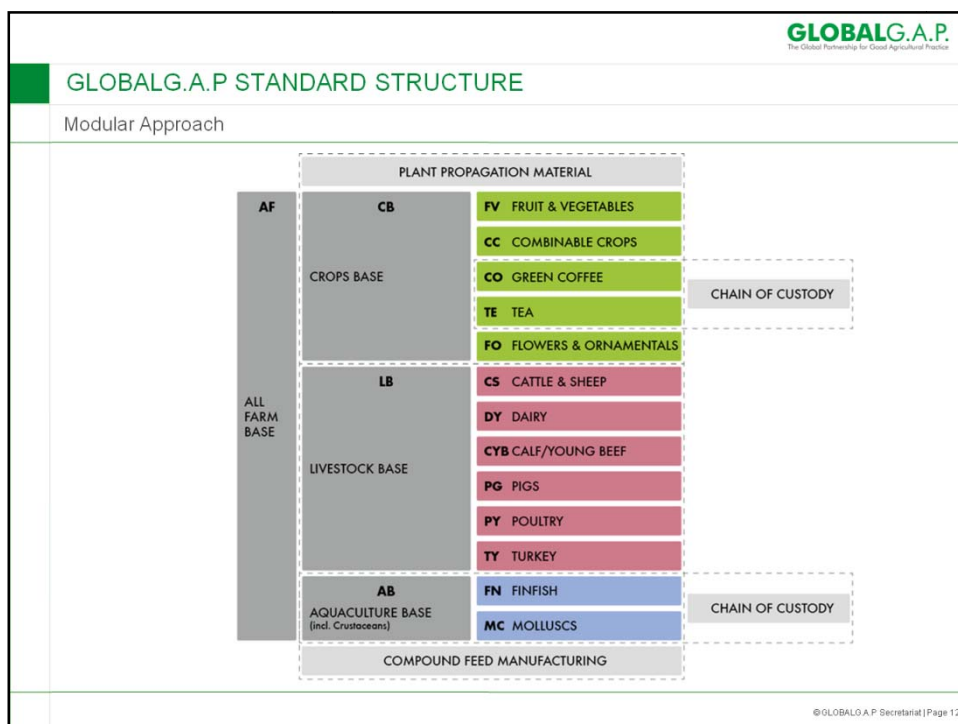


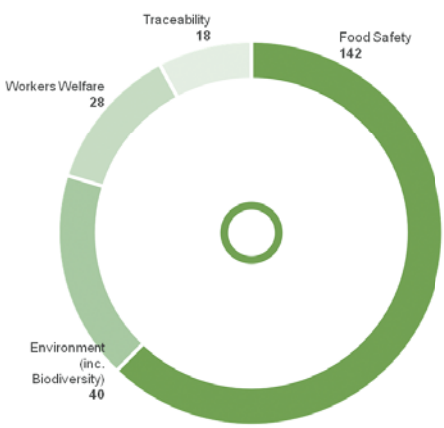
| STATISTICS                         |                        | GLOBALG.A.P.<br>The Global Partnership for Good Agricultural Practice |                             |
|------------------------------------|------------------------|-----------------------------------------------------------------------|-----------------------------|
| COUNTRIES WITH CERTIFIED PRODUCERS |                        |                                                                       |                             |
| <b>Argentina</b> 1100              | <b>Denmark</b> 99      | <b>Israel</b> 1451                                                    | <b>Netherlands</b> 5510     |
| Armenia 1                          | Dominica 6             | Italy 18353                                                           | New Zealand 1661            |
| Australia 108                      | Dominican Republic 867 | Jamaica 2                                                             | Nicaragua 1                 |
| Austria 2228                       | Ecuador 644            | Japan 88                                                              | Norway 59                   |
| Azerbaijan 1                       | Egypt 377              | Jordan 17                                                             | Oman 1                      |
| <b>Belgium</b> 3306                | Ethiopia 11            | <b>Kenya</b> 395                                                      | <b>Pakistan</b> 96          |
| Belize 18                          | <b>Faroe Isl.</b> 7    | Korea (South) 46                                                      | Palestinian Territories 331 |
| Bolivia 1                          | France 3009            | <b>Latvia</b> 1                                                       | Panama 48                   |
| Bosnia/Herzegovina 97              | <b>Gambia</b> 2        | Lebanon 7                                                             | Peru 1488                   |
| Brazil 671                         | Georgia 1              | Lithuania 1                                                           | Philippines 5               |
| Bulgaria 9                         | Germany 8571           | <b>Macao</b> 1                                                        | Poland 1048                 |
| Burkina Faso 295                   | Ghana 426              | Macedonia 16                                                          | Portugal 411                |
| <b>Cameroon</b> 2                  | Greece 11193           | Madagascar 190                                                        | Puerto Rico 4               |
| Canada 43                          | Guadeloupe 34          | Malaysia 21                                                           | <b>Romania</b> 57           |
| Chile 2352                         | Guatemala 1293         | Mali 91                                                               | <b>Saint Lucia</b> 5        |
| China 254                          | Guinea 40              | Malta 109                                                             | Saint Vincent/Grenadines    |
| Colombia 548                       | <b>Honduras</b> 13     | Martinique 52                                                         | Saudi Arabia 1              |
| Costa Rica 310                     | Hungary 1372           | Mexico 101                                                            | Senegal 167                 |
| Côte d'Ivoire 238                  | <b>India</b> 2003      | Moldova 6                                                             | Serbia/Montenegro 16        |
| Croatia 84                         | Indonesia 6            | Morocco 415                                                           | Slovakia 16                 |
| Cyprus 855                         | Iran 1                 | Mozambique 2                                                          | Slovenia 9                  |
| Czech Republic 89                  | Ireland 32             | <b>Namibia</b> 13                                                     | South Africa 1841           |
|                                    |                        |                                                                       | <b>TOTAL</b> 102586         |

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| GLOBALG.A.P. NATIONAL TECHNICAL WORKING GROUPS                                                                                                                          |  | GLOBALG.A.P.<br>The Global Partnership for Good Agricultural Practice                                                                                               |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| MORE LOCAL INPUT IN GLOBALG.A.P. STANDARD SETTING                                                                                                                       |  |                                                                                                                                                                     |  |
| <b>North/South America</b><br>Argentina<br>Brazil<br>Chile (Aqua/FV)<br>Colombia (Aqua/FV)<br>Costa Rica<br>Guatemala<br><b>Mexico</b><br>Peru<br>Uruguay<br><b>USA</b> |  |                                                                                 |  |
| <b>Europe</b><br>Belgium<br>Bulgaria<br>Czech Republic<br>Denmark<br>France<br>Germany<br>Greece                                                                        |  | <b>Asia</b><br>India<br>Malaysia<br>Thailand (Aqua/FV)<br>Japan<br><br><b>Africa</b><br>Cote D'Ivoire<br>Egypt<br>Ghana<br>Kenya<br>South Africa<br><b>Tanzania</b> |  |
| Italy<br>Netherlands<br><b>Norway (Aqua)</b><br>Poland<br>Spain<br>Turkey<br>Ukraine                                                                                    |  |                                                                                                                                                                     |  |

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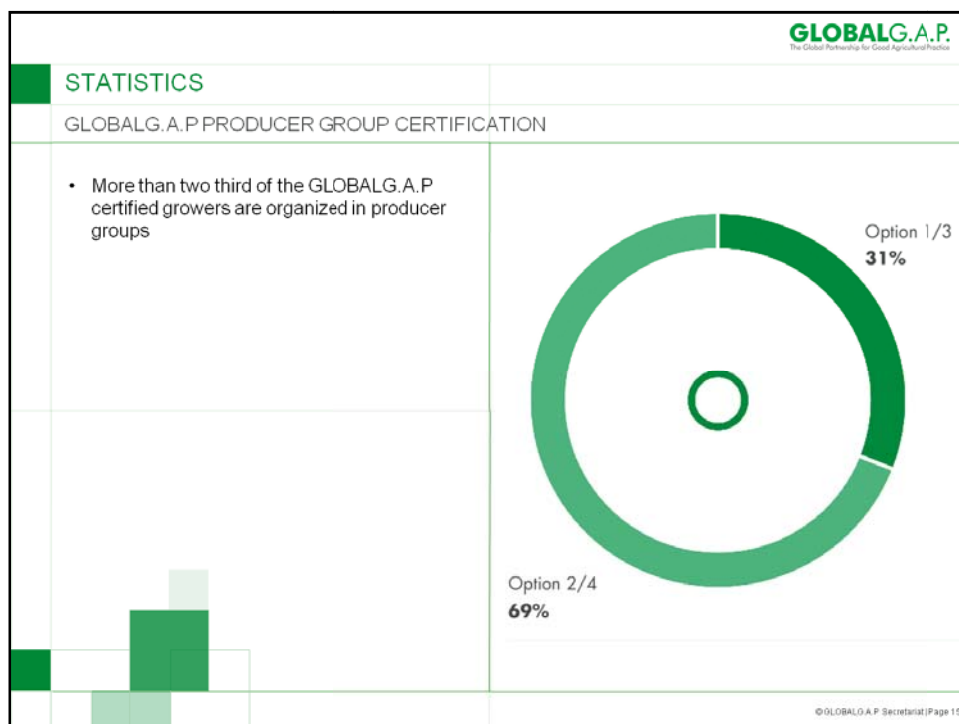


| GLOBALG.A.P.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                |             |     |                                 |    |                 |    |              |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|-------------|-----|---------------------------------|----|-----------------|----|--------------|----|
| THE GLOBALG.A.P STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                |             |     |                                 |    |                 |    |              |    |
| Holistic Approach to Farm Assurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                |             |     |                                 |    |                 |    |              |    |
| <ul style="list-style-type: none"> <li>• GLOBALG.A.P is holistic. The GLOBALG.A.P Standard is designed to assure consumers that the food they eat is produced according to Good Agricultural Practice</li> <li>• Under continual improvement, Good Agricultural Practice minimize the risk of microbiological contamination, lessen detrimental environmental impacts of farming operations, and ensure a responsible approach to worker health and safety as well as animal welfare</li> <li>• Based on supply chain consensus and product specific consumer expectations, the composition of the elements varies across the GLOBALG.A.P scopes</li> </ul> | <p><b>Holistic Approach Fruit and Vegetables</b><br/>Total number of Control Points: 228</p>  <table border="1"> <thead> <tr> <th>Category</th> <th>Control Points</th> </tr> </thead> <tbody> <tr> <td>Food Safety</td> <td>142</td> </tr> <tr> <td>Environment (inc. Biodiversity)</td> <td>40</td> </tr> <tr> <td>Workers Welfare</td> <td>28</td> </tr> <tr> <td>Traceability</td> <td>18</td> </tr> </tbody> </table> | Category | Control Points | Food Safety | 142 | Environment (inc. Biodiversity) | 40 | Workers Welfare | 28 | Traceability | 18 |
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                |             |     |                                 |    |                 |    |              |    |
| Food Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 142                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |                |             |     |                                 |    |                 |    |              |    |
| Environment (inc. Biodiversity)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                |             |     |                                 |    |                 |    |              |    |
| Workers Welfare                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                |             |     |                                 |    |                 |    |              |    |
| Traceability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                |             |     |                                 |    |                 |    |              |    |

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| GLOBALG.A.P.                                                                        |                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GLOBALG.A.P RULES                                                                   |                                                                                                                                                                                                                                                                                                                                                                           |
| Certification Options                                                               |                                                                                                                                                                                                                                                                                                                                                                           |
|  | <p><b>Option 1: Individual Producer</b></p> <ul style="list-style-type: none"> <li>• The individual producer is the certificate holder</li> <li>• Farmer self assessment</li> <li>• Annual external inspection</li> </ul>                                                                                                                                                 |
|  | <p><b>Option 2: Producer Group</b></p> <ul style="list-style-type: none"> <li>• Farmer group is the certificate holder</li> <li>• Annual internal inspection of all producer group members</li> <li>• Quality Management System (QMS)</li> <li>• Annual internal audit of the QMS</li> <li>• Annual external inspection</li> <li>• Sample Individual producers</li> </ul> |

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## GLOBALG.A.P STANDARD STRUCTURE

### Modular Approach

#### CONTENTS

#### SECTION CB CROPS BASE MODULE

- CB.1 TRACEABILITY
- CB.2 PROPAGATION MATERIAL
- CB.3 SITE HISTORY AND SITE MANAGEMENT
- CB.4 SOIL MANAGEMENT
- CB.5 FERTILIZER APPLICATION
- CB.6 IRRIGATION/FERTIGATION
- CB.7 INTEGRATED PEST MANAGEMENT**
- CB.8 PLANT PROTECTION PRODUCTS
- CB.9 EQUIPMENT

- ANNEX CB.1 GLOBALG.A.P GUIDELINE – MICROBIOLOGICAL HAZARDS
- ANNEX CB.2 GLOBALG.A.P GUIDELINE – RESPONSIBLE WATER USE
- ANNEX CB.3 GLOBALG.A.P INTEGRATED PEST MANAGEMENT TOOLKIT**
- ANNEX CB.4 GLOBALG.A.P GUIDELINE – PPP USE IN COUNTRIES THAT ALLOW EXTRAPOLATION
- ANNEX CB.5 GLOBALG.A.P GUIDELINE – RESIDUE ANALYSIS
- ANNEX CB.6 GLOBALG.A.P GUIDELINE – MRL EXCEEDANCE RISK ASSESSMENT
- ANNEX CB.7 GLOBALG.A.P GUIDELINE – VISUAL INSPECTION AND FUNCTIONAL TESTS OF APPLICATION EQUIPMENT

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|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|  | GLOBALG.A.P STANDARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | INTEGRATED PEST MANAGEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|  | <p><b>CB. 7 INTEGRATED PEST MANAGEMENT</b></p> <p><i>Integrated Pest Management (IPM) involves the careful consideration of all available pest control techniques and the subsequent integration of appropriate measures that discourage the development of pest populations, and keeps plant protection products and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment.</i></p> <p><i>An IPM Toolbox (Annex CB.3) has been elaborated to provide alternative actions for the application of IPM techniques in the commercial production of agricultural and horticultural crops.</i></p> <p><i>Given the natural variation on pest development for the different crops and areas, any IPM system must be implemented in the context of <b>local physical</b> (climatic, topographical etc), <b>biological</b> (pest complex, natural enemy complex, etc.) and <b>economical conditions</b>.</i></p> <p>© GLOBALG.A.P. Secretariat   Page 17</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | GLOBALG.A.P STANDARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | INTEGRATED PEST MANAGEMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|  | <p><b>CB. 7.1</b><br/>Has assistance with implementation of IPM systems been obtained through training or advice?</p> <p><b>CB.7.2 to 7.4:</b><br/>Can the producer show evidence of implementation of at least one activity that falls in the category of:</p> <ul style="list-style-type: none"> <li>• Prevention?</li> <li>• Observation and Monitoring?</li> <li>• Intervention?</li> </ul> <p><b>CB. 7.5</b><br/>Have anti-resistance label and/or other recommendations been followed to maintain the effectiveness of available plant protection products?</p> <p>© GLOBALG.A.P. Secretariat   Page 18</p> |

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The Global Partnership for Good Agricultural Practice

**GLOBALG.A.P STANDARD**

**INTEGRATED PEST MANAGEMENT**

Smallholder Guide for

# GLOBALG.A.P.

Plant Protection Module

Version 1.0 - February 2010

Based on "GLOBALGAP Control Points and Compliance Criteria Integrated Farm Assurance" (V3.0-2\_Sep07, English Version)



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**GLOBALG.A.P.**

Smallholder Guide  
(Not a normative document)

Code Ref: 10\_PPM  
Version: 1.0 Feb 10  
Page: 3

**2. Integrated Pest Management (IPM)**

■ Chemical application is not the only way to protect your plants. There are many things you can do to prevent and to control pests and diseases on your farm without using chemicals.

■ Integrated Pest Management (IPM) is not about organic farming. It is a way to prevent, monitor and control pests and diseases on your farm with the combination of biological, mechanical and chemical methods.

**Principle 1: Prevention**

**Example:**

- Crop rotation
- Selecting a site without pest and disease history
- Increasing organic matter content in the soil
- Mulches
- Use of pest-free planting materials
- Weed control (Weed is a host of various pests.)
- Drainage of equipment (e.g. planting tools)



**Principle 2: Observation and Monitoring**

**Example:**

- Regular inspection of pests
- Identification of natural enemies
- Use of pheromone traps for pest monitoring



**Use of threshold levels for decision making**

| Pest/Disease | Non-chemical use | Chemical use |
|--------------|------------------|--------------|
| Damage       | < 10%            | > 10%        |
| Yield        | < 10%            | > 10%        |
| Plant loss   | < 10%            | > 10%        |
| Control      | < 10%            | > 10%        |

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**GLOBALG.A.P.**

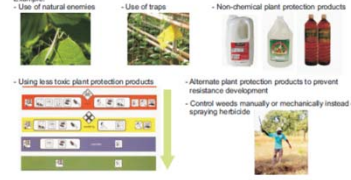
Smallholder Guide  
(Not a normative document)

Code Ref: 10\_PPM  
Version: 1.0 Feb 10  
Page: 4

**Principle 3: Intervention**

**Example:**

- Use of natural enemies
- Use of traps
- Non-chemical plant protection products
- Using less toxic plant protection products
- Alternate plant protection products to prevent resistance development
- Control weeds manually or mechanically instead of spraying herbicide



■ Only when you have exhausted non-chemical methods, chemical application should be considered as the last resort. See the next sections for the responsible choice, storage and application of chemicals.

**Relevant GlobalGAP Control Point**

| CP | F | 1 | Has assistance with implementation of IPM systems been obtained through training or advice?                                           |
|----|---|---|---------------------------------------------------------------------------------------------------------------------------------------|
| CP | F | 2 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Prevention"?                 |
| CP | F | 3 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Observation and Monitoring"? |
| CP | F | 4 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Intervention"?               |
| CP | F | 5 | If new plant protection products have been used, has protection been achieved with the appropriate minimum input?                     |
| CP | F | 6 | Have any resistance label recommendations been followed to maintain the effectiveness of existing plant protection products?          |

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**GLOBALG.A.P. STANDARD**

**INTEGRATED PEST MANAGEMENT**



**Smallholder Guide**  
(for a maximum of 5000 plants)

Code Ref: SG\_PIM  
 Version: 1.0 Feb 10  
 Page: 4

**Principle 3: Intervention**

**Examples:**

- Use of natural enemies



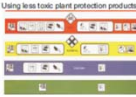
- Use of traps



- Non-chemical plant protection products



- Using less toxic plant protection products



- Alternate plant protection products to prevent resistance development

- Control weeds manually or mechanically instead of spraying herbicide



■ Only when you have exhausted non-chemical methods, chemical application should be considered as the last resort. See the next sections for the responsible choice, storage and application of chemicals.

**Relevant GlobalGAP Control Point**

|            |                                                                                                                                       |
|------------|---------------------------------------------------------------------------------------------------------------------------------------|
| CP - 7 - 1 | Has assistance with implementation of IPM systems been obtained through training or advice?                                           |
| CP - 7 - 2 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Prevention"?                 |
| CP - 7 - 3 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Observation and Monitoring"? |
| CP - 7 - 4 | Can the producer show evidence of implementation of at least one activity that falls in the category of "Intervention"?               |
| CP - 7 - 5 | Where plant protection products have been used, has protection been achieved with the appropriate minimum input?                      |
| CP - 7 - 6 | Have any resistance alert recommendations been followed to maintain the effectiveness of available plant protection products?         |

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**GLOBALG.A.P. STANDARD**

**INTEGRATED PEST MANAGEMENT**



Control Points and Compliance Criteria  
 Integrated Farm Assurance - Crops Base  
 ENGLISH VERSION

Code Ref: IFA 4.0 -CPCC  
 Version: CB V4.0  
 Page: 40 of 61

**ANNEX CB.3 GLOBALG.A.P. GUIDELINE | INTEGRATED PEST MANAGEMENT TOOLKIT**

**1. INTRODUCTION**

This document is a toolbox of alternative actions for the application of IPM techniques in to the commercial production of agricultural and horticultural crops. It has been elaborated to provide possible actions for the IPM implementation. Given the natural variation on pest development for the different crops and areas, a specific model for every situation involved in IPM can not be developed, and therefore, the considerations analyzed, and examples given in this document are not all inclusive, but are directed towards the implementation of IPM in the local industry. This is an important consideration because any IPM system must be implemented in the context of local physical (climatic, topographical etc), biological (pest complex, natural enemy complex etc) and economical (access to subsidies or lack thereof, requirements of all importing countries etc) conditions.

**1.1 Definition**

**Integrated Pest Management (IPM)** is the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. (International Code of Conduct on the Distribution and Use of Pesticides, FAO 2002).

**1.2 Goal**

The goal of applying IPM in to the framework of GLOBALG.A.P is to ensure sustainable production that includes crop protection. This can be achieved by integrating and applying all available pest control and suppression tactics, including the responsible application of chemicals.

The last word in "IPM" is management. This is of cardinal importance, because it implies that there must be a knowledge of what the problem(s) is/are and the intensity of the problem(s). In the case of pest management this information can only be obtained by applying standardized pest monitoring systems.

**1.3 Framework**

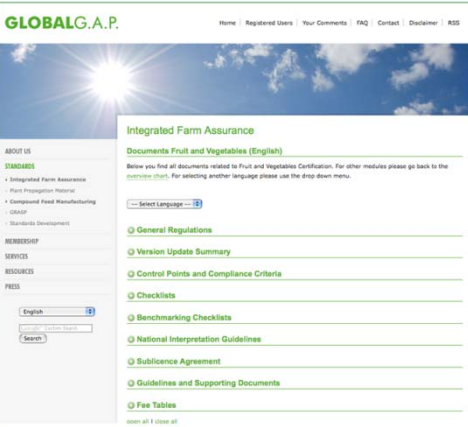
This document lists potential approaches that can be used to implement the three basic pillars of IPM, which are the, prevention, monitoring and control, of diseases, weeds and arthropod pests in fruit and vegetable crops. This toolbox is designed to supply examples of the different approaches that producers can consider for developing their own IPM programmes. It is not intended as an exhaustive and final text on IPM tools and will be updated regularly.

Different crops in different areas of the world require different combinations of IPM methods. However, the overall IPM philosophy is generic and universal. IPM must be considered as a flexible system that must be suited to the local conditions (physical, biological and economical) under which a particular crop is produced in a particular area. Therefore a generic

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|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|  | <div style="text-align: right;">  </div> <div style="background-color: #008000; color: white; padding: 5px;">GLOBALG.A.P STANDARD</div> <div style="background-color: #008000; color: white; padding: 5px;">INTEGRATED PEST MANAGEMENT</div> <p><b>Key points for IPM implementation:</b></p> <ul style="list-style-type: none"> <li>• vital part of the GLOBALG.A.P. Standard = Major Must</li> <li>• market excess via GLOBALG.A.P. certification is the incentive</li> <li>• Group certification ensures participation of smallholders</li> <li>• Certified groups can facilitate IPM training</li> <li>• IPM is very much a local approach, therefore local knowledge is needed</li> <li>• National Technical Working Groups can provide this local knowledge</li> <li>• Local Quality Assurance Scheme can be recognised by GLOBALG.A.P.</li> </ul> <div style="text-align: right; font-size: small;">© GLOBALG.A.P. Secretariat   Page 23</div> |
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| <p><b>GLOBALG.A.P.</b><br/>The Global Partnership for Good Agricultural Practice</p>                                                                                                                                                                                          |                                                                                    |
| <p><b>THANKS FOR YOUR ATTENTION!</b></p>                                                                                                                                                                                                                                      |                                                                                    |
| <p>QUESTIONS – DISCUSSION – CONTACT US</p>                                                                                                                                                                                                                                    |                                                                                    |
| <ul style="list-style-type: none"> <li>• Dr. Friedrich Lüdeke</li> <li>• Email: <a href="mailto:luedeke@globalgap.org">luedeke@globalgap.org</a></li> <li>• Telephone: +49 (0) 50 22 89 102 97</li> <li>• <a href="http://www.globalgap.org">www.globalgap.org</a></li> </ul> |  |
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## How IPM Facilitates Trade

*By Keith Jones CropLife International*



### How IPM Facilitates Trade

Keith Jones, Director, Stewardship & Sustainable Agriculture



### A Global Federation representing the Plant Science Industry in 91 countries

#### Associations

- AfricaBio
- AgroBIO Mexico
- AgroBio Brazil
- BIO Production Agriculture Assoc
- CIB
- CBIJapan
- EuropaBio
- CropLife Africa Middle East
- CropLife America
- CropLife Asia
- CropLife Latin America
- European Crop Protection Assoc
- Japan Crop Protection Assoc
- CropLife Canada
- Israel Crop Protection Assoc



#### Companies

- BASF
- Bayer CropScience
- Dow AgroSciences
- Dupont
- FMC
- Monsanto
- Sumitomo
- Syngenta

Led by the major research-based companies developing crop protection and plant biotech

## All elements of the lifecycle are covered



## .....but CropLife's emphasis is at the field level

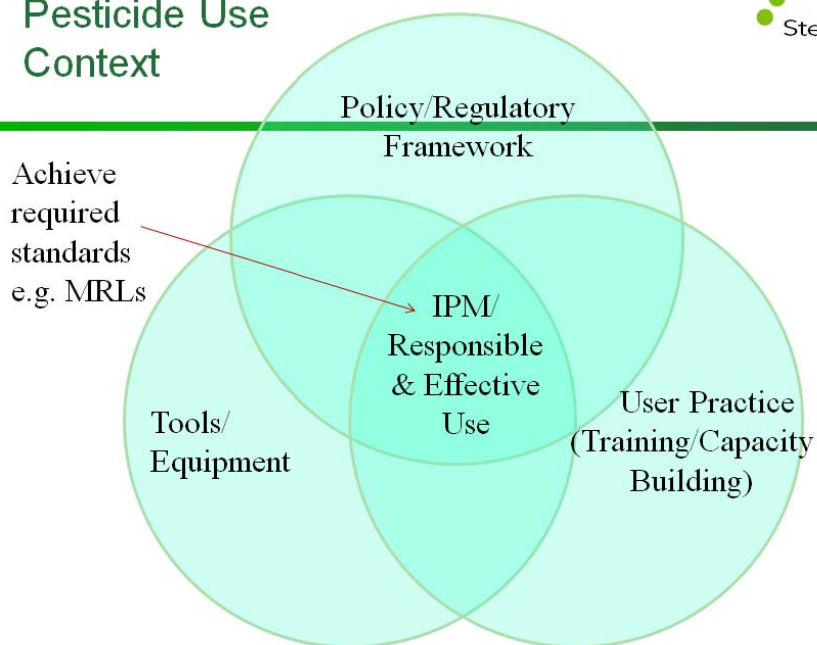


## Promotion of IPM

- IPM is a major focus of our stewardship programmes
- IPM includes, when needed, the judicious and responsible use of pesticides – *as little as possible, as much as necessary*
- GAP in general, MRL compliance in particular, reflects the stewardship approach - IPM helps achieve standards to access markets
- Supported through training and capacity building
- Appropriate regulation e.g. availability of tools and information is also required.



## Pesticide Use Context



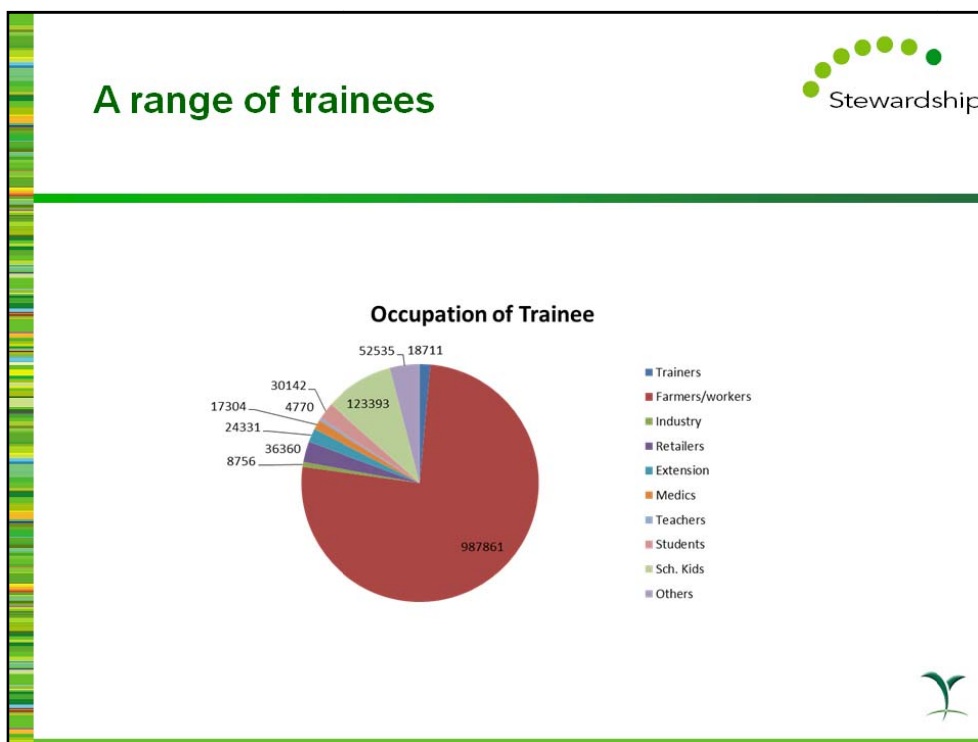




**But....**

- GAP in general and MRLs in particular - should facilitate trade and not be a barrier
- Need to provide clear information to farmers
- Should not develop a multiplicity of different standards
- Should be achievable





## GAP & Responsible Use: Thailand

- Collaboration between DoAE and Thai Crop Protection Assoc.
- 390 officials from DoAE trained in GAP – will train farmers
- Elsewhere 2576 farmers and 3153 retailers trained in Responsible Use
- Pilot container management scheme being established

Stewardship

## GAP Training: Cameron Highlands, Malaysia



- Collaboration between Malaysia DoA, Cameron Highlands Vegetable Growers Assoc and the Malaysian Crop Protection Association
- Training farmers in GAP, including IPM
- 50 innovative farmers participating
- Aim to be certified according to Malaysia GAP standards (inc MRLs)



## IPM in Chilli: Andhra Pradesh, India

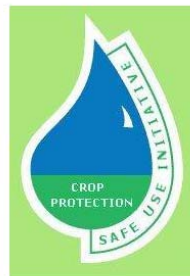


- Collaboration between CropLife India and the Indian Spice Export Board
- Training farmers in IPM, including responsible use of pesticides
- 3721 Farmers trained
- Farmers achieved quality standards (including MRL requirements) required for export

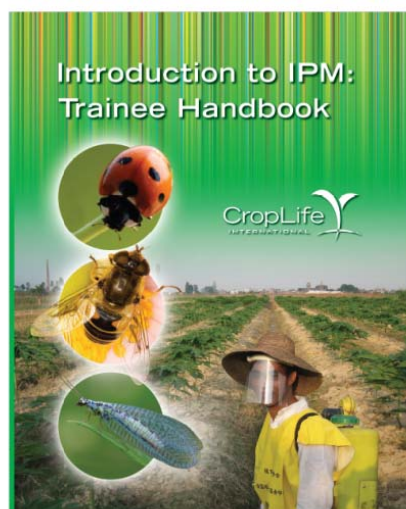


## ECPA: 'Safe Use Initiative'

- Supports responsible and effective use of pesticides, within IPM
- Implemented in Spain, Italy, France, Portugal, Greece, Cyprus, Lithuania, Romania and Cyprus
- Contribute to the National Action Plans (within SUD 2009/128/EC)
- Helps to ensure appropriate products are available to farmers and required standards achieved
- Training material available (inc via dedicated websites).



## Global Training Guidelines







## Local Guidelines/Material

Stewardship

The collage features several items:

- Two Sinhala posters from CropLife Sri Lanka showing people in a kitchen setting.
- A poster with the title 'انتباہ: کھانے پینے یا کاشت سے پہلے ہاتھ منہ اچھی طرح سمان سے دھو لیں۔' (Warning: Wash hands and face well before eating or drinking).
- A screenshot of the 'cosechavida' website with the heading 'RECURSOS Y PREVENCIÓN'.
- A grid of 24 small images showing various agricultural practices.
- A book cover titled 'Safe Use of Pesticides' with the subtitle 'Istimaalka Badbaadso ee Sumaha'.
- A poster with a water drop graphic and the text 'ΑΠΟΡΡΙΨΗ ΧΗΜΙΚΩΝ' (Rejection of chemicals).

## Main Points

Stewardship

- Farmers need access to tools and information to improve livelihoods through
  - Increased productivity
  - Increased safety and reduced environmental impact
  - Access to markets – GAP, MRLs....
- Supported through appropriate, enforceable regulation
- Supported by adoption IPM (within stewardship)
- Requires investment in capacity building
- Must be promoted by all stakeholders in the food chain



**DAY 2 - PRESENTATIONS ON ISSUE #3: *POLICIES AND STRATEGIES***

**IPM in the European Strategy for sustainable use of pesticides**

*By Patrizia PITTON, European Commission / DG SANCO*



---

**OECD Workshop**  
**on Integrated Pest Management**  
**Berlin 18 October 2011**

**Integrated Pest Management**  
**Keystone in the European Strategy for**  
**sustainable use of pesticides**

**Patrizia Pitton**  
**Unit E3 – Chemicals, contaminants, pesticides**



---

- Thematic Strategy on sustainable use of pesticides
- Objectives and main provisions concerning IPM
- Key points for IPM implementation





## Objectives of Thematic Strategy on sustainable use of pesticides

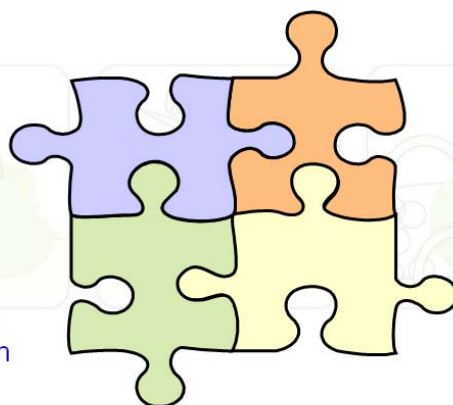
- Minimise the risks to health and environment
- Reduce the level of harmful active substances including substitution principle
- Encourage low input or pesticide-free cultivation
- Establish a system to monitor progress on such objectives
- Improve control of use and application



## New EU pesticides legislative framework

Revision of  
Directive  
91/414/EEC:  
Regulation (EC)  
1107/2009  
adopted

New Regulation  
1185/2009 (EC) on  
statistics of ppp  
adopted



New Directive  
on sustainable  
use  
2009/128/EC  
adopted

Revision of  
Directive  
2006/42/EC on  
machinery  
Directive  
2009/127/EC  
adopted



### Objectives of Directive 2009/128/EC on sustainable use of pesticides

- Achieve a sustainable use of pesticides by:
  - reducing the risks and impacts of pesticide use on human health and the environment and
  - promoting the use of IPM and of alternative techniques such as non chemical alternatives
- Scope of the directive is at present restricted to plant protection products as defined by Regulation No 1107/2009 on placing of plant protection products on the market



### National Action Plans

- To be finalised by 26 November 2012:
  - Quantitative objectives, targets, measures and timetables to reduce risks and impacts of pesticides uses and encourage development of IPM and alternative techniques to reduce dependency on the use of pesticides
  - Monitoring the use of active substances of particular concern
  - Measures to implement all provisions defined by the Directive
  - Public participation
  - Integration with other EU policies plans



### Integrated Pest Management

- Member States shall take all necessary measures to **promote low pesticide-input pest management, giving wherever possible priority to non-chemical methods**
- Promotion of organic farming and IPM
- Ensure necessary conditions for the implementation of IPM in particular:
  - **Tools for pest monitoring and decision making**
  - **Advisory services on IPM**
- **General principles of IPM** (in Annex III) to be applied by all professional users by 1 January 2014
- Member States to establish incentives to encourage Crop or sector-specific IPM guidelines on a voluntary basis



### New Definition of Integrated Pest Management

- IPM means careful consideration of all available **plant protection methods** and subsequent integration of appropriate measures that discourage the development of populations of harmful organisms and keep the use of plant protection products and other forms of intervention to levels that are economically **and ecologically** justified and reduce or minimise risks to human health and environment. Integrated pest management emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.



### General principles of IPM

- Prevention (adequate cultivation techniques and respect of beneficial organisms)
- Monitoring, early diagnosis systems and professionally qualified advisory services
- Decision whether and when apply plant protection measures to be based on threshold values where feasible
- Sustainable biological, physical and other non-chemical methods must be preferred to chemical methods if they provide satisfactory pest control
- Pesticides specific and the least side effects
- Intervention at strictly needed levels taking into account resistance
- Anti resistance strategies to be applied
- Check efficacy of intervention: records and monitoring



### Other measures relevant for IPM implementation

- Target training available to all professional users, distributors and advisors - subjects shall include IPM, organic farming techniques and biological control methods and initiation to comparative assessment
- Inspection of equipment at regular intervals and by 2016 all inspected
- COM to define harmonised risk indicators: to measure progress achieved in reduction of risks
- Member states can still use their national risk indicators and shall identify:
  - trends in use of certain substances
  - priority items requiring particular attention as well as good practices to be promoted





### Key points for IPM implementation

- Availability of qualified advisory services and creation of effective knowledge networks to divulge research results and to orient research objectives on the basis of farmers needs
- Integrate efforts of concerned parties to support IPM implementation in environmental and agricultural policies with provisions for incentives on preventive techniques
- Informing general public on IPM and organic farming to heighten awareness of and to promote such productions

**THANK YOU for your attention!**

## **Pesticide Risk Reduction Program: A Canadian initiative to help growers achieve pesticide risk reduction**

*By Pat Curry, Canada, Health Canada, PMRA, and Cezarina Kora, AAFC, Pest Management Centre*



**Pesticide Risk Reduction Program:  
A Canadian initiative to help growers  
achieve pesticide risk reduction**

OECD IPM Workshop, Berlin, Germany, October 16-19, 2011

**Pat Curry<sup>1</sup> and Cezarina Kora<sup>2</sup>**  
<sup>1</sup>Health Canada, Pest Management Regulatory Agency  
<sup>2</sup>Agriculture and Agri-Food Canada, Pest Management Centre

**Canada**

### **Presentation Outline**

- Introduction
- Overview of Canada's agriculture sector
- Context of Pesticide Risk Reduction Initiative
- Program objectives and activities
- Highlight of successes & outcomes
- Case study: achieving risk reduction in apple production
- Challenges
- Suggested topics for discussion by BOG

## Introduction

- **Goal of this workshop**  
How to facilitate further progress on IPM adoption and implementation, leading to greater risk reduction
- **Session on Issue #3 : Policies and Strategies**  
Canadian example of a government program that promotes IPM with the goal of risk reduction

## Canada's Agriculture – a diverse landscape and economy

- **\$42 billion** industry providing 8% of Canada's GDP
- **230,000** farms (**67.6** million ha), of which:
  - **40%** field crop (\$15 Billion)
  - **6%** fruit and vegetable (\$1.4 Billion)
  - **4%** greenhouse (\$2.5 Billion)
  - Remaining **50%** are animal production/forage farms



Source: Statistics Canada, 2006 Census of Agriculture

## Extension service and IPM implementation in Canada: a provincial jurisdiction

- Canada: a federation of 10 provinces and 3 territories
- Provinces have various approaches to delivering extension and IPM programming at operational level



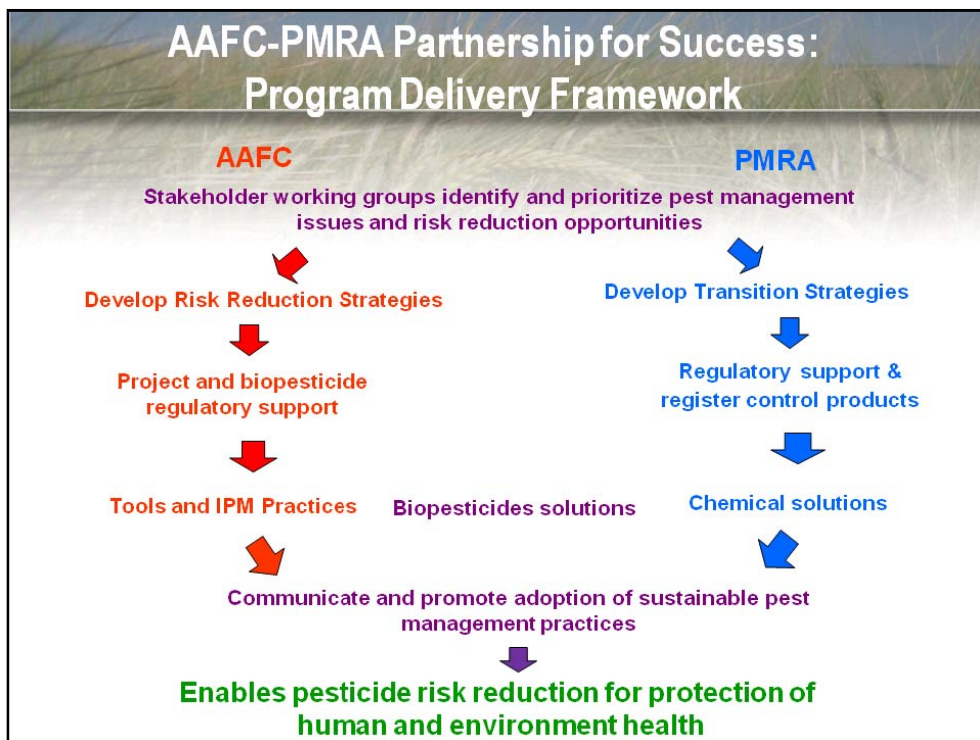
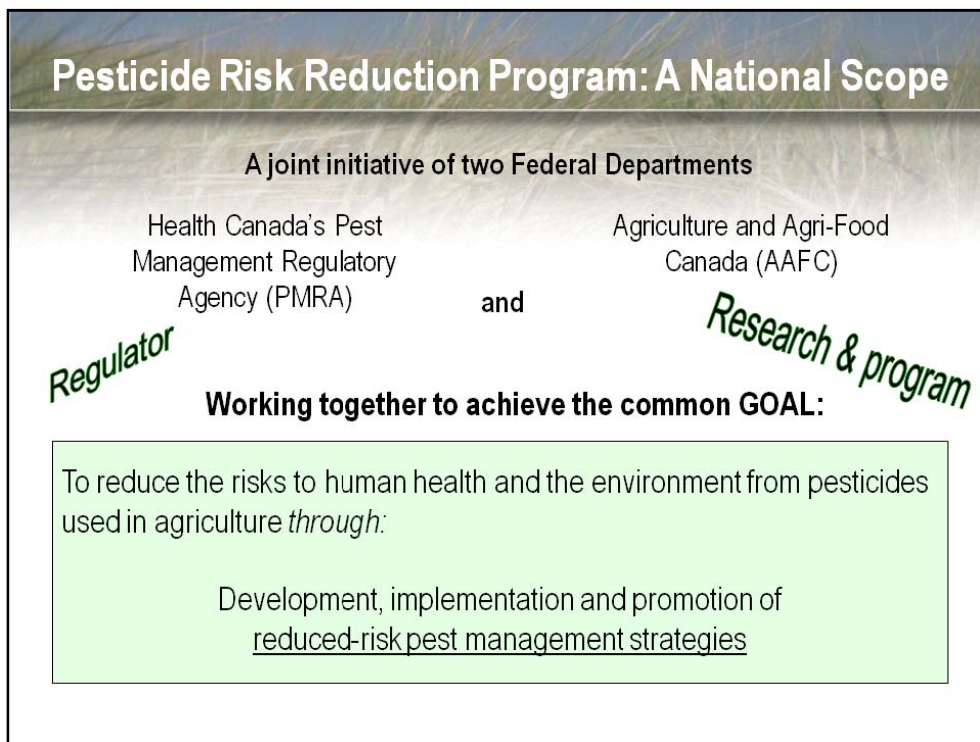
- Federal Agriculture Department, with Provinces, sets pesticide risk reduction policies, programs and initiatives

## Canada's Pesticide Risk Reduction Program: Context

Established in 2003 as part of the national ***Building Public Confidence in Pesticide Regulation and Improving Access to Pest Management Products*** initiative in response to:

- Public concerns over the impact of pesticide use on human and environment health
- Government commitment to sustainable agriculture development and maintaining competitiveness of the sector
- Grower needs for access to new practices and reduced-risk products to address the loss of pesticides through re-evaluation
- Government commitment to align with international sustainable environmental policies (e.g. following recommendations from 1998 OECD workshop on IPM)





## Highlights of Successes and Outcomes (Solutions for Agri-industry and Environment)

Program support has led to:

Increased availability of new control products:

- ✓ Pesticide uses (new actives, label expansions)
- ✓ Biologicals & biopesticide uses (e.g. 18 new actives registered in last 4 years)



## Highlights of Successes and Outcomes (Solutions for Agri-industry and Environment ) (cont')

Program support has led to:

Increased availability and access to new, innovative IPM tools and practices:

- ✓ Decision making systems
- ✓ Cultural management methods
- ✓ Resistant cultivars
- ✓ Advanced pesticide application technologies
- ✓ Integrated crop management approaches

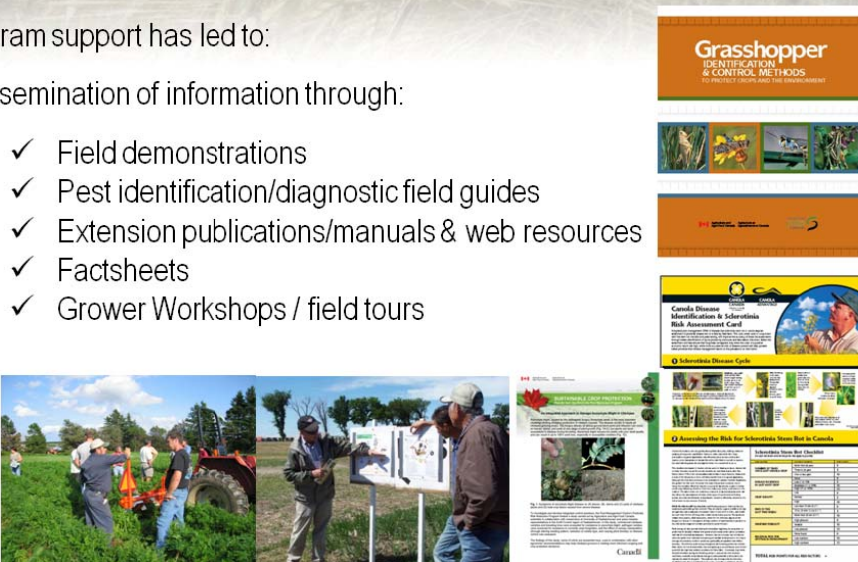


## Highlights of Successes and Outcomes (Solutions for Agri-industry and Environment) (cont')

Program support has led to:

Dissemination of information through:

- ✓ Field demonstrations
- ✓ Pest identification/diagnostic field guides
- ✓ Extension publications/manuals & web resources
- ✓ Factsheets
- ✓ Grower Workshops / field tours



## Case Study:

### Achieving Risk Reduction in Apple Production

Replacement of older chemistries for insect pests scheduled for phase-out through re-evaluation:

- Azinphos methyl (December 2012)
- Diazinon (TBD)
- Endosulfan (December, 2016)



Alternative control solutions were needed to help growers address pest management gaps from the loss of these uses

Two complementary strategies were established and are currently under way at PMRA and AAFC



### PMRA's Transition Strategy to address the loss of older chemistries

- Stakeholder working group initially established following first announcement of azinphos methyl phase-out in 2007
- Identified potential replacement products, efficacy data available and/or trials underway
- Working towards registration of potential replacement actives through coordination of WG and regulatory support

**Results to date:** 44 products were submitted by registrants to PMRA, 24 registered (20 still under review)



### AAFC's Pesticide Risk Reduction Strategy to address the loss of older chemistries

Funding provided for:

- Novel pest monitoring and decision making tools for judicious use of spray applications
- Efficacy and application technology for spinosad-based bait for apple maggot
- Biological controls (pest parasitic organisms)
- Tech transfer demonstration projects and grower workshops to educate growers on how to incorporate new chemistries and practices into orchard IPM





## Outcomes for growers as a result of joint work

### Benefits to growers

-  More efficient solutions available to enable integrated pest management
-  Better information and know-how in use of new tools, technologies and understanding of the benefits of IPM approaches
-  Help transitioning away from older chemistries and reduced dependence on pesticides

## Program Challenges

- How to increase and measure rate of grower adoption of reduced risk solutions and IPM approaches
- Measurement of risk reduction impact of the Program; linking tangible Program outputs with risk reduction
- Making the most of stakeholders' time in this highly collaborative program

### **Recommendations from 5-year evaluation of the Pesticide Risk Reduction Program**

- Periodic measurement of:
  - awareness and adoption rate of risk reduction strategies and tools, including replacement products
  - economic viability of pesticide risk reduction tools
- Increased promotion and demonstration to encourage adoption of pesticide risk reduction tools

### **Suggested topics for discussion by BOG**

- How can government policies or programs increase IPM adoption?
- Are national IPM action plans/policies (e.g. top to bottom vs. bottom up approaches) a proven way to increase IPM adoptions?
- What systems have other countries implemented successfully to increase IPM adoption?



**Implementation of IPM in Agriculture in Japan**

*By Mr. Hayakawa, Japan/ Agricultural Chemicals Inspection Station*

# Implementation of IPM in agriculture in Japan.

OECD Workshop on Integrated Pest  
Management  
Berlin, October 2011

Yasuhiro Hayakawa  
Agricultural Chemicals Inspection Station in Japan

1

## Pest management in Japan

- High temperatures and humidity.  
→ Outbreak of pests and weed growth quite commonly occur.
- Agricultural practices and crops grown are diverse.



- Promotion of IPM through prefectural extension organizations.
- Japan has been developing IPM with a focus on the appropriate use of agricultural chemicals.

2



## Concern about the use of agricultural chemicals

Farmers have concerns about the use of agricultural chemicals.

1. Occurrence of tolerant pests
  - ▪ Increase of the use of agricultural chemicals
  - Decrease of effectiveness of agricultural chemicals
2. Drift of agricultural chemicals
  - agricultural chemical residues in foods



Needs of nonchemical alternatives have been increasing.

3

## Formulation of IPM guideline in Japan (1)

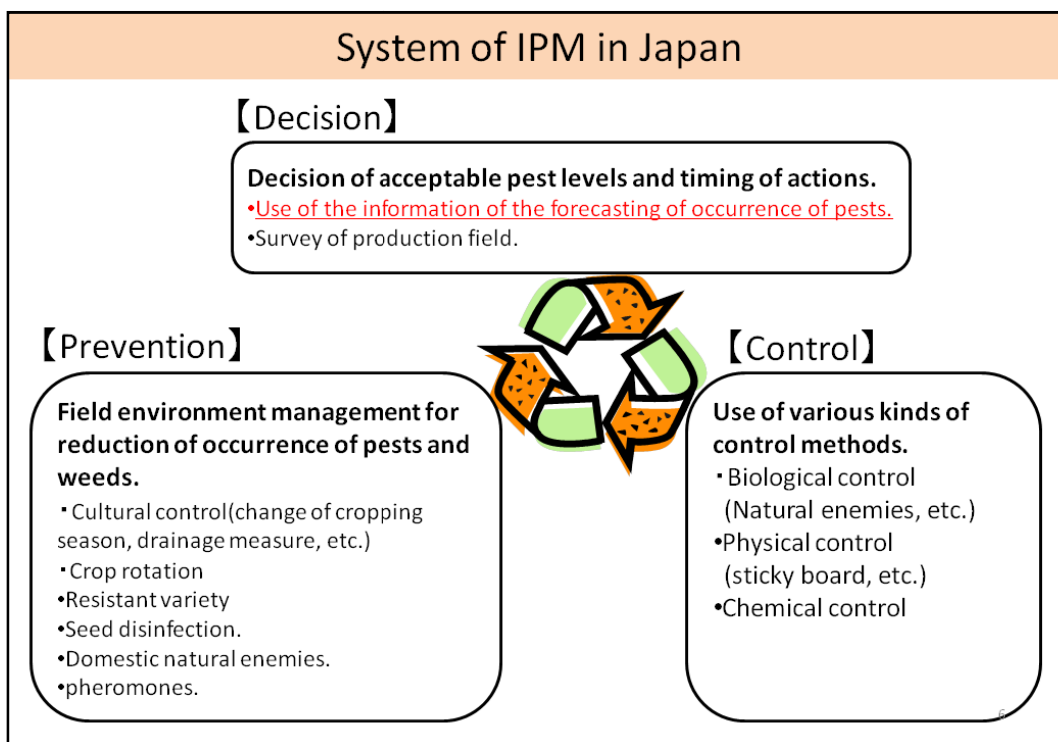
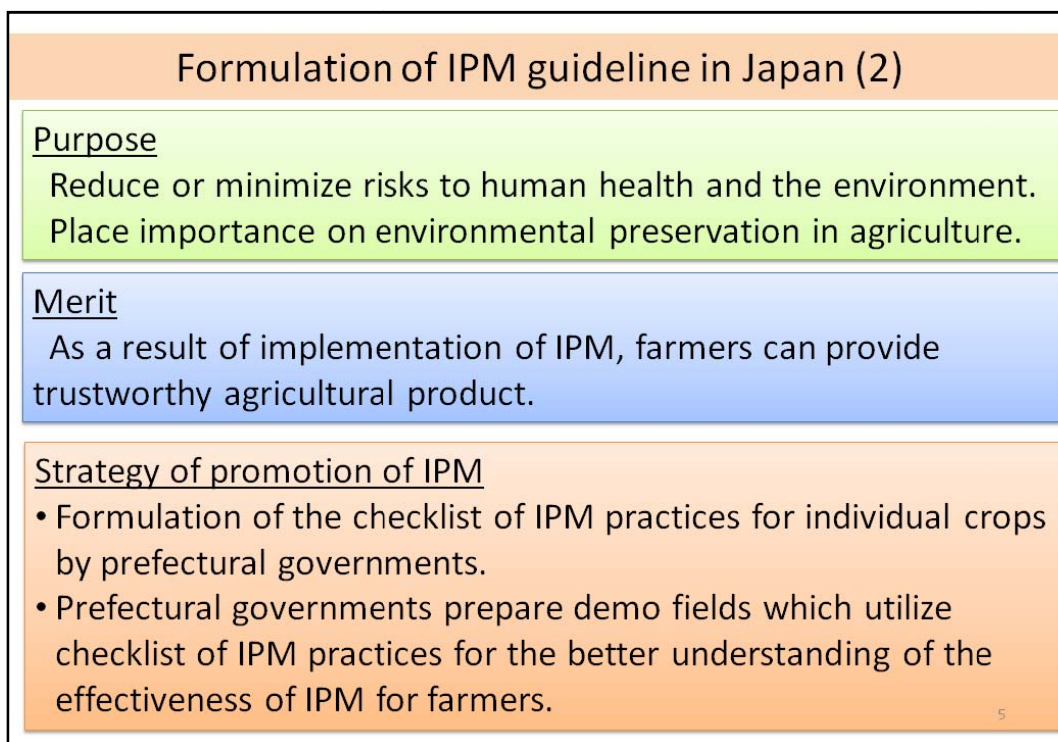
2005 Formulation of IPM guideline in Japan

### Definition

Ministry of Agriculture, Forestry and Fisheries(MAFF) supports FAO definition of IPM.

***“Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.”***

4



## System of forecasting of occurrence of pests

Forecasting of occurrence of pests has been supporting farmer's decision.

### Survey



Occurrence of pests



Crop growth



weather

MAFF designated 55 Pests and 30 diseases as targets.



Blast  
(*Pyricularia grisea*)



Common cutworm  
(*Spodoptera litura*)

Prefectural governments survey above designated pests and serious pests which occurred in each prefecture.



Corn earworm  
(*Heliothis armigera*)

## Strategy of promotion of IPM in Japan

- MAFF formulated 11 model checklists of IPM practices for individual crops.  
Rice, cabbage, citrus, apple, pear, indoor cultivated tomato, indoor cultivated strawberry, soybean, sugarcane, Japanese tea and chrysanthemum
- Support for formulation of checklist of IPM practices.  
Financial support to prefectural government for development and introduction of IPM technologies.



Prefectural governments

- Formulation of checklist of IPM practices for individual crops.
- Promotion of checklist of IPM practices.

8

## What is checklist of IPM practices?

Checklist of IPM practices for citrus

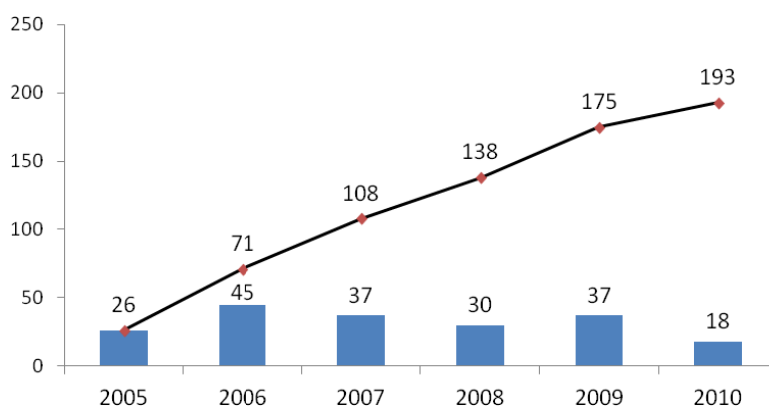
**Farm work process for  
Implementation of IPM**

**Detail of each farm work  
process**

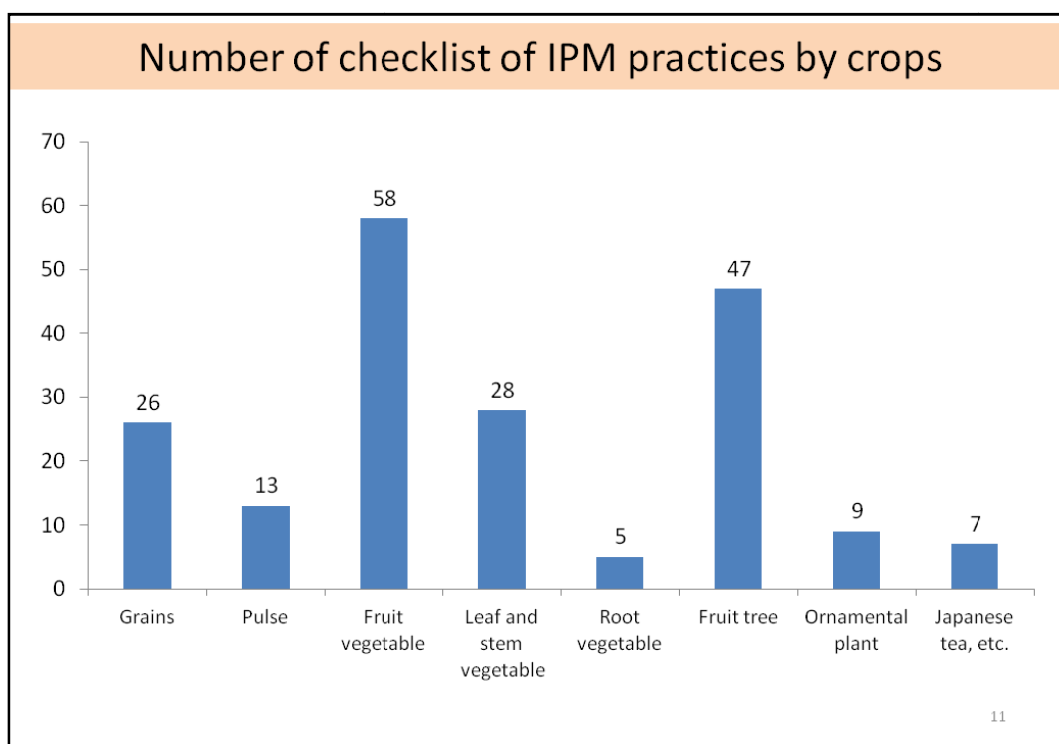
| Item of management                                                                                                                | Point of management                                                                    | Status of implemen-<br>tation last<br>year | Goal<br>for this<br>year | Status of implemen-<br>tation in<br>this year |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|-----------------------------------------------|
| Elimination of source of pests                                                                                                    | Farmers should eliminate source of pests in orchard and surrounding areas.             | ✓                                          | ✓                        | ✓                                             |
| Usage of agricultural chemicals with narrow spectrum.                                                                             | When farmers apply agricultural chemicals, they should select it with narrow spectrum. |                                            |                          |                                               |
| Farmers assess own efforts. When they implement work process, they check the column. And they reflect their efforts to next year. |                                                                                        |                                            |                          |                                               |

## Formulation of checklist of IPM practices

Prefectural governments have formulated 193 checklists of IPM practices by 2010.







### Situation of IPM in Japan (1)

Farmers implement IPM by following reasons:

- Measures against tolerant pests
- Reduction of agricultural chemicals use → Cost and labor reduction
- Avoidance of drift → contribution for food safety
- Consumer's needs for crops with reduced agricultural chemicals use

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## Situation of IPM in Japan (2)

### Farmer's opinions

- Expansion of markets
- Increase of mail-order sales
- Leading to gain the certification of eco-farmers
- Reduction of agricultural chemicals use

### Consumer's opinions

- IPM should be spread more widely.
- It is necessary to inform consumers of IPM more widely.

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## Situation of IPM in Japan (3)

### Issues in promoting IPM

- Capacity development
  - Training for leaders and instructors
- Cost reduction of IPM technologies
- Incentive for implementation of IPM
- It is necessary to clarify the impact of IPM on environment and cost reduction.
- Distribution of biological pesticide is low volume.

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### Promotion of IPM

- To raise farmer's awareness to IPM , MAFF has been making efforts to transmit merits of IPM by ...
  - introduction of good practices
  - holding a public meeting with consumers
- MAFF has provided subsidies for developing required technologies and for promoting the use of such technologies in agriculture.
- In addition, MAFF has been conducting research to develop indicators for the assessment of effect of IPM since 2008.  
(candidate of indicators: spider, frog, beetle, etc.)

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### Conclusion

- At prefecture level, a total of 193 IPM checklists were prepared. They support the implementation of IPM by farmers.
- Various kinds of technologies need to be further developed to implement IPM reflecting each region's agricultural practice even for the same crop.

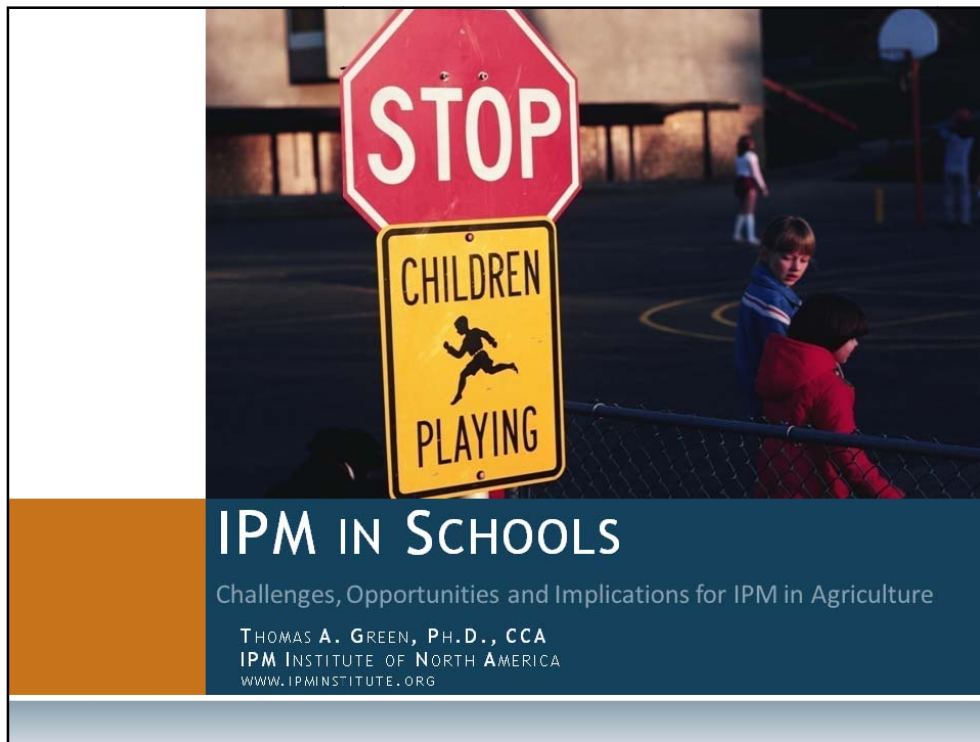


To promote IPM, It is necessary to provide appropriate technical guidance at a local level.  
MAFF will continue to provide financial support for prefectural governments and technical information and guidance to farmers.

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## IPM in US Schools: Challenges, Opportunities and Implications for IPM in Agriculture

*By Tom Green, US/IPM Institute of North America, Madison, WI*





## HISTORY



1992-2011: More than 50 studies, surveys report unmanaged pest problems, improper pesticide use.

- *School IPM 2015, Green and Gouge 2009.*

Inadequate legislative mandates in most states.

- In nearly half of 15,000 school districts in the US, anyone may apply a pesticide without any training or license.

Low public awareness, appreciation.

- Less than 19% of households have heard of IPM (1989, 1995, 2006)

## CONSEQUENCES

- Pesticide residues on school walls, floors.

*Williams et al. 2006*

- Asthma allergens 100x level of concern.

*Nalyanya et al. 2009*

- Food safety and fire risks.
- Poor air quality, energy loss.
- Relocations/closings.
- Loss of public trust.

- Astoria's Public School 70 has the City's worst bedbug problem, parents Furious, *New York Daily News*, 1 September 2011

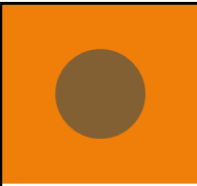
- Pesticides on playing fields, *Fox News*, 6 June 2011

- Roaches close 11 Orlando school cafeterias, *Bay News 9*, 30 April 2011

- Public funding for IPM reduced by 36%, 2000-2010.



*Dirty floor drains create food safety risk.*



## ASTHMA

Asthma is the number one cause of school absences – *more than 12.8 million school days are lost per year.*

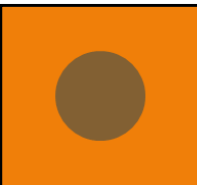
Asthma affects:

- 6% of school children nationally
- Up to 28% in urban centers

The cost of treating asthma in children under 18 years of age is \$3.2 billion per year!

Symptoms can result from and be triggered by exposure to cockroaches, other pests, cleaning products, aerosols including pesticides.





## IPM IS THE SOLUTION!

IPM reduced pest complaints and pesticide use by 70 to 90% with no increase in long-term cost. *Gouge et al. 2006*

IPM STAR schools reduced pesticide risk, eliminating use of high risk pesticides. *Green et al. 2007*

We know how to do IPM in schools! We need:

- Improved coordination across US.
- Better integration with infrastructure already in place, e.g., facility management professionals.



*Effective door sweeps alone can cut pest complaints by 65%.*

# TACTICS

Sanitation, exclusion, education.

Ants, cockroaches, rodents, stinging insects, others.

Compendia of practices:

- [www.ipmstar.org](http://www.ipmstar.org)
- *School IPM 2015*, Chaps. 7-8.  
<http://www.ipmcenters.org/pmsp/pdf/USschoolsPMSP.pdf>

**Pyramid of IPM Tactics for Roaches**

PENNSSTATE College of Agricultural Sciences 7th IPM Pennsylvania Department of AGRICULTURE

# Tools?

### Established

- ⊙ State-level legislation
- ⊙ State-lead individual, sole responsibility is school IPM
- ⊙ State/federal grants
- ⊙ Schoolbugs listserv
- ⊙ Train the trainer
- ⊙ Fact sheets, manuals
- ⊙ *Pest Presses*, timely IPM bulletins
- ⊙ Monroe, Texas models, IPM STAR
- ⊙ School district IPM policies, plans, contracts for services
- ⊙ IPM curricula
- ⊙ Regional working groups

### Emerging

- ⊙ Regional school district coalitions
- ⊙ Texas IPM Affiliates for Public Schools
  - ⊙ Professional org for school district IPM coordinators
- ⊙ Green Shield Certified
- ⊙ *Business Case for School IPM*
- ⊙ *Reducing Your Child's Asthma using IPM*
- ⊙ IPM Voice, [www.ipmvoice.org](http://www.ipmvoice.org)

[www.ipminstitute.org/school\\_ipm\\_2015/resources.htm](http://www.ipminstitute.org/school_ipm_2015/resources.htm)



## COORDINATION: NATIONAL STEERING COMMITTEE AND...

**Northeastern Working Group**, 37 members  
[www.nepmc.org/work\\_school.cfm](http://www.nepmc.org/work_school.cfm) led by

- Lynn Braband, Cornell University
- Kathleen Murray, Maine Dept. of Agriculture

**Western Working Group**, 71 members  
<http://cals.arizona.edu/apmc/westernschoolIPM.html> led by

- Carrie Foss, Washington State University
- Dawn Gouge, University of Arizona
- Tim Stock, Oregon State University

**Southern Working Group**, 48 members  
[www.sripmc.org/schoolIPM/](http://www.sripmc.org/schoolIPM/) led by

- Fudd Graham, Auburn University
- Janet Hurley, Texas AgriLife Extension

This National School IPM Working Group includes over 214 professionals from across the country including:

- 43 government officials.
- 65 university scientists and Extension educators.
- 14 industry experts.
- 16 representatives from non-governmental organizations.

**North Central Working Group**, 58 members  
[www.ipminstitute.org/NC\\_IPMIS\\_Working\\_Group/main.htm](http://www.ipminstitute.org/NC_IPMIS_Working_Group/main.htm) led by

- Thomas Green, IPM Institute of North America
- Bob Stoddard, EnviroSAFE



## METRICS, SINCE 2006



Number students and staff impacted by demonstrations:

611,499

Number impacted by coalitions:

1,510,359

Average pesticide use reduction

69%

Average pest complaint reduction

31%

Funding leveraged: USD \$3,301,763

44 meetings and workshops

Expanded contact database to > 10,000 professionals working in schools

25 publications

5%?



## CHALLENGES?



Start up costs significant for:

- creating awareness,
- generating commitment,
- training facility managers, custodial, food service, school health, instructional staff, students. Everyone has a role to play!

Public resources undergo periodic constriction.

IPM is not a high priority compared to instruction.

Deferred maintenance increases pest access, harborage; "contracting out" cleaning reduces proficiency.

## Ag implications?

|                                 | Schools   | Ag        |
|---------------------------------|-----------|-----------|
| IPM on priority list            | Low       | High      |
| Adoption of high-level IPM      | 5-8%??    | 40-70%??  |
| Legislation                     | x         |           |
| Coalitions/learning communities | x         | Emerging  |
| IPM-based certification         | IPM STAR  | Many      |
| "Market" drivers                | Low       | Many      |
| Public resources                | Declining | Declining |

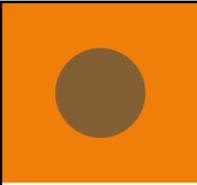
| Ag implications?                                                        |           |           |
|-------------------------------------------------------------------------|-----------|-----------|
|                                                                         | Schools   | Ag        |
| IPM on priority list                                                    | Low       | High      |
| Adoption of high-level IPM                                              | 5-8%??    | 40-70%??  |
| Legislation                                                             | x         |           |
| Coalitions/learning communities                                         | x         | Emerging  |
| IPM-based certification                                                 | IPM STAR  | Many      |
| "Market" drivers                                                        | Low       | Many      |
| Public resources                                                        | Declining | Declining |
| Potential to increase consumer/taxpayer awareness/appreciation for IPM! | X         | 😊         |

## WHERE TO FROM HERE?



- US EPA announces \$1 million in grants including to working groups.
- Case study article on state legislation, model legislation.
- Mid-term evaluation of progress towards goal of high-level IPM in all US public schools by 2015. Includes on-line survey of all school districts.
- Partner with you!

*Every child has the right to realize their highest potential*



THANK YOU TO OUR FUNDERS


More than 18 school IPM projects nationwide  
are currently supported by:

**US EPA, US EPA Regions**  
**USDA NIFA Regional IPM Centers**  
**USDA Smith-Lever Grant**  
**Center for Disease Control and Prevention**  
**National Environmental Health Association**



**Past and current demands on agriculture and IPM, restrictions and suggestions**

*By Gesine Schuette, PAN Germany/ Research Center for Biotechnology, Society and Environment,  
Hamburg*

|                                                                                                                                                                                                                                            |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|  <b>PAN Germany</b><br><small>Pestizid Aktions-Netzwerk e.V.</small>                                                                                      | <b>Dr. Gesine Schütte</b> |
| <b>OECD Workshop on IPM</b><br><b>Strategies for the adoption and implementation of IPM in agriculture contributing to the sustainable use of pesticides and to pesticide risk reduction</b><br><i>16-19 October 2011, Berlin, Germany</i> |                           |
| <b>Original and current demands on agriculture and IPM, restrictions and suggestions</b>                                                                                                                                                   |                           |
|                                                                                                                                                                                                                                            |                           |

|                                                                                                                                                                    |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|  <b>PAN Germany</b><br><small>Pestizid Aktions-Netzwerk e.V.</small>            | <b>Dr. Gesine Schütte</b> |
| <b>Outline</b>                                                                                                                                                     |                           |
| <b>Original and current demands on agriculture and IPM, restrictions and suggestions</b>                                                                           |                           |
| <ul style="list-style-type: none"><li>1 Past and current Demands</li><li>2 Restrictions</li><li>3 Suggestions</li><li>4 Key points to IPM implementation</li></ul> |                           |



### Original and current demands 1

#### IPM: Original definitions and demands

- Combination of chemical and biological pest control agents (Smith & Allen 1954)
- Prevention of pest outbreaks by application of ecological knowledge on trophic links of natural enemies (Way & van Emden 2000)
- Coordination of cultural, biological and chemical measures (Lewis et al. 1997)

Afterwards a struggle for semantic dominance began leading to ample lists, guidelines and weighted criteria of up to 30 pages for IPM, e.g.

“Bio-intensive and chemically intensive IMP” (Hoppin 1996)

“Real IPM” (realipm.com 2009)

“Low medium and high IPM” (Lynch 1998) and “system ratios” of IPM (Benbrook & Groth 1997)

### Original and current demands 2

#### Further pressing demands on agriculture

- Conservation of biodiversity and soils, limiting eutrophication (“Ecological sustainable agriculture”)
- Sustainability of food supply chains (social aspects, land and water *grabbing*)
- Mitigation of global warming



Dr. Gesine Schütte

**Original and current demands 3**

**Background: What has happened?**

Biodiversity still decreases with particularly high rates in agricultural areas. Insect pollinators are threatened (UNEP 2010) - pesticide inputs have not fallen.

Food waste is one of the most important drivers of land, energy and water use, all of which increase environmental problems (FAO 2011).

Eutrophication (over-nutrition) decreases the productivity and biodiversity of coastal waters (National Research Council 2000).

Subtle forms of soil degradation may account for the lack of positive yield trends in several high production systems (changes in soil organic matter composition, accumulation of substances which impair mineralisation or nutrient uptake, limited micro- and macronutrients other than N) (Cassman 1999).

Water grabbing: The increase in world grainland production between 1959 and 1995 by the factor 2.4 was connected with by a 2.2-fold rise in irrigation water used (Postel 1999) (and increased amounts of CO<sub>2</sub> in air).



Dr. Gesine Schütte

**Restrictions**

**What has limited IPM implementation and its positive effects despite many exemplary success stories?**

- The performance and outcome of IPM completely **depends on pesticide and product prices** when it is confined to economically justified "*necessary*" applications.  
**Economic threshold models** for pesticide applications **alone are not the right tool** to promote pesticide risk reduction because its **risks** and **benefits** are to a great extent **external to the farm**.
- Definitions (e.g. FAO 2005) based on terms like "*careful consideration, appropriate measures, economically justified risks, minimised risks, least possible disruptions and encouragement of natural control*" are **too vague**.
- Official comprehensible, **mandatory** and **provable criteria** for IPM are **missing**.

### Suggestions 1

- Proponents of IPM should make clear, that IPM **cannot equalize** or smooth **forgone food policy, which is needed e.g. in favour of:**

Changes in livestock production (feeding "natural" animal diets and cutting down meat production by 50%) and prevention of food waste could secure food for a population of 9 billion in 2050, reducing negative environmental effects instead of enhancing them (Fairlie 2010, FAO 2011).

Production increases where and by whom it is needed:

A village in Malawi where local personnel co-ordinate investments in infrastructure (transport, storage, electricity), education, health, small loans, seed and fertilizer supply increased its agricultural production eleven fold (Grill 2010).

Organic farming, which can increase yields by on average 80% (76 projects worldwide over 4,4 million farmers involved) (Pretty et al. 2006)

### Suggestions 2

- In such a communicated and enforced context, IPM could be one tool in a box appropriate to face the many challenges in a coordinated manner.
- Thereby IPM should stand for the following **standards** which should be  
**mandatory and provable**  
 +  
**variable within a defined range depending on local situations**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <br><b>PAN Germany</b><br><small>Pesticide Action Network e.V.</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Dr. Gesine Schütte</b> |
| <b>Suggestions 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                           |
| <b>Standards for IPM (defined range – depending on local situation)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |
| <ul style="list-style-type: none"> <li>• minimum number / <b>diversity of crops</b> in rotation or multi-cropping at farm scale (standard level of 4, minimum + maximum rates for crops)</li> <li>• minimum portion of <b>non-agricultural land</b> at farm-scale (beneficial species)</li> <li>• minimum of <b>intensity/level of extension service</b> for pests and biodiversity <b>seized</b></li> <li>• minimum of <b>abundance of agricultural flora</b> (providing food for pollinators and natural enemies of pests)</li> <li>• minimum <b>soil organic content</b></li> <li>• maximum <b>nitrogen surplus/ha</b></li> <li>• maximum <b>soil compaction</b></li> <li>• restricted range of pesticides (<b>no highly hazardous pesticides</b>)</li> <li>• increasing (defined rate) portion of livestock <b>feed based on natural diets</b> instead of grain or plant proteins adequate for human diets</li> <li>• maximum portion of land used to produce <b>agro-fuel /materials</b> for industrial use</li> </ul> |                           |

|                                                                                                                                                                                                                                                                                                              |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <br><b>PAN Germany</b><br><small>Pesticide Action Network e.V.</small>                                                                                                                                                    | <b>Dr. Gesine Schütte</b> |
| <b>Suggestions 4</b>                                                                                                                                                                                                                                                                                         |                           |
| <b>Standards for land use in connection with IPM<br/>(defined range – depending on local situation)</b>                                                                                                                                                                                                      |                           |
| <ul style="list-style-type: none"> <li>• minimum portion of <b>non-agricultural land</b> in agricultural landscapes and improved connectivity of non-agricultural lands (woods, open habitats)</li> <li>• regain a spatial cohesion (closer proximity) between <b>animal and plant production</b></li> </ul> |                           |



### Key points & priority actions to IPM Implication

#### Short-term recommendation

##### Incentives for conservation of natural control and pollinator agents

By: Preservation / restoration of **arable weeds with low yield-penalty and semi-natural habitats** for overwintering habitat or substitute habitat after harvest). A field totally cleared of weeds is a barrier to medium sized pollinators and beneficial arthropods. Critical distance: 50m between flowers.

#### Long-term recommendation

##### Widen rotations and crop diversity

Development of a crop diversity index and intelligent ways to **widen rotations** and crop diversity **preventing** pest outbreaks and soil degradation.

Proposal: **International trading system which trades credits for high crop diversity areas.**

#### Contribution of actors / role of CAP

Function as a trailblazer

### Original and current demands on agriculture and IPM, restrictions and suggestions

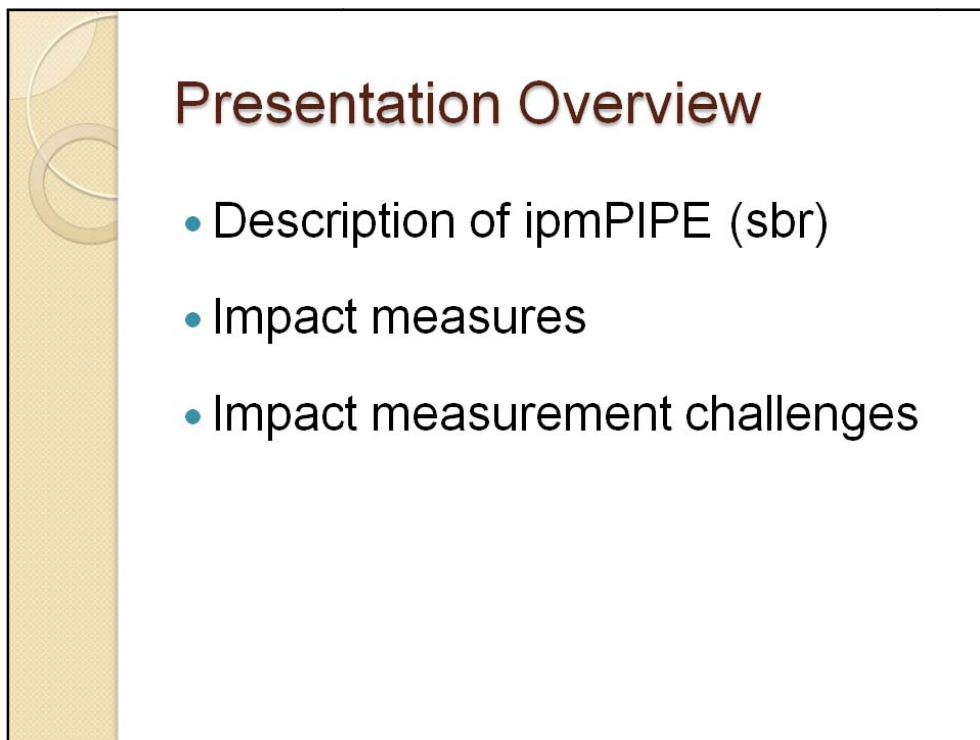
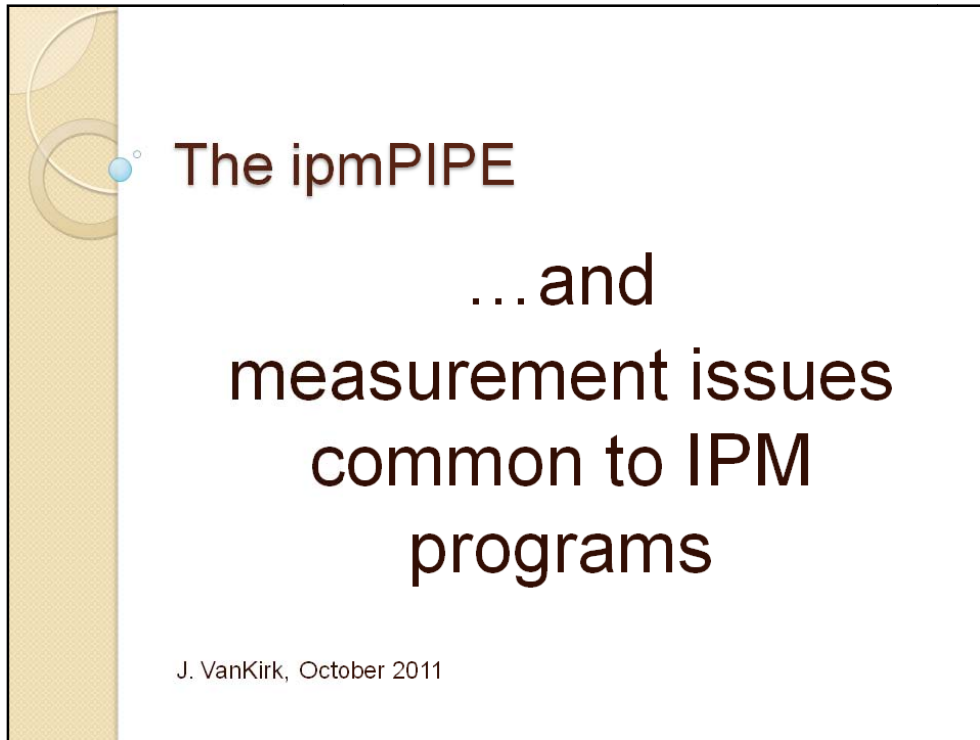
## Thank you for listening!



**DAY 2 - PRESENTATIONS ON ISSUE #4: *MEASUREMENT AND IMPACTS***

**IPM Pest Information Platform for Extension and Education**

*By James R. VanKirk, US/Southern Region IPM Center, North Carolina State University*



## ipmPIPE

- Integrated Pest Management
- Pest
- Information
- Platform
- for
- Extension and Education

Isard, et. al, 2006. The establishment of a national pest information platform for extension and education. <http://bit.ly/pOCfLg>

**Standardized Framework**  
Communications & Data Management  
Harnessing Internet Capabilities

Inputs:



Analysis



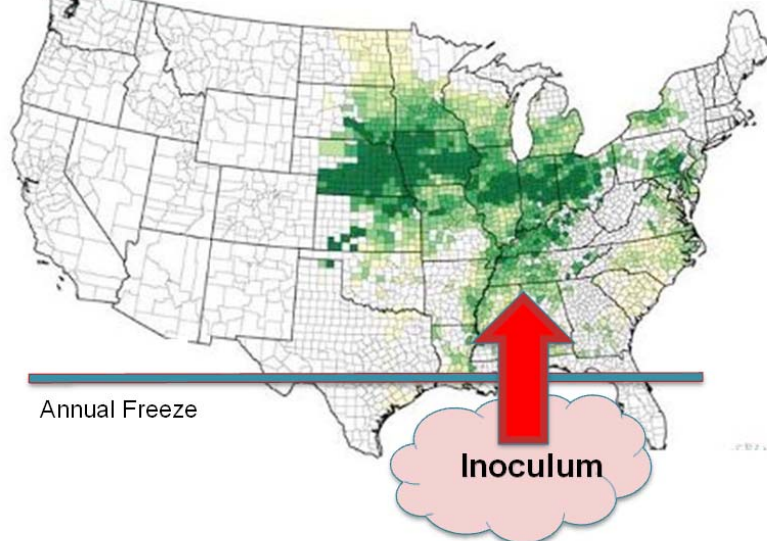
Decisions:

## The Pest: Asian Soybean Rust

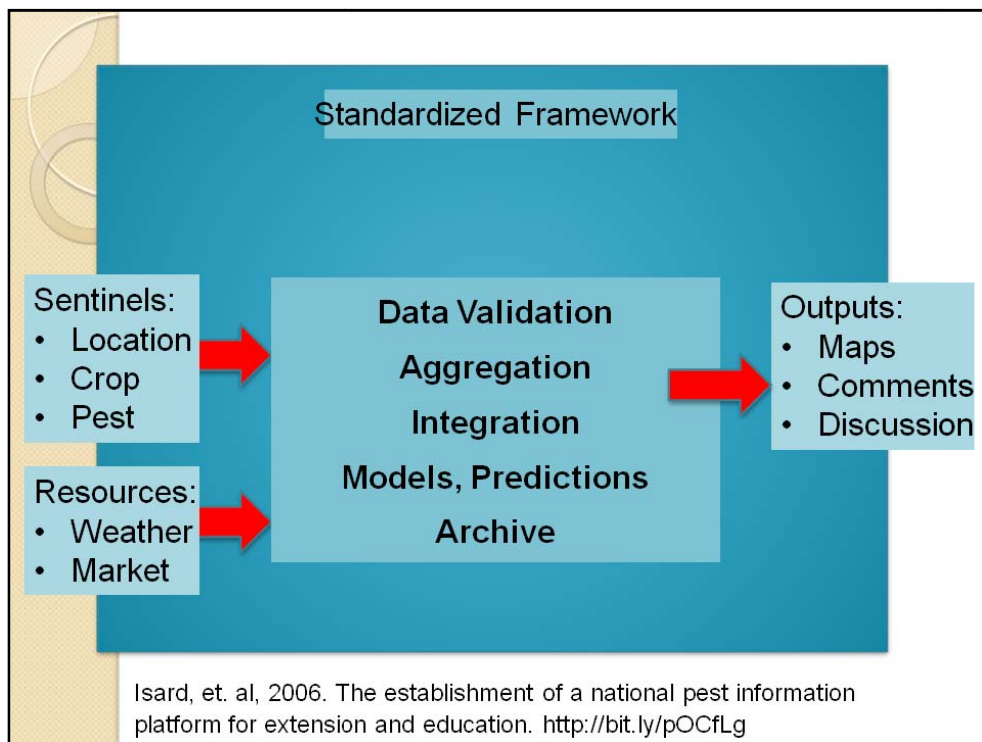
- SBR needs live green host to survive
- Susceptibility to economic damage is limited window between R1 and R5



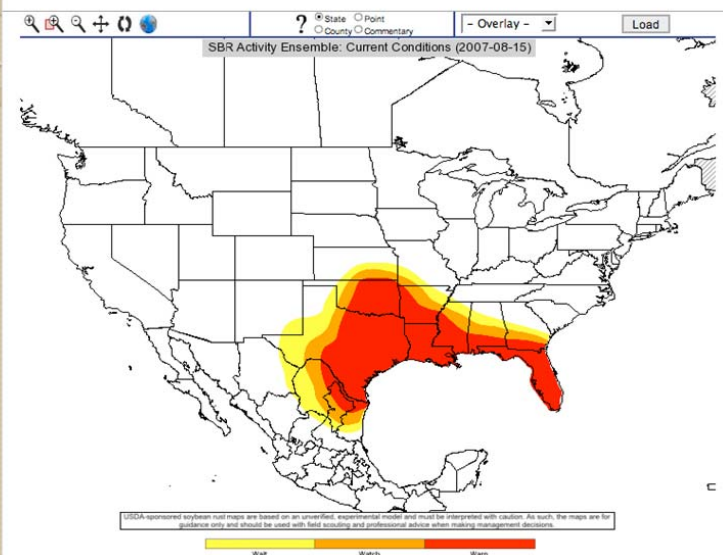
## Annual Dynamics, Soybean Rust

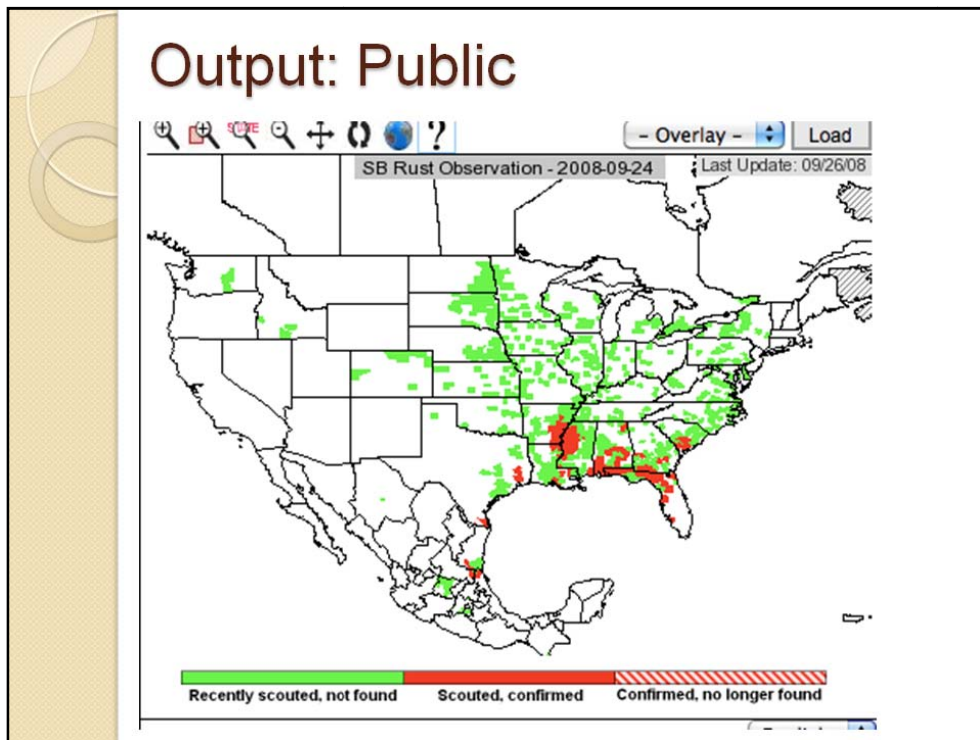






## Output Example: Restricted





### Output: Public, State Comments

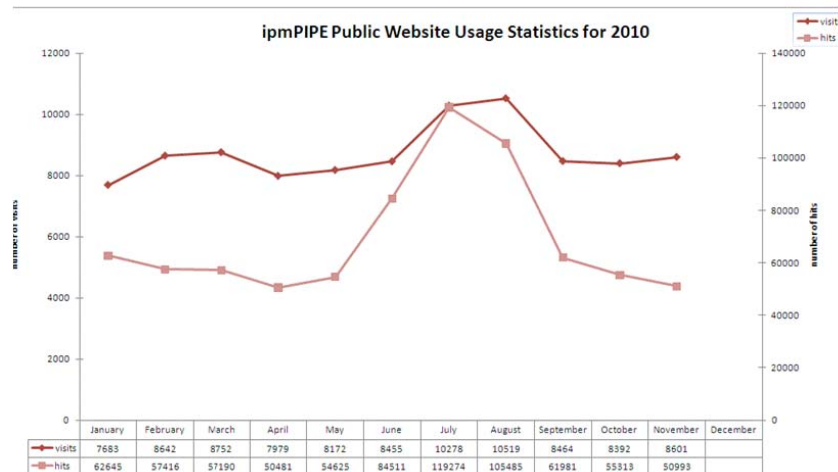
#### Kentucky Commentary (08/31/05)

it is now **too late** in the season for SBR to cause appreciable damage...If SBR rust spores blew in with Katrina...By the time damage would be possible, harvest will be well under way and/or most fields will be **beyond the stage where yields would be (impacted).**

## ipmPIPE and Impact Evaluation

- Description
- Impact measures
- Impact measurement challenges

## Measures: Uptake



## Measures: Impacts

Since 2005, the SBR-PIPE has successfully met the needs of U.S. soybean industry and is estimated to have saved farmers between \$209–299M, **annually**. (Hershman, et. al 2011 <http://bit.ly/nzfC4P>)

**\$209–299M, annually  
(fungicides avoided)**

## ipmPIPE and Impact Evaluation

- Description
- Impact
- Impact measurement challenges



What have you done for me lately?

...or, how soon they forget

|             |                      |
|-------------|----------------------|
| <b>2005</b> | <b>\$299,000,000</b> |
| <b>2006</b> | <b>\$299,000,000</b> |
| <b>2007</b> | <b>\$299,000,000</b> |
| <b>2008</b> | <b>\$299,000,000</b> |
| <b>2009</b> | <b>\$299,000,000</b> |
| <b>2010</b> | <b>\$299,000,000</b> |
| <b>2011</b> | <b>????</b>          |

Real Benefits, Hard to Quantify

- Substitute for disappearing human resources



## Real Benefits, Hard to Quantify

- How to quantify productivity increase?



## Real Benefits, Hard to Quantify

- Template for “offspring”

Soybean Rust



Legume

Pecan

Cucurbit Downy Mildew

Southern Corn Rust

Onion

Western

## ipmPIPE as a Measurement Tool

- GPS-referenced, easily relatable to other data
  - Management (e.g. pesticide use)
  - Environmental (e.g. water quality)
  - Health
- Challenges
  - Availability of the other data
  - Privacy issue

## A Few Key Points

- Who cares? – Choose and translate the impact based on target audience
- How can recurring/sustained impacts retain sustainable political value?
- Can we assign value, document (and translate) less tangible impacts?
- New technologies may facilitate measurement.

## Germany's Network of Reference Farms for Plant Protection

*By Bernd Freier, Germany/JKI Institute for Strategies and Technology Assessment)*





## German National Action Plan on Sustainable Use of Plant Protection Products

Published in 2008





on S

Network of Reference Farms for Plant Protection



Monitoring and evaluation of pesticide use in practice  
Started in 2007



Demonstration Farms for Integrated Plant Protection



Demonstration of best practice (IPM)  
Started in 2011

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## Network of Reference Farms for Plant Protection



Joint project of

- Ministry for Food, Agriculture and Consumer Protection,
- State Plant Protection Services and
- Julius Kühn-Institut, Federal Research Centre for Cultivated Plants

**Aims**

- Generation of annual data on **pesticide use intensity** (treatment frequency index) in main crops of farms
- Expert evaluation of treatment intensity in terms of the **necessary minimum** of pesticide use (general principle of IPM)

*Approx. 120 experts from German State Plant Protection Services are involved*

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## Central demand of IPM:

### The use of pesticides must be kept to the necessary minimum

*The **necessary minimum use of pesticides** is the minimum amount needed to ensure successful crop, not least in terms of economic viability.*

*It requires that all other practicable options to prevent and deter harmful organisms have been exhausted and that consumer, environment and user protection provisions have been adequately taken into account.*

- As much as necessary and as little as possible
- No unnecessary pesticide uses

The necessary minimum is flexible (situation-specific)!

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## Treatment Frequency Index

### = Indicator for intensity of pesticide use

First established in Denmark (Kudsk, 1989)

*The treatment frequency index (TFI) lists the number of times a pesticide is applied to a given field or area, taking dosage reductions and partial field treatments into account. Pesticides applied in tank mixtures are calculated separately.*

- Application of full dose of pesticide (maximum permissible dose): **1.0**
- Application of half-dose of pesticide: **0.5**
- Application to 50 % of area: **0.5**

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## Network of Reference Farms for Plant Protection



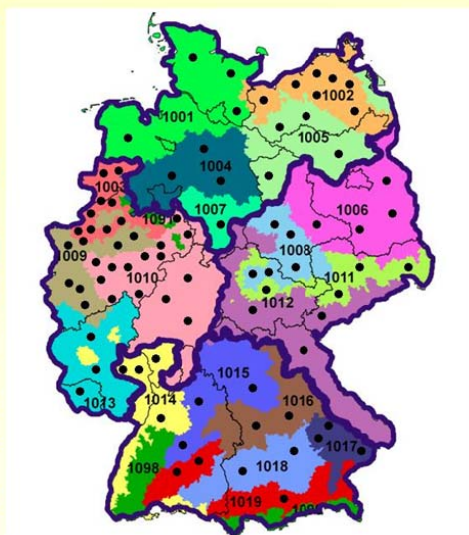
In 2010:

| Crop                 | Number of Farms | Number of Fields |
|----------------------|-----------------|------------------|
| Winter wheat         | 86              | 246              |
| Winter barley        |                 | 198              |
| Winter oil seed rape |                 | 168              |
| Other arable crops   |                 | 165              |
| Cabbage              | 28              | 68               |
| Carrots              |                 |                  |
| Asparagus            |                 |                  |
| Onions               |                 |                  |
| Apples               | 19              | 56               |
| Viticulture          | 9               | 24               |
| Hops                 | 3               | 14               |

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## Distribution of Reference Farms for Arable Crops in Regions of Germany in 2010



19 arable cropping regions

Four main regions:

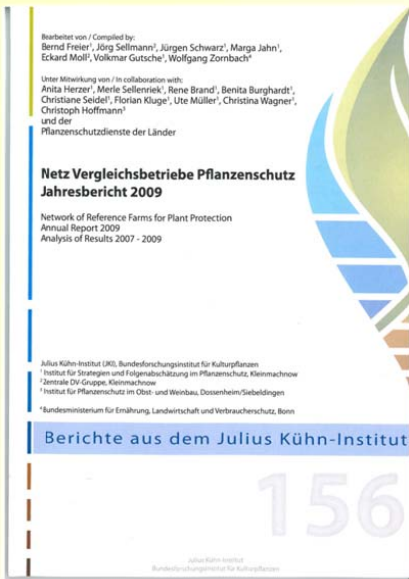
North  
East  
South  
West

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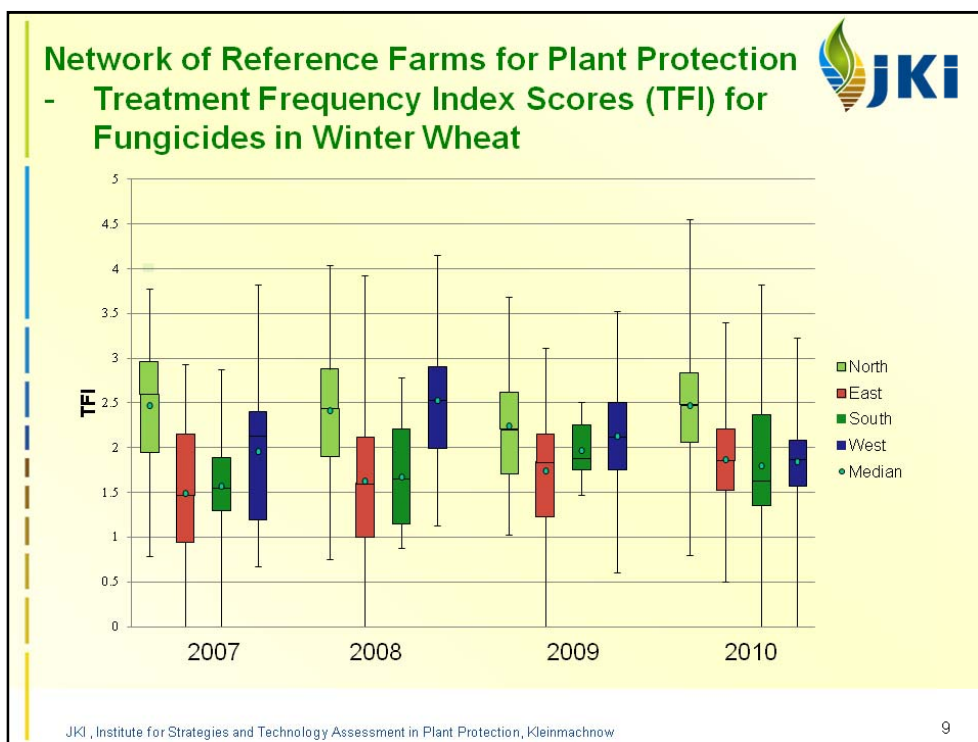
## Publication of Annual Reports



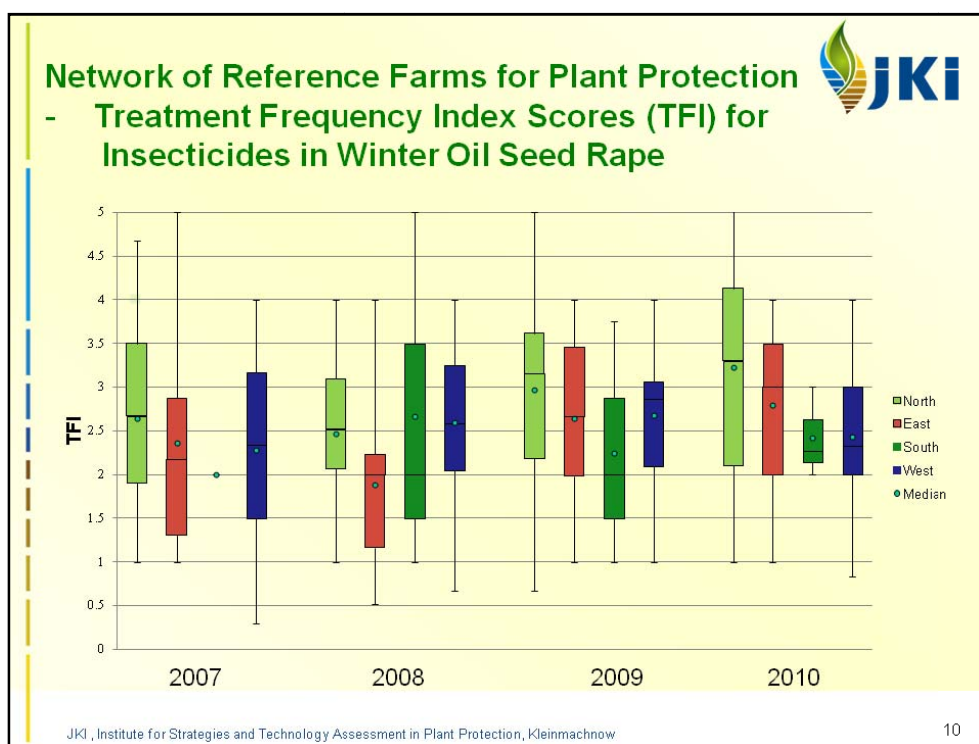


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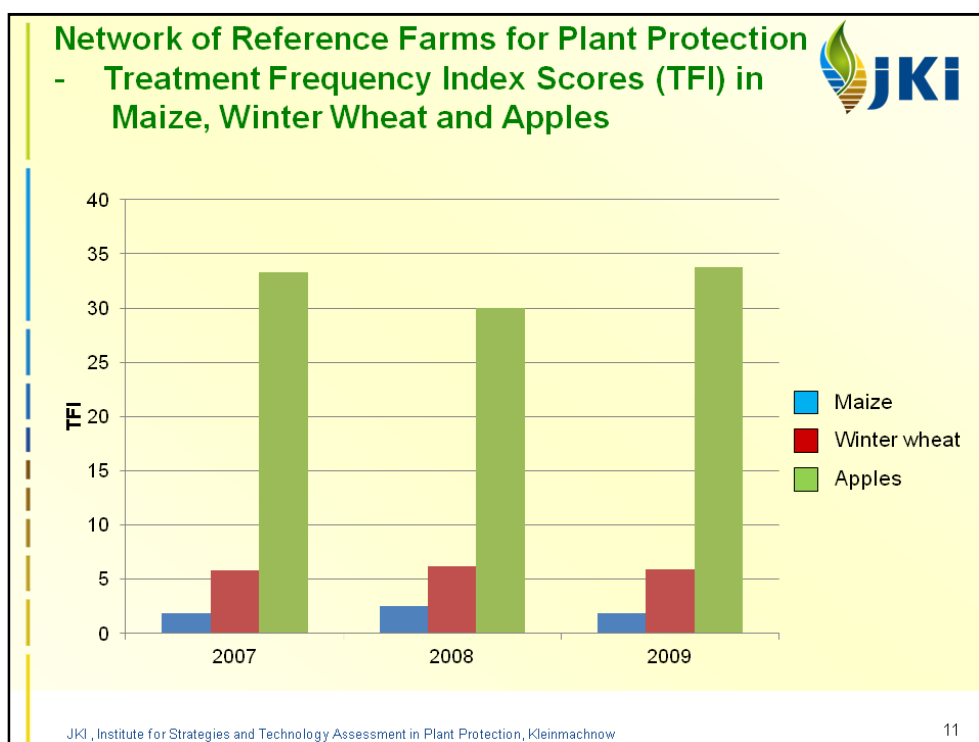
8



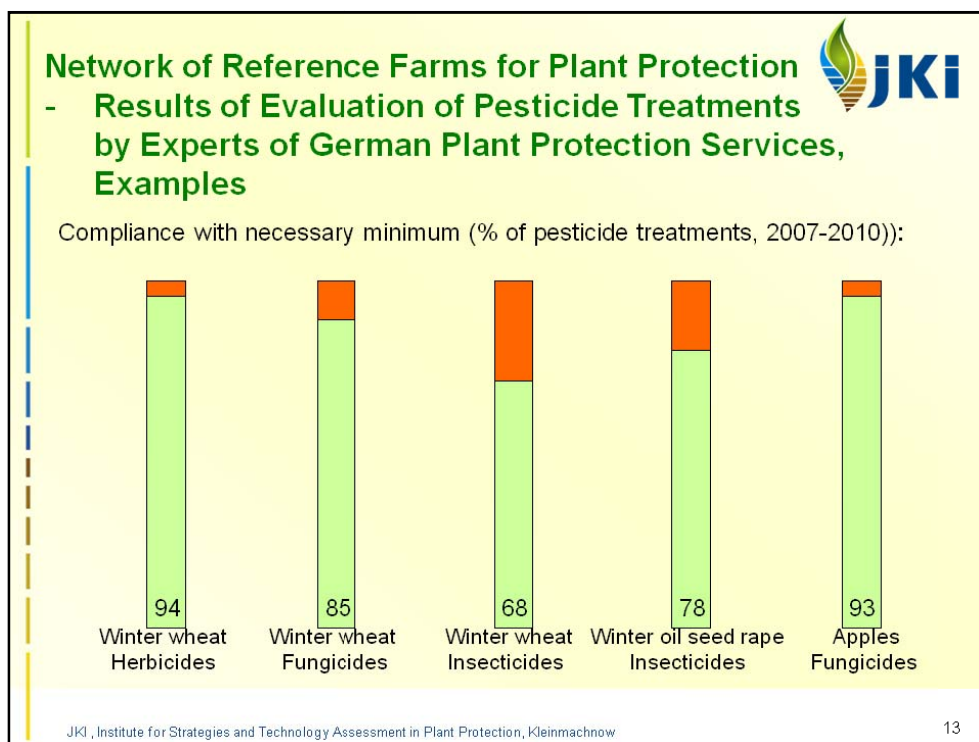
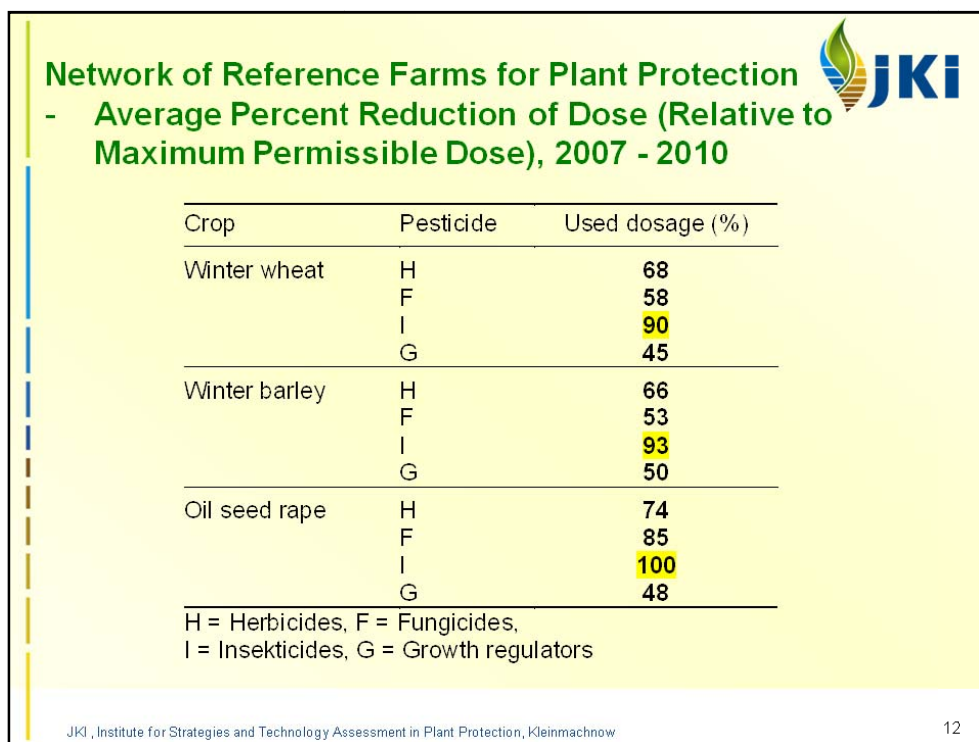




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## Network of Reference Farms for Plant Protection

### - Factors influencing Treatment Frequency Index



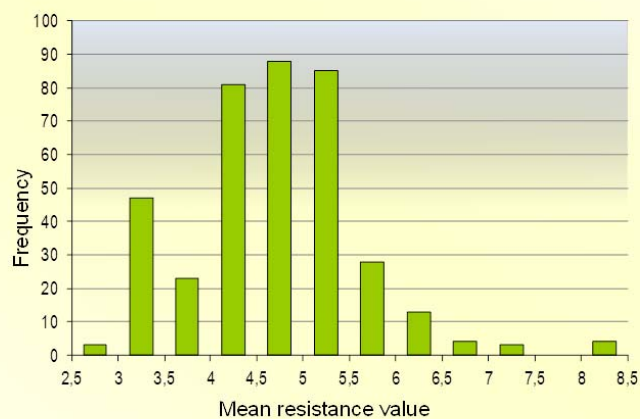
|                                      |           |                  |
|--------------------------------------|-----------|------------------|
| Field size                           | no        |                  |
| Farm size                            | no        |                  |
| Previous crop                        | yes       |                  |
| Tillage                              | yes       | without plough + |
| Sowing date                          | yes       | -                |
| Resistance value of cereal varieties | <b>no</b> |                  |
| Soil value                           | yes       | +                |
| Yield                                | yes       | +                |

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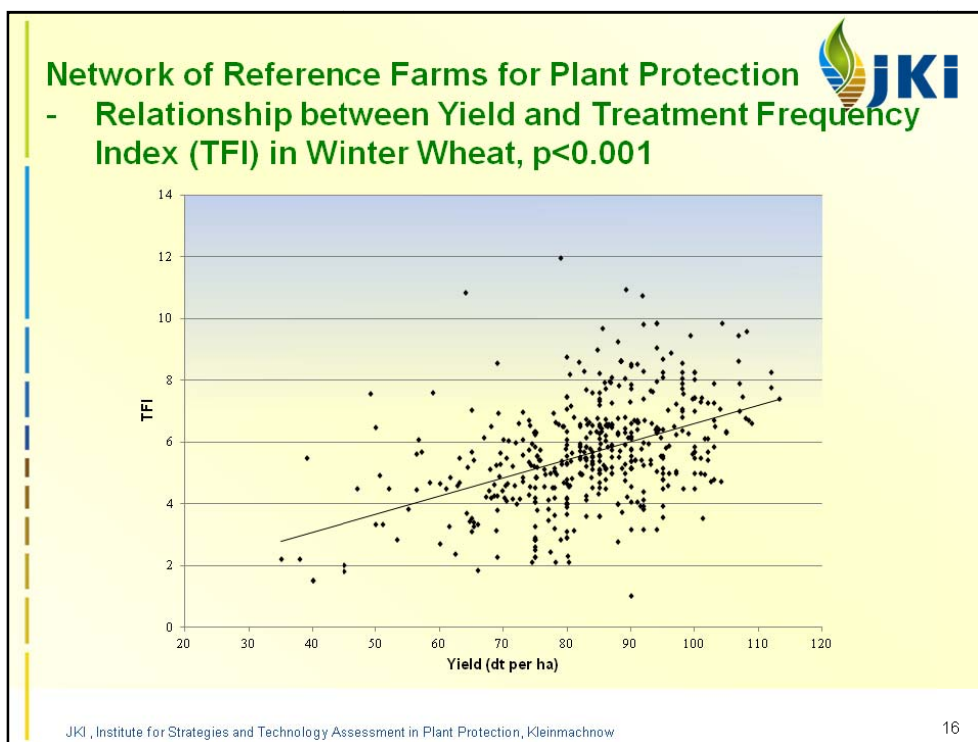
## Network of Reference Farms for Plant Protection

### - Frequency of Used Winter Wheat Varieties with Different Resistance Values, 2007 - 2008



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**Network of Reference Farms for Plant Protection** 

**- Costs of Pesticide Use, 2007-2010**

Pesticide costs and operating costs

|                             |                              |
|-----------------------------|------------------------------|
| <b>Winter wheat</b>         | <b>220 € per ha and year</b> |
| Herbicides                  | 75                           |
| Fungicides                  | 104                          |
| Insecticides                | 18                           |
| Growth regulators           | 23                           |
| <b>Winter oil seed rape</b> | <b>261 € per ha and year</b> |
| Herbicides                  | 112                          |
| Fungicides                  | 50                           |
| Insecticides                | 46                           |
| Growth regulators           | 53                           |

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## Summary



- Mean crop-specific TFIs with wide range between fields
- Moderate differences between regions and years
- 50% reduction of growth regulator doses and 30% reduction of herbicide and fungicide doses, but no reduction in insecticides
- Nearly 90% of all treatments confirmed to be "necessary minimum" ; reduction in insecticide use in cereals and oil seed rape was possible
- Identification of factors influencing the TFI, such as previous crop, tillage, sowing date, and soil value
- No effect of variety resistance to TFI in cereals
- Reference farms are useful to identify advantages and lacks in IPM implementation
- Conclusive data for required advisory activities

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Photograph: Oldenburg

**Thank you for your attention!**

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## **An Integrated System Approach to Sustainable Crop Protection**

*By Karel Bolckmans, IBMA - International Biocontrol Manufacturers Association*

# **An Integrated System Approach to Sustainable Crop Protection**

## **Measurement and Impact**

**Karel Bolckmans**

Director, Global R&D and Production  
Koppert BV, the Netherlands



OECD Workshop  
Berlin, October 16-19, 2011



## **Case Study : Almeria, Spanje**



## Key Pests in Sweet Peppers

1. Western Flower Thrips  
(*Frankliniella occidentalis*)  
Tomato Spotted Wilt Virus (TSWV)
2. Whiteflies  
(*Bemisia tabaci*)
3. Two-spotted Spider Mites  
(*Tetranychus urticae*)

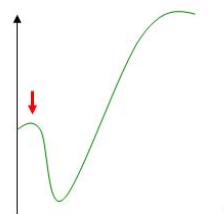


## Pesticide Resistance



## The vicious spiral

- Agronomic problems
  - Resistance
  - Resurgence : pesticide induced pest outbreaks
    - Hormoligosis
    - Elimination of natural enemies
- Leads to
  - Increasing application frequency
  - Increasing dose rates
  - Use of illegal pesticides
- Leads to
  - More pest problems
  - Increasing residue levels
- Leads to
  - Increasing environmental impact
  - Decreasing Food Safety

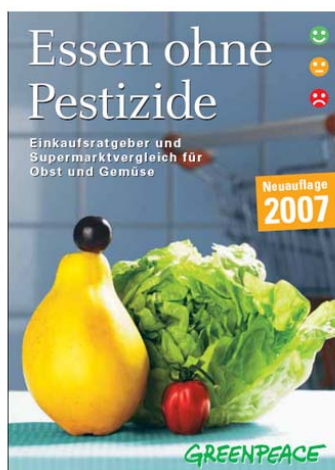


1. Agronomic problem
2. Environmental problem
3. Food Safety problem





## Measurement with Impact



### Extra-legal requirements by Retailers

1. Safety margin :  $x\%$  below MRL
2. Adding up residues from the same group
3. Black listed pesticides
4. Maximum number of active ingredients



## An Integrated Systems Approach

- **Systems Approach**
  1. Time / Process
    1. Before planting
    2. During cropping
    3. Post-harvest
  2. System Levels
    - Pests/Diseases/Weeds
    - Plant, Crop, Resources, Environment
  3. Causal interactions
- **3 pillars (IOBC)**
  - 1. Prevention**
  2. Observation
  3. Intervention
- **Knowledge**



## IPM Toolbox

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Source : GlobalGAP IPM Toolbox  
Karel Bolckmans, Rob Wessels, Ricardo Adonis



## DEVELOPMENT OF BASIC KNOWLEDGE

### 2.1. PESTS, DISEASES AND WEEDS

- 2.1.1. **List** of relevant pests, diseases and weeds in the target crop for the specific area – region or country.
- 2.1.2. **Basic information** (fact sheets) about the biology of the relevant pests, diseases and weeds and about their natural enemies.

### 2.2. PLANT PROTECTION PRODUCTS

- 2.2.1. **List** of pesticides which can be legally applied against the relevant pests, diseases and weeds in the target crop.
- 2.2.2. **Basic information** (fact sheets) plant protection products

### 2.3. TRAINING

### 2.4. EXTENSION



## TOOLS FOR IPM BEFORE PLANTING

### 3.1. RISK ASSESSMENT

- 3.1.1. **History** of the plot
- 3.1.2. **Surrounding** crops and vegetation
- 3.1.3. **Soil** and **water** samples
- 3.1.4. Analysis and Evaluation of the Risk Assessment

### 3.2. PREVENTION

- 3.2.1. **Soil** : creating and maintaining fertile and suppressive soils by :  
crop rotation, fallow, green manure, soil biodiversity, managing erosion, non-chemical soil-desinfection, clean-tillage or sanitation of crop residues, ...
- 3.2.2. **Water** : clean water, optimal irrigation and fertigation
- 3.2.3. **Plants**  
resistant varieties adapted to local growing conditions, horizontal vs. vertical resistance, resistant rootstock, pest- and disease-free starting material.
- 3.2.4. **Climate** : warning systems based on climate models
- 3.2.5. **Timing** of planting & growing
- 3.2.6. **Location**, plot selection



## TOOLS FOR IPM DURING CROPPING

### 4.1. PREVENTION

#### 4.1.1. Cleanliness of the farm (Hygiene and Sanitation)

- Prevent transmission of pests, diseases and weeds by **vectors, people, equipment, materials** and by managing **crop residues**
- Prevent **pesticide drift** from neighbouring plots.

#### 4.1.2. Cultural and Technical Measures

- Optimal crop care (fertilization, irrigation, etc.)
- Canopy management and micro-climate, plant density
- Cropping system : cover crops, mixed crops, strip cropping, strip harvesting, permaculture, fallow field margins, ...
- Mulching
- Induced resistance against pests and diseases
- Other technical measures : exclusion techniques, etc.

#### 4.1.3. Conservation Biological Control

- Measures to increase populations of natural enemies and pollinators in and around the crop
- Provide nesting places for predatory birds to control rodents.
- Prevent population reduction of natural enemies by using pesticides.



## TOOLS FOR IPM DURING CROPPING

### 4.2. MONITORING AND DECISION SUPPORT TOOLS

- 4.2.1. Organisation
- 4.2.2. Observation
- 4.2.3. Record keeping
- 4.2.4. *Warning Systems and Decision Tools*
- 4.2.5. Evaluation / Decision making



## TOOLS FOR IPM DURING CROPPING

### 4.3. INTERVENTION

- 4.3.1. **Mechanical / Physical Control** (e.g. roughing, vacuuming, UV-C, TPC, ...)
- 4.3.2. **Semiochemicals** : mass-trapping, mating disruption
- 4.3.3. **Augmentative Biological Control**
- 4.3.4. **Sterile Insect Technique** (SIT)
- 4.3.5. Use of natural and environmentally friendly products ("**Biopesticides**")
- 4.3.6. Smart use of **Chemical Plant Protection Products**
  - 1) Monitoring, Warning Systems, Decision making, Action Thresholds
  - 2) Product Selection
  - 3) Adjuvants
  - 4) Anti-resistance management
  - 5) Application : Precision Agriculture
  - 6) Nominate a person who is responsible for application of crop protection products.



## TOOLS FOR IPM POST-HARVEST

### 5.1. POST-HARVEST TREATMENTS

- 5.1.1 *Selection of techniques and products (chemical, biological, technical)*
- 5.1.2. Application technique
- 5.1.3. Record of applications

### 5.2. STORAGE AND TRANSPORTATION

- 5.2.1 Monitoring
- 5.2.2 Prevention
- 5.2.3 Intervention





## The Goal of Measurement

- Enforce policy by controlling
- Monitor **progress** and measure **impact**
  - Can be used as feedback to **adapt** policy if needed
  - Can be used to **motivate** farmers



## Measuring the Problem vs. the Solution

- Measuring reduction of the **Problem**  
Pesticide Use, Presence and Effects
- Measuring the **Solution**  
IPM Activity and Impact



## Measuring reduction of the Problem

- Pesticide **effects** ?
  - on the environment : biodiversity, bees, ...
  - on agriculture : ecosystem services, resilience of agroecosystems, productivity, natural resources, pesticide resistance, ...
  - on public health : number of worker accidents, pesticide related diseases, ...
- Pesticide **presence** ? (records from retailers, NGO's,...)
  - in the environment : in water, soil, organisms, ...
  - residues on food, in drinking water, in humans
- Pesticide **input** ? (records from farmers)
  - type of active ingredients
  - amounts used

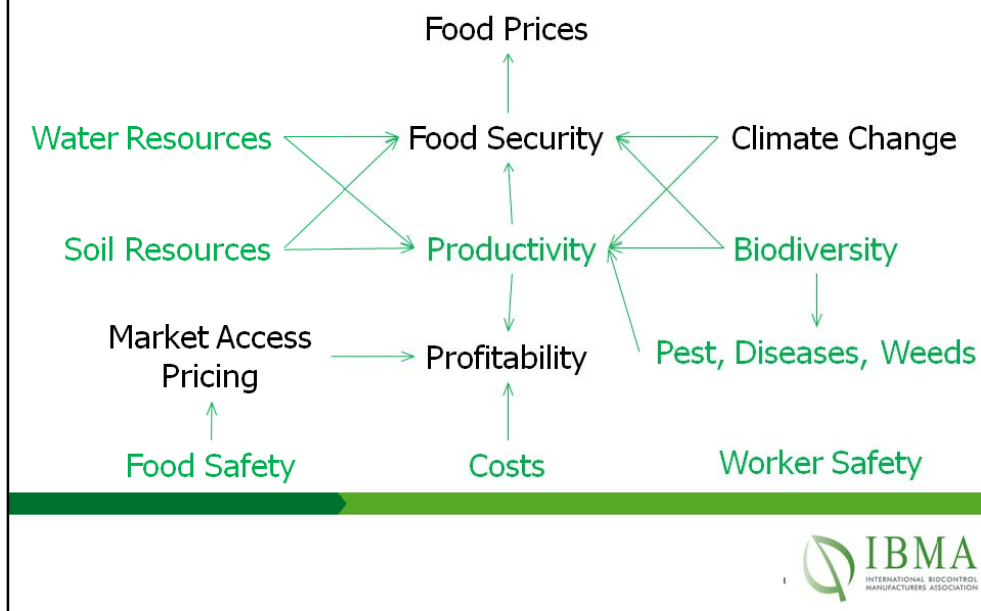


## Measuring the Solution

- IPM **Activity** (uptake, implementation, means, effort)
  - Level and extent of implementation of IPM tools and strategies (cfr. IPM Toolbox)
  - Use existing certification programs : e.g. GlobalGAP, SESAME (IOBC), etc.
- IPM **Impact** (effects, results, performance)
  - Reduction of pesticide use and residues
  - Reduction of negative effects of pesticides
  - Effect on productivity, soil, water, biodiversity, food safety, food security, pricing, ...



## IPM has Impact on ...



## How to measure in the most effective and efficient way ?

- **efficient** = with the least amount of effort, cost and bureaucracy; ideally without any measuring or controlling.
- **effective** = yielding the highest amount of relevant information.

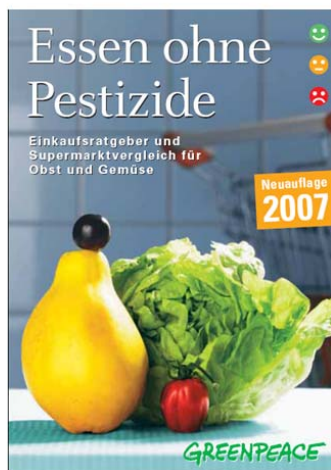
## Do we even always need to measure at all ?

*How to design policies without any need for measurement or controlling?*

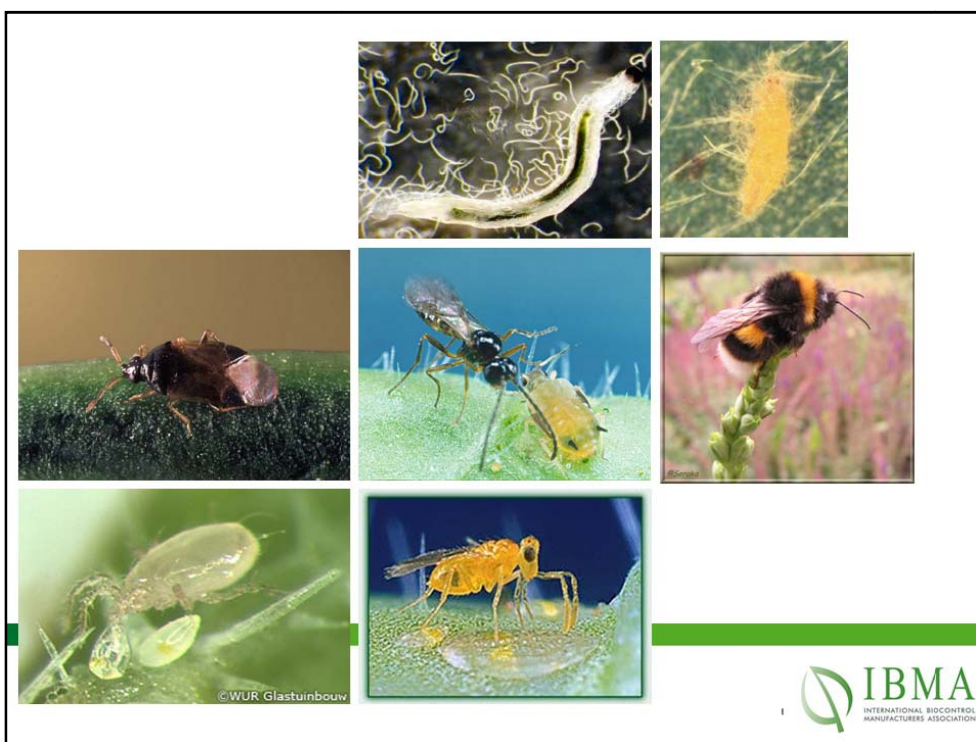
### Example : **crop rotation**

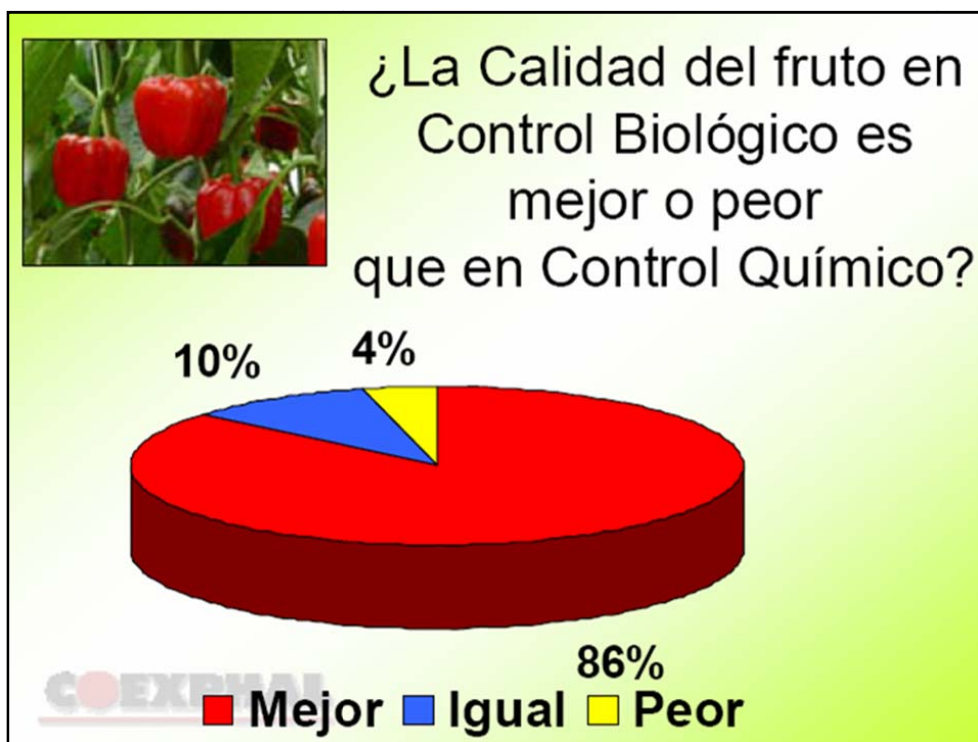
- Farmers can afford not to do crop rotation because of the availability of chemical soil disinfection products.
- Eliminating these soil disinfection products will force farmers to return to crop rotation without the need for controlling or measuring.

## The Invisible Hand ?









### **“Necessity is the mother of invention”**

- Necessity unleashes innovation
- Create necessity to cause change
- From push (which requires controlling) to pull
- Provide resources to enable change
  - Knowledge : extension, training & education.
  - Tools : public and private research, access to biopesticides.
- Tax on pesticides to fund research on IPM

## Recommendations

- **Farmers**
  - Listen to the needs of societies.
  - If you have a problem, demand help. Seek knowledge.
  - Support and direct research.
- **Regulators**
  - Do not accept illegal pesticide use.
  - Continue to support research on IPM.
  - Provide resources to enable change : research, extension, regulation of biopesticides, Access & Benefit Sharing.
- **Supermarkets**
  - Reward farmers that make an effort.
  - Work with farmers as partners.



**Thank you !**







**Okanagan-Kootenay Sterile Insect Release (SIR) Program – A Successful Area-Wide IPM Program**

*By Cara McCurrach, Canada/ Okanagan-Kootenay SIR Program, British Columbia)*



## **Okanagan-Kootenay STERILE INSECT RELEASE PROGRAM 1991-2011**

---

### **A Successful Area-Wide IPM Program**

Cara McCurrach  
General Manager, OKSIR PROGRAM  
Kelowna, BC, Canada

Presentation to the OECD Workshop on IPM  
Berlin, Germany October 16-19, 2011

[www.oksir.org](http://www.oksir.org)



## **A SUCCESSFUL AREA-WIDE IPM PROGRAM**

---

- **COMMITMENT**
- **CO-OPERATION**
- **STRONG ORGANIZATION**

- Mandate
- Governance and Funding
- Program Services
- Measuring Success
- Success Factors
- Challenges and Opportunities
- Summary

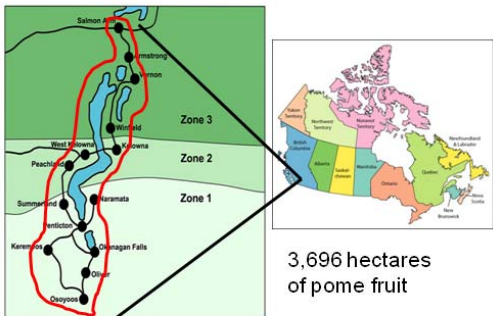




## MANDATE

To keep codling moth below economic levels through delivery of an efficient, effective and sustainable area-wide pest management program.



3,696 hectares of pome fruit



## GOVERNANCE and FUNDING

- Board of Directors
  - ✓ 5 local elected officials and 3 growers
- Operations Advisory Committee
  - ✓ technical and regulatory advisors
- Funded through Municipal Taxation
  - ✓ property tax assessment – all properties
  - ✓ grower parcel tax on planted acreage
- Annual Program Budget
  - ✓ \$3,2 million CDN (€ 2,2 million)





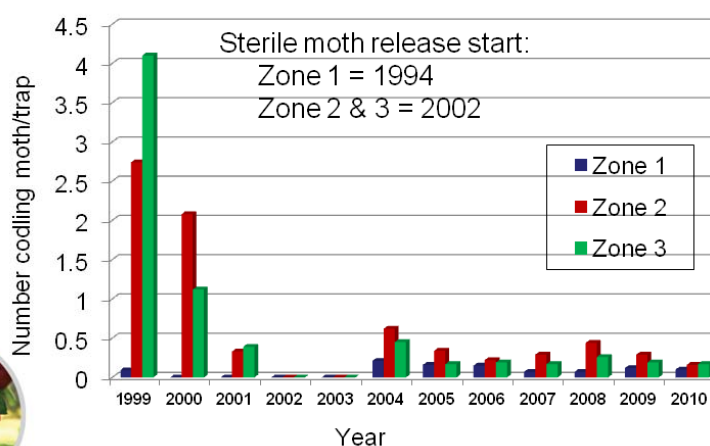

## PROGRAM SERVICES

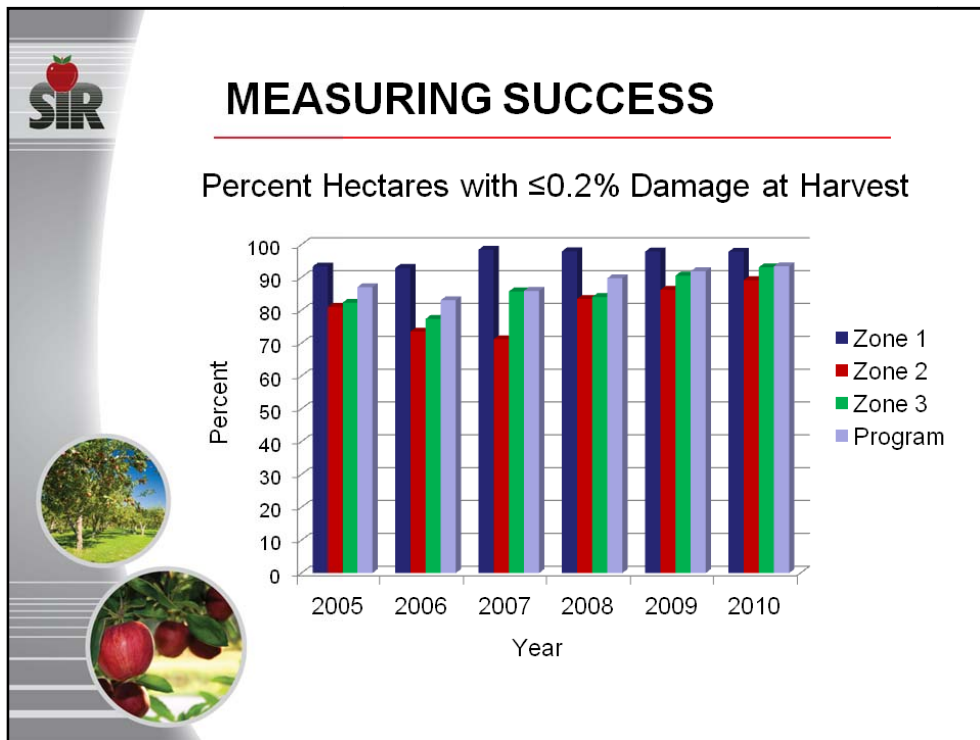
- Mandatory Area-wide Control Application
  - ✓ weekly sterile moth release or mating disruption
- Surveillance
  - ✓ pheromone traps, fruit damage, banding, visual inspection
- Enforcement
  - ✓ inspection, fruit stripping, tree removal
- Education
  - ✓ publications, newsletter articles, website, field visits, meetings



## MEASURING SUCCESS

Changes in Average Codling Moth Captures/Trap/Year





**SIR**

## MEASURING SUCCESS

Changes in Codling Moth Product Sales  
1991-2010

| Control Products | Kg or L sold/ha |      | Percent Change |
|------------------|-----------------|------|----------------|
|                  | 1991            | 2010 |                |
| All products     | 5.4             | 0.9  | - 83%          |
| Organophosphates | 5.4             | 0.4  | - 92%          |

*Data derived from sales by Grower Supply Co. Ltd. and reported to the BC Ministry of Environment.*





## SUCCESS FACTORS

### Strong Organization

- Consistency in delivery of services for area-wide management
  - ✓ Application of mandatory control
  - ✓ Authority to access all properties
  - ✓ Surveillance system
  - ✓ Authority to enforce control





## SUCCESS FACTORS

### Co-operation

- Collaborative education activities with industry to promote codling moth best management practices
- Collaborative research and technical advice to improve program services

### Commitment

- Growers and industry organizations support
- Ongoing local government and citizen support
- Dedicated and committed Program staff






## CHALLENGES

- Philosophical differences among growers
- Maintaining adequate funding levels
  - ✓ local government support
  - ✓ decreasing pome fruit hectares
- Increasing value to stakeholders(clients)
- Threat of new pests
  - ✓ (e.g. apple maggot, brown marmorated stink bug)



## OPPORTUNITIES

- More cost effective control methods
- Addition of other pests
- Recognition as Area of Low Pest Prevalence
- Other funding sources





## SUMMARY

- Establishment of an effective structure for delivery of area-wide pest management
- Suppression of codling moth to sub-economic levels = reduced reliance on pesticides
- Improved opportunities for biological control
- Dedicated enforcement for growers
- Documentation of pest prevalence
- Improved earlier detection and response to new invasive alien species



Okanagan-Kootenay  
STERILE INSECT RELEASE PROGRAM 1991-2011

## A Successful Area-Wide IPM Program

- COMMITMENT
- CO-OPERATION
- STRONG ORGANIZATION

*THANK YOU FOR YOUR ATTENTION.*



[www.oksir.org](http://www.oksir.org)