



Using systems approaches for market access

Rieks Van Klinken
Principal Research Scientist
CSIRO Health & Biosecurity

What is a systems approach?

A **pest risk management option** that integrates different **measures**, at least two of which **act independently**, with cumulative effect.

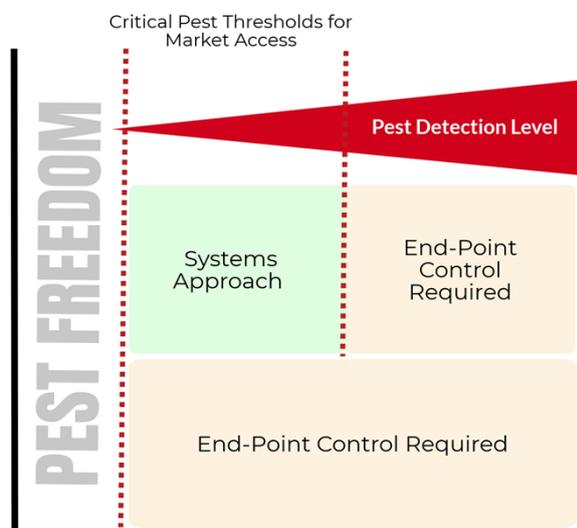
Or:

A combination of management actions that achieve an equivalent result as an end-point treatment.

Phytosanitary measure: Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests.

-International Standards for Phytosanitary Measures (ISPM), produced by the Secretariat of the International Plant Protection Convention, FAO

Options for accessing markets



What approach to take?

- Improved market access (including flexibility)
- Beat competitors to market
- Improve fruit quality (price and reputation)
- Maximise shelf life (shop and post-sale)
- Food safety
- Minimize costs
- Reduced business complexity

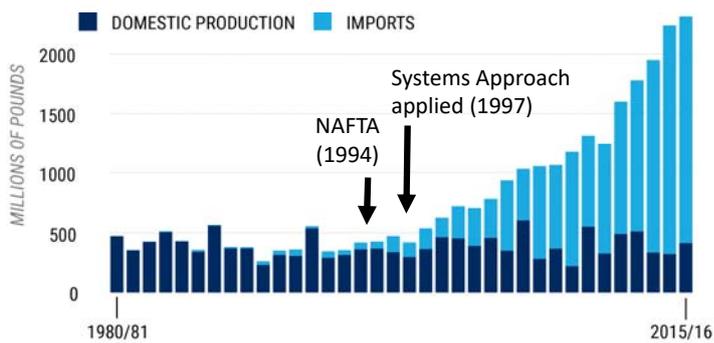
Systems Approaches are widely used: internationally

- Unshu oranges exported from Japan → USA
 - Target pests: citrus canker, citrus greening
- Citrus exported from South Africa → European Union
 - Target pest: false codling moth
- Apples exported from Europe → USA
 - Target pests: leaf miner, pear leaf blister moth, plum fruit moth, summer fruit tortix moth, leaf roller
- Cherry, peach, nectarine exported from USA → Japan
 - Target pest: codling moth
- Ya pear (sand pear) exported from China → USA
 - Target pests: chocolate spot, fruit flies, pear fruit moth, Hawthorn spider mite, peach fruit moth, Japanese wax scale, red wax scale, Manchurian fruit moth, yellow peach moth, Guignardia canker, brown rot, mealybug, pear scab
- Hass avocado exported from Mexico → USA
 - Target pests: Mediterranean fruit fly, Mexican fruit fly, and others

Hass avocado systems approach: Mexico to USA

U.S. AVOCADO SUPPLY

U.S. imports of avocados, predominantly from Mexico, have increased drastically over the last 15 years to keep up with demand.



Source: USDA
GRACE DONNELLY/FORTUNE

Pests: Med fly and Mexican FF (*Anastrepha ludens*)

Measures

- All contiguous orchards pest free
- No fallen avocados or dead branches
- Post-harvest protection
- Post-harvest sampling (dissection)
- Refrigerated, secure transport

Benefits to Mexico (exporter)

- X 5 production increase
- 200% increase to Europe (side benefit)

Benefits to USA (importer)

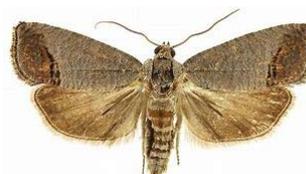
- Year-round avocado
- No pest interceptions
- \$2.2 b GDP; \$1.2 b labour income; \$0.6 b tax
- 18,695 jobs to the US economy in 2015

Systems approaches are being used: Australia

Systems approach is utilized in new bilateral stone fruit trade with China.

Measures

- Orchard controls and sanitation requirements
- Trapping and monitoring surveys with corrective actions on detection
- Pre-export inspection



Systems Approaches are widely used: other industries

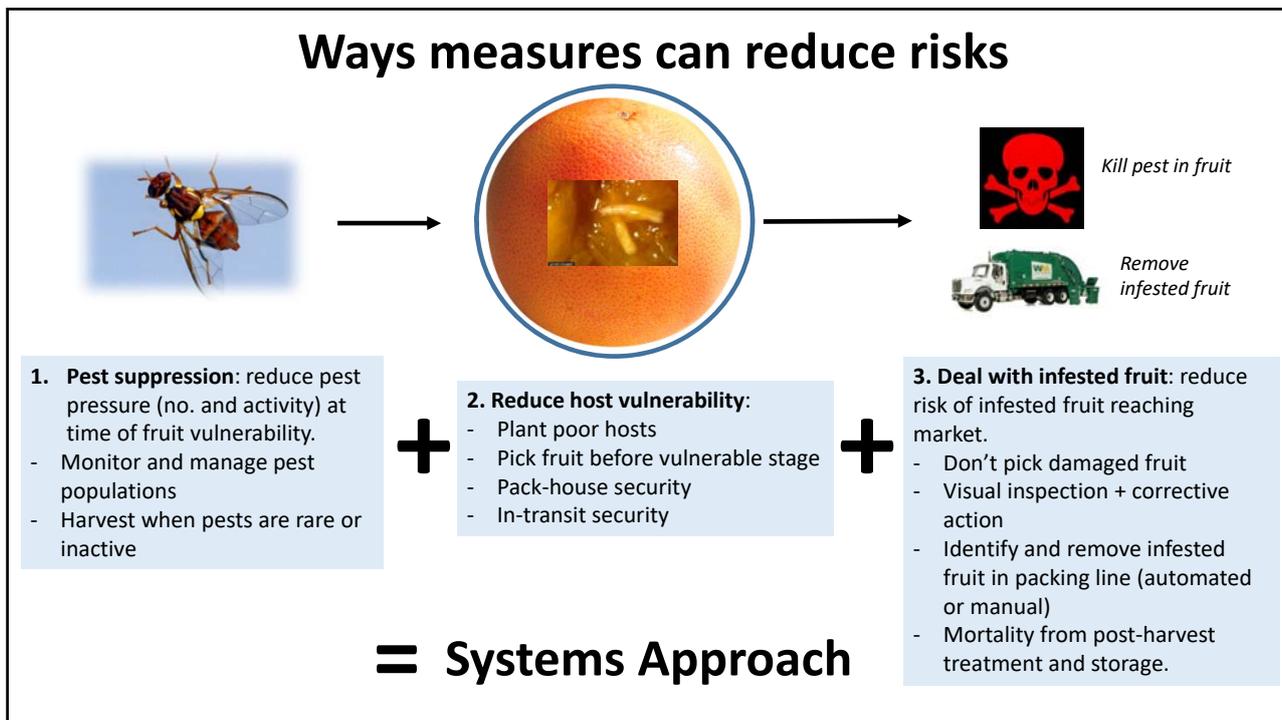
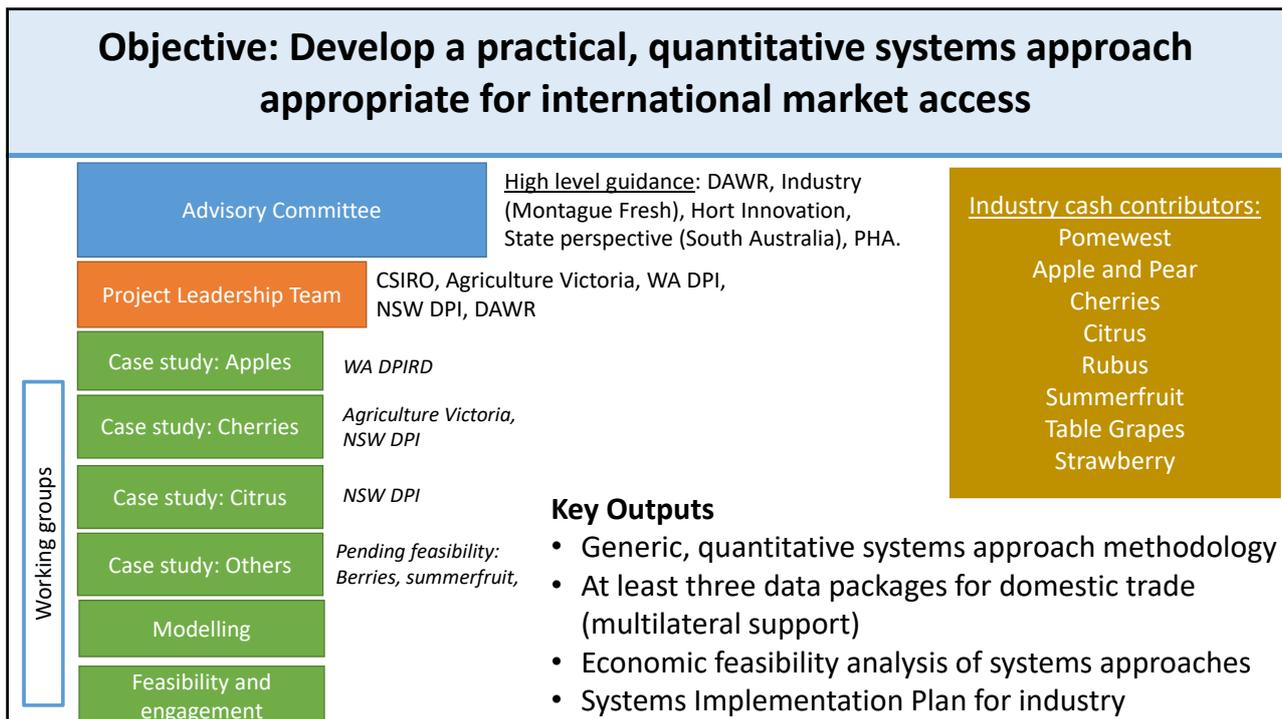
- **Seed**
 - CABI: Good Seed Initiative (Africa and Asia)
 - International Clean Seed Pathway (under development)
 - USDA APHIS: Soybean and corn seed systems approach production
- **Nursery**
 - Boxwood Blight Cleanliness Program (USA)
 - Guatemala's Geranium propagation program to USA
 - Systems Approach to Nursery Certification (USA)
 - Nursery Industry Accreditation Scheme Australia
- **Cut Flowers**
 - Cut flowers and foliage, Southeast Asia → Australia

Our project: Systems approaches for horticultural market access (2018-2021)

Outcomes:

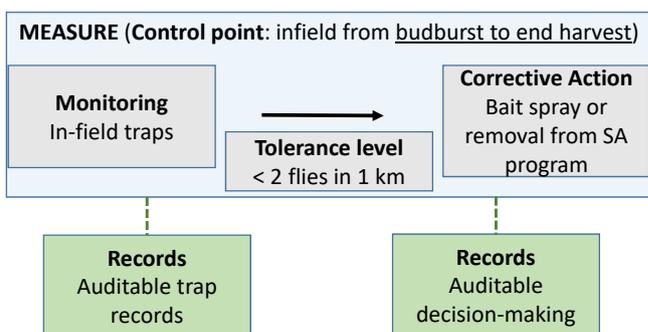
- 1) *Improved domestic and international market access for fresh produce.*
- 2) *Reduced disinfestation costs and chemical usage.*
- 3) *Improved pest management systems, fruit quality and shelf life.*

- A national project that requires multi-lateral support to be successful.
- Aim to develop an easily adaptable, generic approach that is applicable to any commodity, pest, growing region or market.
- Initial focus is to assist domestic market access.
- Ensure elements in place to be applicable to international markets
- Need to be innovative: Industries, markets, supply chains, technology and regulatory environment can all change fast.



Measures that suppress pests: cherry example

Objective: ensure adult pest numbers are acceptably low when fruit is vulnerable to attack



Associated measures that contribute to risk reduction:

- **Cool winters** that contribute to low pest activity and reduction in mating
- **Pre-season confirmation of pest absence** (with corrective action)
- **Pre-winter** spray and farm hygiene to minimise over-wintering FF population (discretionary)
- **On-farm quarantine** practices to prevent movement of pests from elsewhere (discretionary)

Validation of measure [= data package]: consolidated work captured under the Fruit Fly Code of Practice. Three + years of farm-scale demonstration with trial domestic exports – conducted and analysed. Quantitative risk analysis.

**Systems approach originally designed by NSW DPI, CGA, and Ag Vic*

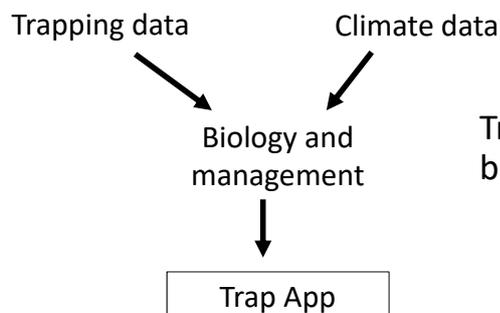
Pre-harvest pest suppression measures: Implementation

Measure:	Pre-harvest monitoring
Description	Monitoring with corrective action
Purpose	Demonstrate FF density/ activity is acceptably low
Dependence	Independent
Control point	On farm: budburst to harvest
Preventative action	Other measures and discretionary management
Monitoring	Approved trap method, lay out and frequency
Tolerance level	1 fly in trap/2 weeks within 1 km.
Corrective action	Bait spray (1 fly) or exclusion from SA program 2-4 fly)
Verification (of measure application)	Third party assurance. Record keeping. State audit.
Validation (data package)	Historical trapping data to show it is possible. Data to justify trap threshold.

Described using HACCP principles (Hazard Analysis and Critical Control Points)

**Systems approach originally designed by NSW DPI, CGA, and Ag Vic*

Trapping data underpins most FF systems approaches: developing a “trap app”



Trap App development to get better value from trap data

- Farmers
- NPPOs
- Trading partners

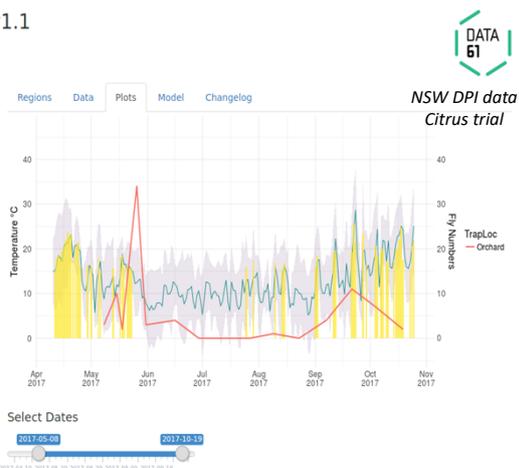


At the exploratory phase: what is most useful?

Trap app: Climate and pest populations

Orchard Data Summaries v1.1

Dataset: Citrus 2017
Select the Orchard: CA19_08
Contact: matt.hill@csiro.au



Understanding pest populations on property

- Red line: trap catches
- Grey: daily max/min
- Yellow: >15°C at sunset (suitable for mating)

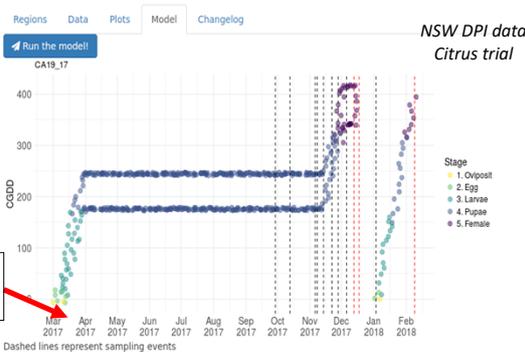
In this case a big pre-winter peak in flies has resulted in flies being caught throughout winter

Trap App: When did trapped flies hatch?

Orchard Data Summaries v1.1



Dataset: Cherries 2017/18
 Select the Orchard: CA19_17
 Contact: matt.hill@csiro.au



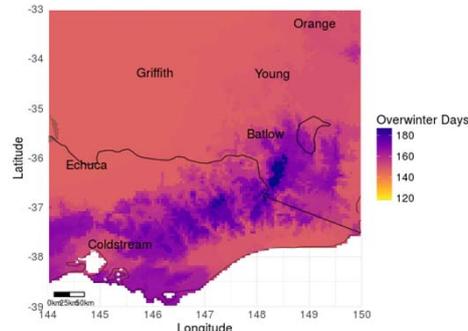
- Reverse day degree model from trap catches
- Dotted lines = trap events
- Red lines = flies caught
- Displays minimum time needed to complete generation (over-wintering triggers and development)

Working out what went wrong can help you manage pests better in the future

Climate modelling to identify seasonal pest absence

Seasonal Climate Summaries Custom App

Select Crop: Apples Cherries Citrus
 Select Season: 2015/16 2016/17 2017/18



- Overwintering days =

$$\sum \text{days between } 5 \text{ days } < 18^{\circ}\text{C} \rightarrow 5 \text{ days } > 18^{\circ}\text{C}$$

- Still improving population modelling and seasonal forecast data

Help identify areas most amenable to seasonal pest absence, and how often those conditions are met.

How can you help systems approaches achieve its promise?

- Help us better engage with your industries (farms and supply chains)
- Help us understand your business and new innovations
- Communicate with our team about research gaps and application challenges
- Participate in collaborative research and pilot trials
- Encourage industry groups to participate in case studies or establish similar state-level projects.

Acknowledgements

Initiators of systems approach case studies
and data collection:

- New South Wales DPI
- Agriculture Victoria
- Western Australia DPIRD
- Cherry Growers Australia Inc.

- Project Lead: Dr Rieks van Klinken
rieks.vanklinken@csiro.au
- Engagement Officer: Dr Kate Fiedler
kathryn.fiedler@csiro.au



Department of
Primary Industries



Department of
Primary Industries and
Regional Development

Hort
Innovation



ASIAN MARKETS
FUND

AGRICULTURE VICTORIA

pomewest
Serving WA Pome Growers