Presentation by Hilde Wustenberghs
for the Benelux Society for Horticultural Science
symposium “IPM in horticulture: research for practice”
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2 parts in this presentation:
1. What is DICUSS and how was it developed?
2. Some preconditions for bringing the tool into practice.

The indicator development was a joint effort of
• Social Sciences unit of the Institute for Agriculture and Fisheries Research
• Department of Crop Protection of Ghent University

It is currently being tested in collaboration with
• The Research Station for Fruit Growing (PCFruit)
Goal
To construct an indicator for sustainable crop protection to be used on farms
• not an instrument for national action plan evaluation or for sector evaluation
• farms in the broad sense: from glasshouse horticulture, over tree fruit to arable crop production

The indicator we want to develop for sustainable crop protection needs to serve a dual purpose:

1. Monitor the farms’ crop protection sustainability
   and support decision making
2. Be fit for a social learning process
   e.g. in discussion groups of fruit growers, facilitated by an advisor,
   where the indicator results make up the starting point for the discussion
   and farmers learn from each other and the advisor about measures for improvement
We set up an interactive methodology that combined a participatory approach with desk-top research. Results of each step feeding back to the next

Participatory process ⇒ expert driven development process!

While the researchers guaranteed the scientific soundness of the indicators, the other experts were often more closely related to farming practice and ensured that the indicators are adapted to the local concerns.
1.2. Conceptual framework

• Definition

A sustainable crop protection minimises the effect on non-target biota. It has no unacceptable impact on human health nor the environment.

• Requirements at farm level

- Avoid chemical crop protection (prevention, alternative protection,...)
- If chemical treatment is inevitable, choose the least harmful PPPs
- Comply with PPP legislation
- Avoid PPP resistance
- Take safety precautions: operator + third-parties
- Avoid point pollution
- Avoid diffuse pollution

What is “sustainable crop protection” anno 2010?

1. Definition

2. What does this mean at the farm level?

What elements should farmers take into account when protecting their crops from pests, diseases or weeds?

⇒ 7 requirements

↓

IPM principles & more!
Sustainability beyond IPM
How can these requirements of farm level sustainable crop protection be measured? Which indicators can we use? (and are available at reasonable cost)

Together with the experts we made a choice between all available indicators...

- Choosing the least harmful PPPs, the ones that exert a little pressure as possible
  - PIAS: Pesticide Impact Assessment System
  - POCER (Pesticide Occupational and Environmental Risk indicator)
- The other elements of sustainable crop protection = can not be measured directly
  - Inquiry on management practices

In the DPSIR cause-effect chain we now have indicators for
- pressure exerted by chemical crop protection products
- responses to mitigate this pressure
We thus came to a **dual indicator set** with

**On the one hand POCER**
which assesses the risk for 12 compartments
- 4 human health
- 8 environmental compartments and biota

**On the other hand an inquiry**
with questions on 12 themes, concerning
- knowledge, awareness and attitude
- integrated pest management
- human safety
- environmental protection

The themes were derived from the individual interviews with experts and later validated in the focus group.
There the original inquiry was shortened by eliminating non-essential questions.
1.6. Additional information

Paper:
A dual indicator set to help farms achieve more sustainable crop protection
Pest Management Science 68 (8): 1130 - 1140
doi: 10.1002/ps.3332

Additional information can be found in our paper in Pest Management Science
Second part: preconditions

**How do we take DISCUSS off the design table and into practice?**

How to take it to the person trying to protect his/her crops from diseases, pests or weeds.
Database needed for the calculation of POCER

1. The **Compound database** contains the physico-chemical properties and toxicological properties of the compounds, e.g. dermal absorption, degradation rate, LD50, ... These need to be compiled from EU admission files, EFSA, literature, ...

2. The **Usage database** contains the regional and farm level use data
   - National formulation admission conditions, e.g. risk mitigation parameters
   - Farm data, e.g. dose rate

Compiling this database is a time consuming effort!
But once realised, calculation of risk indicators becomes relatively simple.
In this stage our **most important stakeholders** are involved

**Cognitive interviews:**
Test whether

- Questions and instructions are unambiguous: are they understood/interpreted in the same way by all test persons? Is any information missing?

- Are questions and statements clear? E.g. Are questions too lengthy? Are technical terms understood sufficiently? E.g. “surface water”

- Recall problems: the respondent may not remember the information asked for. He/she might have computation problems. E.g. Share of fields adjacent to surface water ↔ sensitive to erosion

- Sensitive content & socially acceptable response should be avoided

- Response categories: mismatch with the question, missing eligible response categories, ...

- Technical issues are not strictly the subject of cognitive interviews, but in this case some did come up!

The initial implementation phase is very important: Not only do farmers learn about the sustainability of their practices and means for improvement, the indicator designers also learn about refining the tools and about appropriately bringing them into practice.

2.3. Inquiry length

- 12 themes, subthemes, several questions/statements per theme
  - very long questionnaire
  - Can we reduce it?

- Test with PCFruit growers
  - internal consistency
  - correlations between themes/questions?
  - min. 30 responses for significant statistics
The graphs show the answers of 10 random fruit growers on a scale from 1 to 5.

Example 1: DRIFT

1. **Statement** concerning awareness of pollution by drift:
   - 1 = don’t agree at all ↔ 5 = fully agree

2. **Questions** concerning actions taken for drift mitigation:
   - 1 = never ↔ 5 = always

In this example there clearly is a good correlation between both. This was probably caused by PCFruit’s “away with the cloud” campaign.
Example 2: POINT POLLUTION

1. Statements
   1. common statement on tank spillage
   2. more provocative

2. Actions taken concerning mitigation

⇒ Relation between both is far less clear!
In a 2012 study by ILVO and PCFruit “fruit farm sustainability” was defined by the themes shown:

Crop protection is only one aspect of farm sustainability!

DISCUSS / crop protection sustainability is preferably seen as part of an integrated farm sustainability assessment.
Group interaction with peers fosters learning about the sustainability of farming practices and more sustainable alternatives. In such a group setting knowledge can be acquired, but also changes in attitude, norms, perceptions and behaviours can take place. Indicators are believed to have the capacity to support this social learning process.

As opposed to

- INDIVIDUAL ASSESSMENT: the advantages of group discussion are lost, no social learning can take place and all the burden of knowledge transfer is put on the advisor, as no peers are present to exchange ideas with.
- LARGE GROUP ASSESSMENT: interpretation of the indicators and learning about alternatives are likely to suffer, as again the advantages of group discussion and advisor coaching are lost. After all, contact between the advisor and group members decreases with increasing group sizes, contact between peers is often insular and group discussions are often dominated by few.

Advisor also needs moderating skills!
Thank you for your attention!

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