PRIBEL: a Pesticide Risk Indicator for the BELgian situation

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CERVA

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Overview

- Principles of PRIBEL
- Methodology of PRIBEL
- Results
- Future of PRIBEL

1. Principles of PRIBEL: objectives

- Development of a multi-impact indicator for the Belgian situation
- Evaluation of the pesticide impact reduction in frame of the Federal Pesticide Reduction Programme
- Spatial aggregation and aggregation of the active substances in pesticide groups and crop groups

1. Principles of PRIBEL: concept

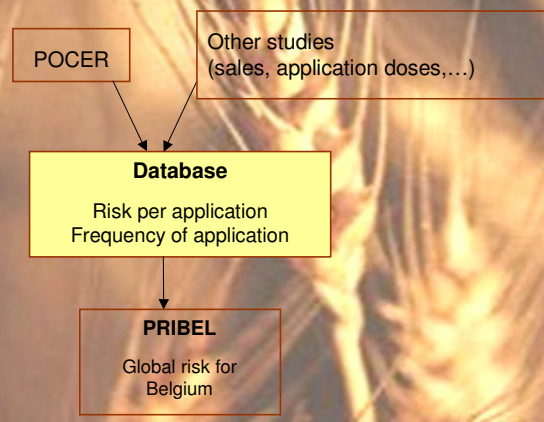
- Overall principles: acceptance criteria from 91/414/EC, Annex VI
- POCER (12) → PRIBEL (7)
  - ❑ applicator
  - ❑ consumer
  - ❑ water organisms
  - ❑ ground water
  - ❑ earthworms
  - ❑ birds
  - ❑ bees

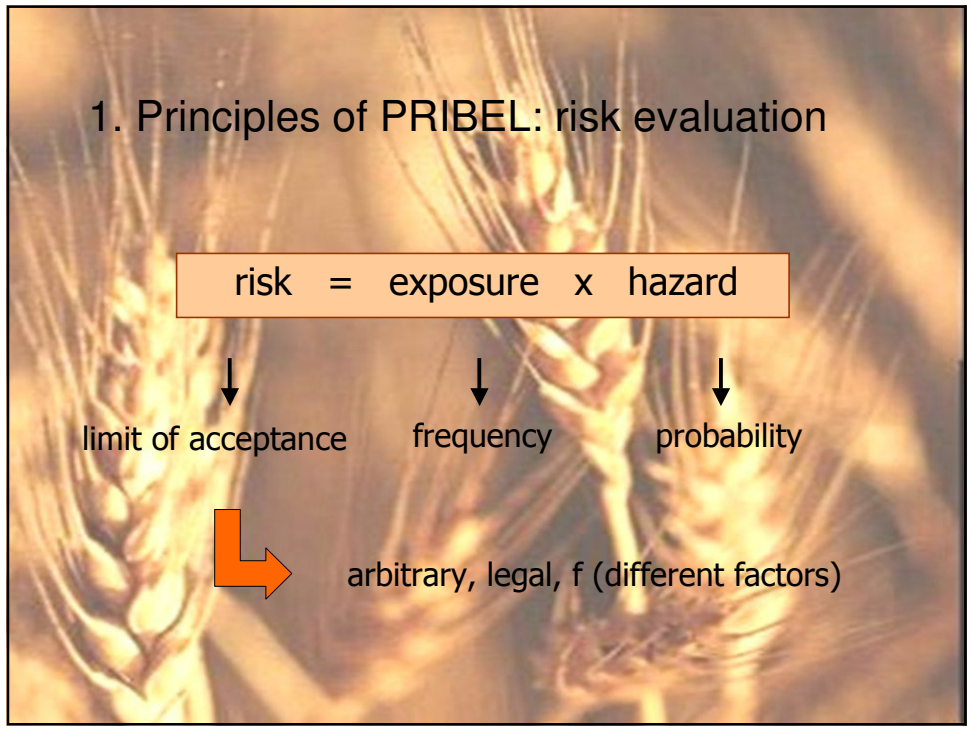
1. Principles of PRIBEL: data sources

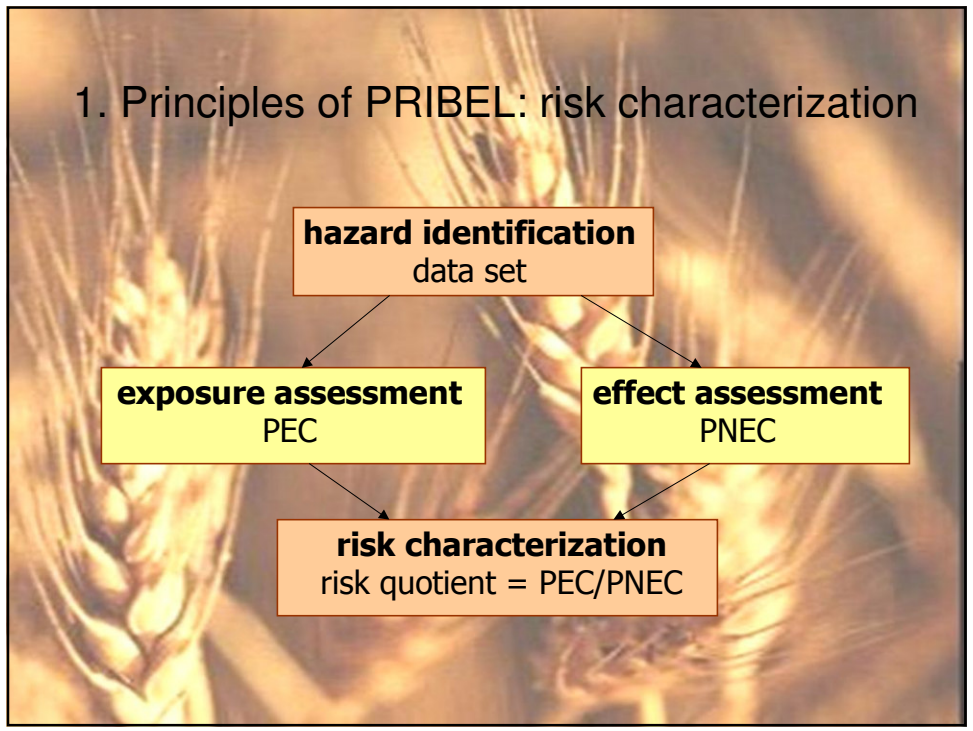
- yearly applied real doses AD (studies Van Lierde)
- sales (federal government)
- application rate AR: (studies Van Lierde)
- (eco)tox data: *adapted* database UGent
  - European endpoints
  - CTB
  - Pandora's box
  - Pesticide Manual
  - ~~companies~~

transparency of PRIBEL

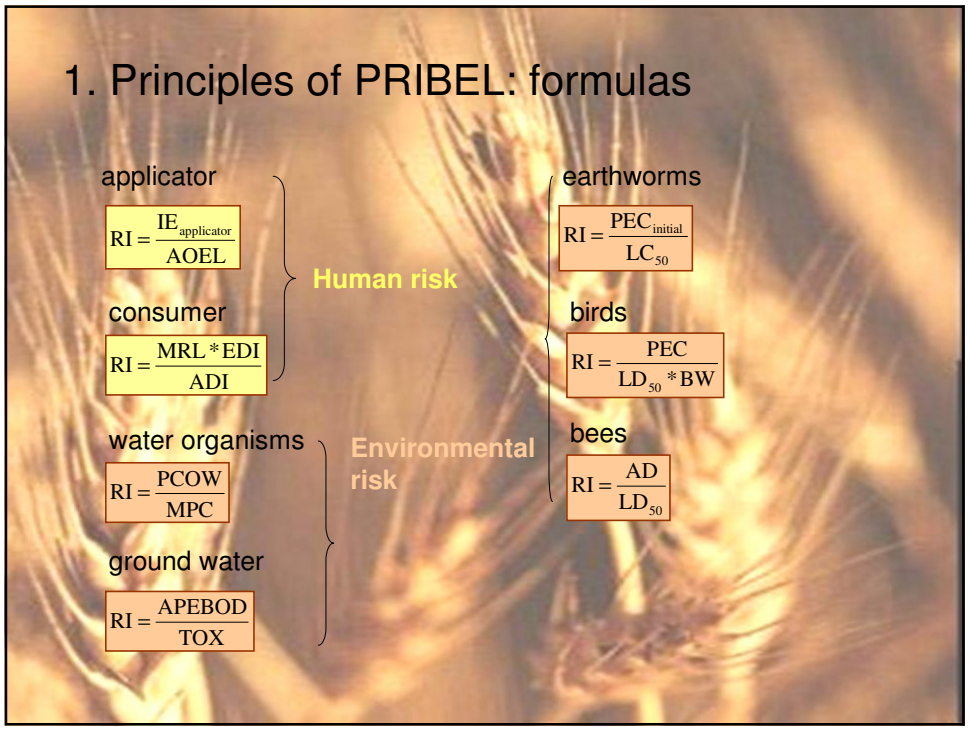
2. Principles of PRIBEL: risk and frequency

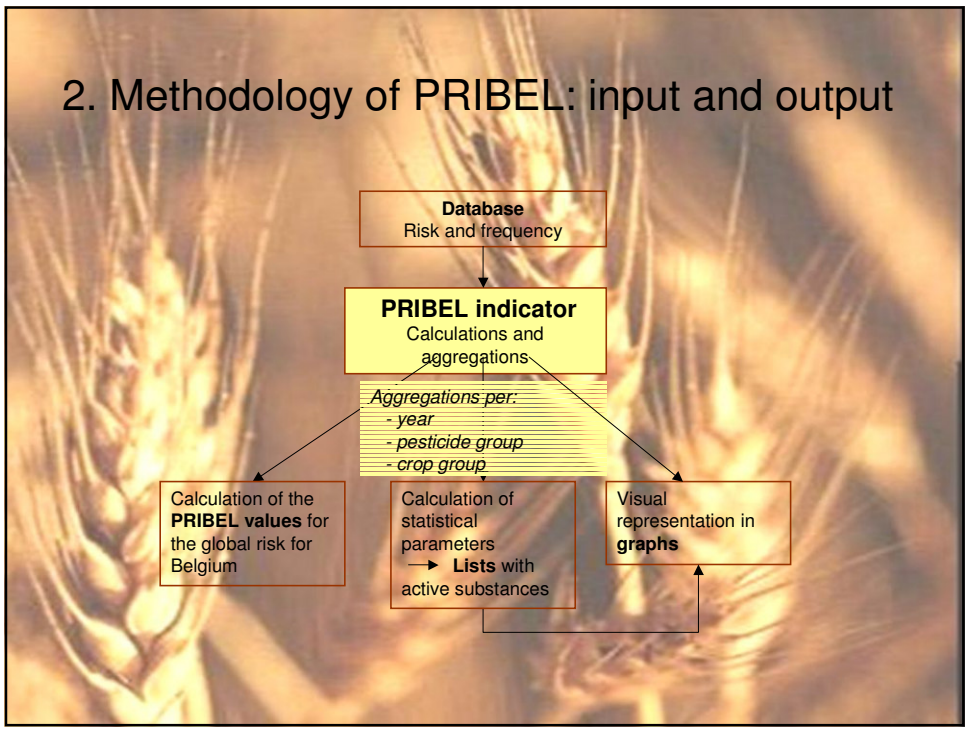



1. Principles of PRIBEL: risk evaluation
risk = exposure x hazard
limit of acceptance
frequency
probability
arbitrary, legal, f (different factors)


1. Principles of PRIBEL: risk characterization
hazard identification
data set
exposure assessment
PEC
effect assessment
PNEC
risk characterization
risk quotient = PEC/PNEC

C. PRIBEL-indicator/Indicateur PRIBEL





2. Methodology of PRIBEL: examples of questions on which PRIBEL can give an answer

- What is, for a particular compartment, the risk caused by all pesticides used in *potatoes*, in comparison with other crops?
- Which pesticide group contains the highest risk for the *applicator* in *maize* in *2002*?
- What is the size of the risk linked to the application of *insecticides* in *cereals* in *2000*, for the compartment *ground water*?
- Which active substance applied in *vegetables* in *2001* creates the highest risk for *water organisms*?
- Which are the 5 fungicides used in *sugarbeet* that imply the highest risk for *birds* in *2001*?

2. Methodology of PRIBEL: examples of questions on which PRIBEL can give an answer

- Which 5 active substances applied in orchard in 2001 involve the highest risk for the consumer?
- What would be the effect of the replacement / elimination of some active substances?
- Compare different schemes from the 14 work groups
- What is the impact of wearing protecting clothes by the applicator?
- Is there an evolution noticeable in the risk over the 3 years considered?

2. Methodology: 3 types of aggregation of total risk in Pribel



- Aggregation by **crop group**:

→ 9 groups: cereals, potatoes, maize, sugarbeet, orchard, vegetables, greenhouse, fodder and industrial crops (flax, colza)


- Aggregation by **pesticide group**:

→ 5 groups: INSE, HERB, FONG, SODE, NPPP

- Aggregation by **year**: 2001 → 2010

3 years: 2000, **2001** (reference year), 2002

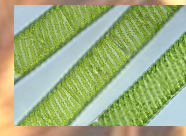
weighted mean

3. Results: examples applicator and water organisms

Applicator

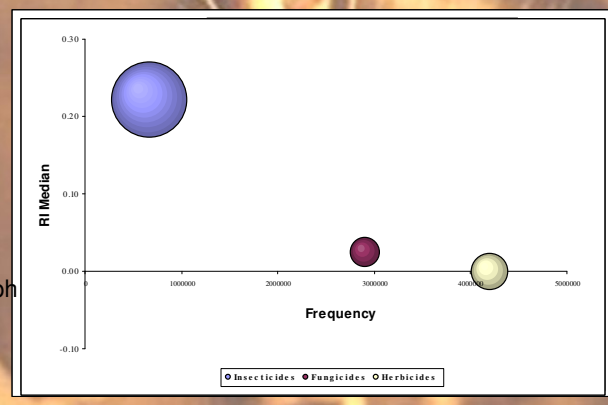


Water organisms

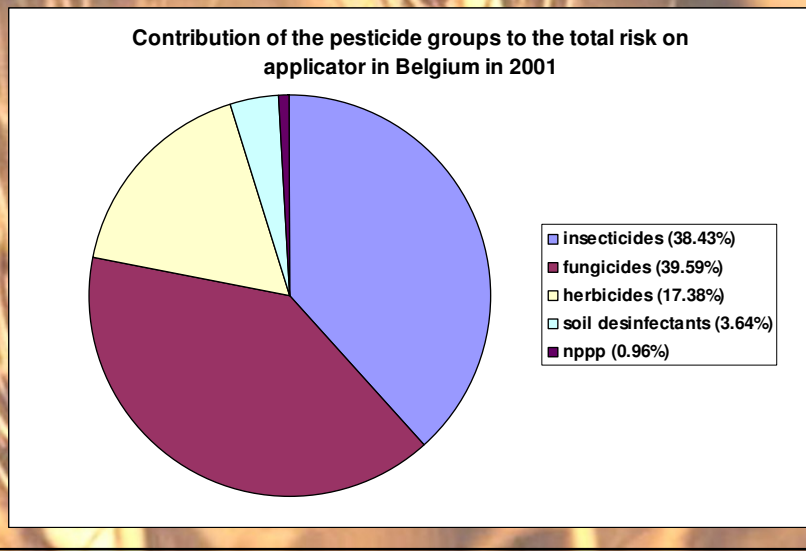
3. Results: calculation principles

- PRIBEL calculates the risk indices for each active substance corresponding to each crop group (~ 8 000 combinations in Belgium)
- connection of the RI's to the frequency database (~ number of applications per hectare and the surface covered by each crop group)
- Four types of graphs are created with the risk indices and the frequency:
  - ❑ Histograms
  - ❑ Pie charts
  - ❑ Boxplot
  - ❑ Bubble graph



3. Results: aggregation of total risk per pesticide group

Pie chart applicator



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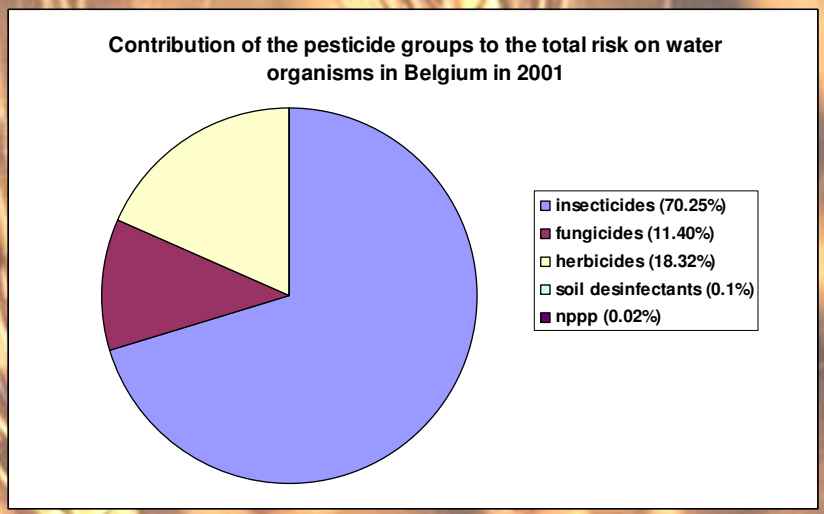
Pie chart water organisms



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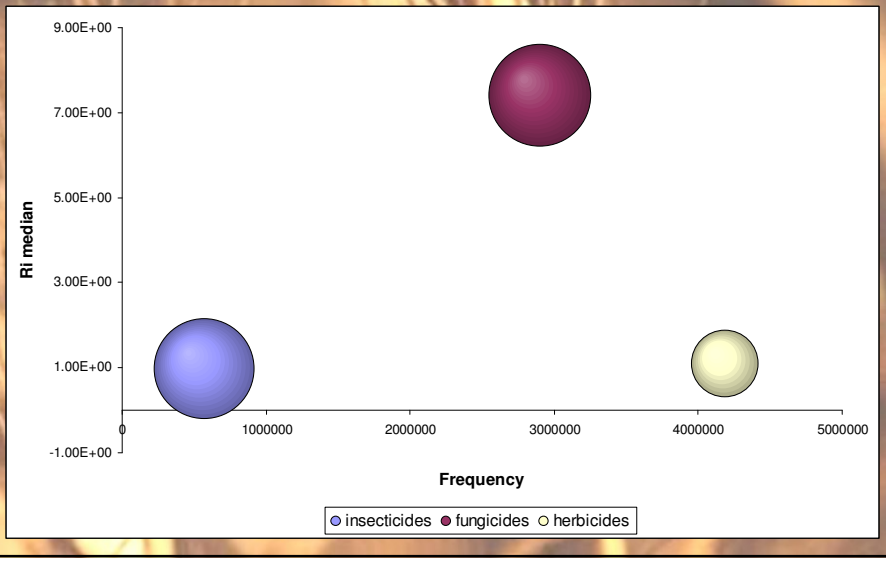
Bubble graph applicator



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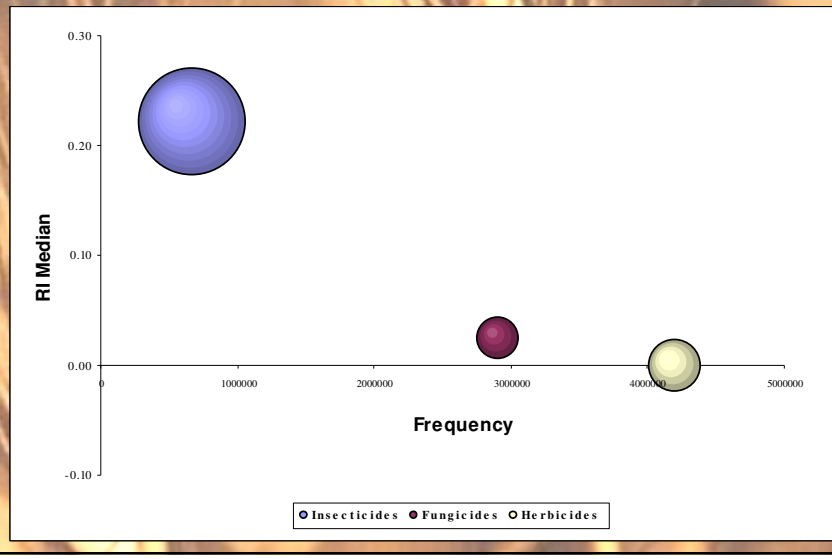
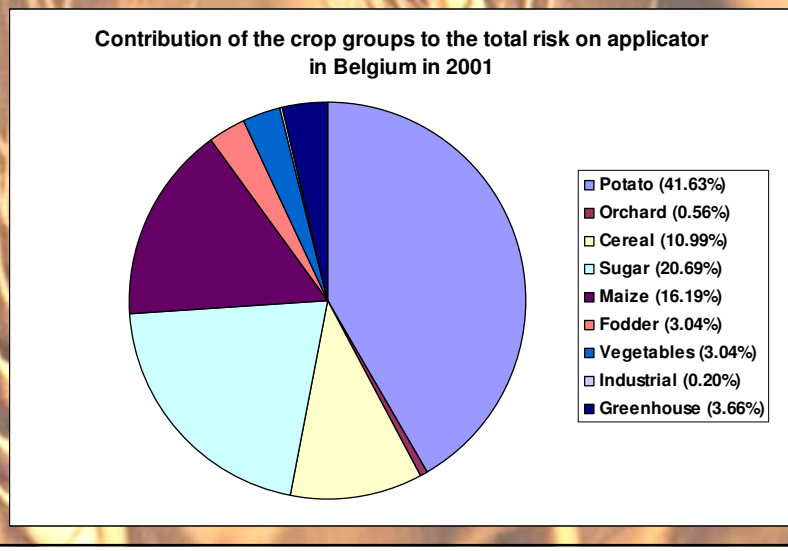
Bubble graph water organisms



3. Results: aggregation of total risk per crop group

Pie chart applicator



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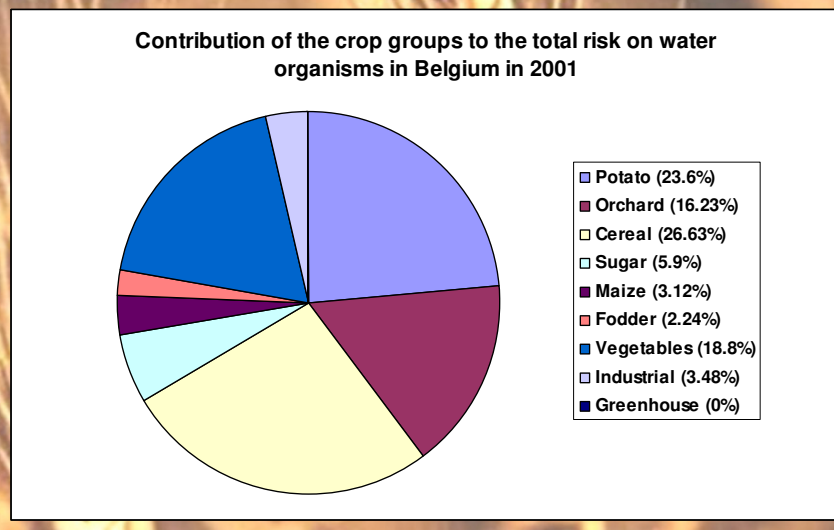
Pie chart water organisms



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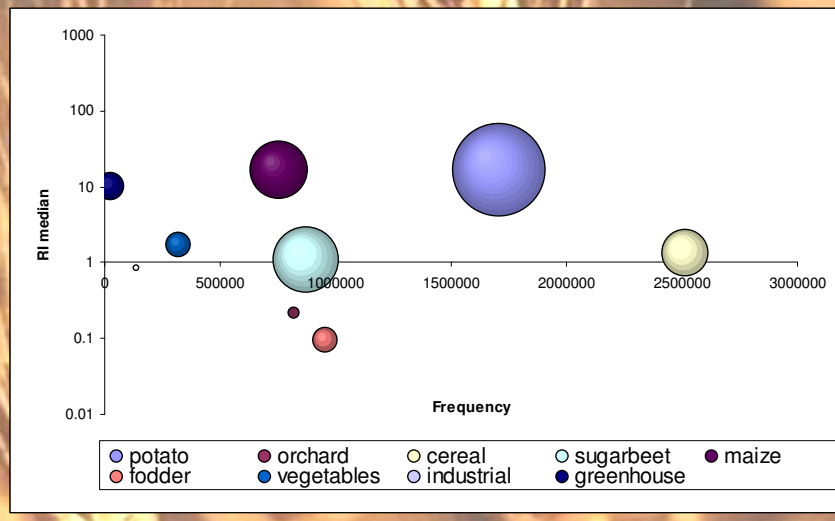

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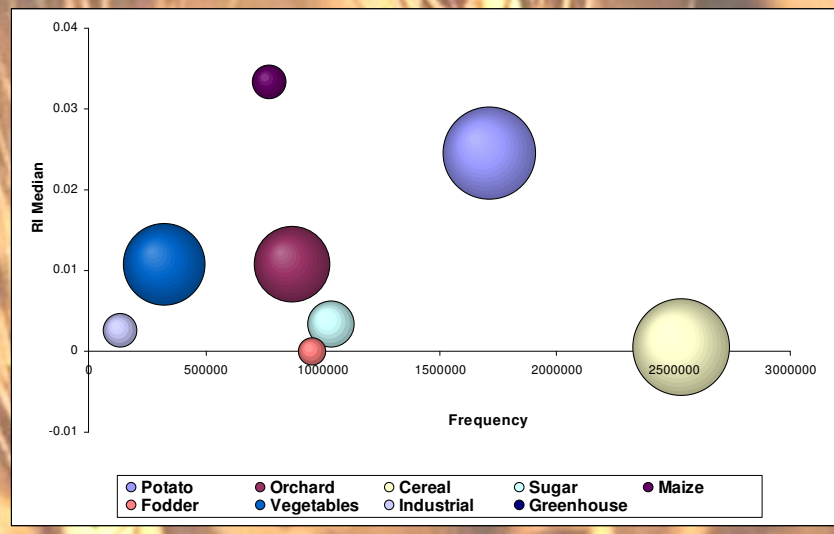
Bubble graph water organisms



4. Future of PRIBEL

This was only the beginning…

- Evaluation of the results
  - ➡ Federal authorities
  - ➡ Group of experts
  - ➡ Conclusions and proposals of 14 work groups
- Yearly evaluation of PRIBEL

  1991, 1996, 2005…
- Deterministic ➡ probabilistic level