Responsible Application of Plant Protection

Contract Farming of

Spinach

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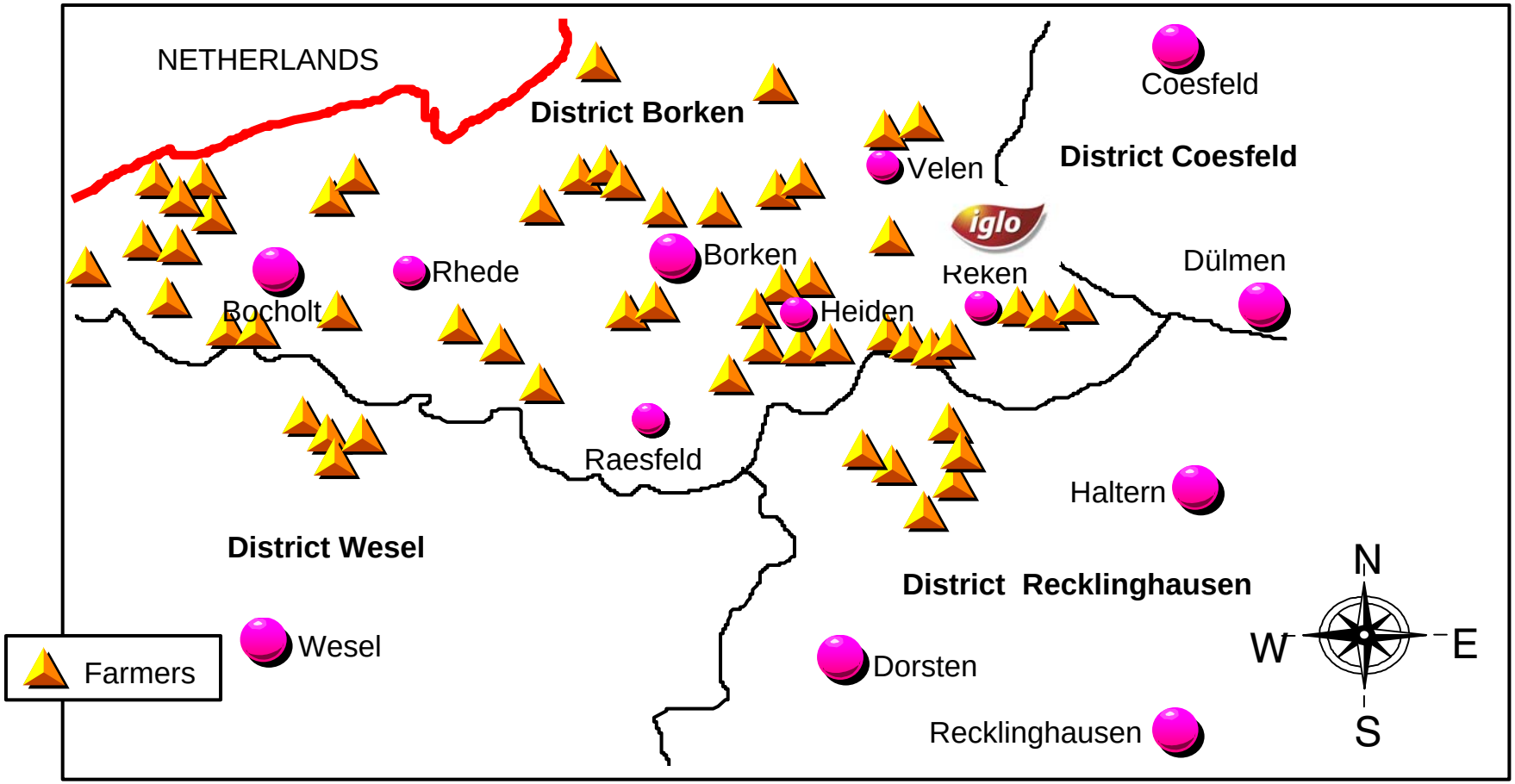
Contract Growing of Spinach
- Geographic Position -



Contaminants Control Cultivation Principles

- iglo vegetables are from contract farming
- iglo prescribes fields, sequence of crops
- iglo provides
  - analyses of the soil status (nutrients)
    - advice for necessary supplements
  - seed materials
  - field inspection
    - advice for necessary treatments
    - suitable measures in case of need

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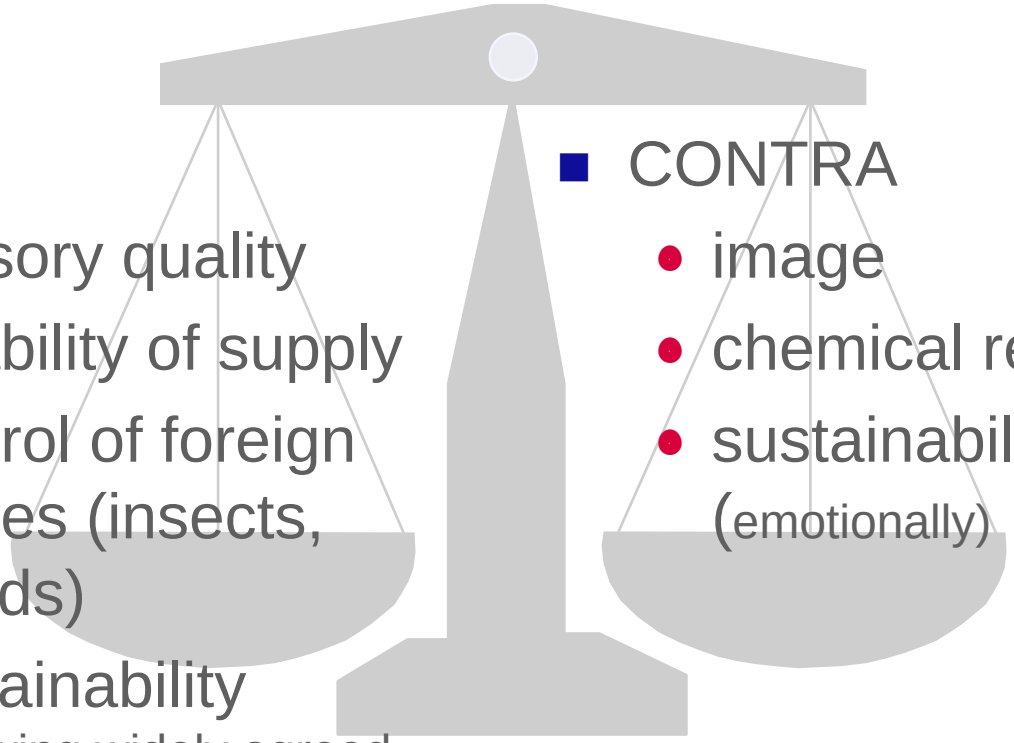
Crop Growing and Requirements

Plantprotection

Treatments

- manual weed control

Contaminants Control Treatment Principles



- PRO
  - sensory quality
  - reliability of supply
  - control of foreign bodies (insects, weeds)
  - sustainability (following widely agreed principles, see chart 13))
- CONTRA
  - image
  - chemical residues
  - sustainability (emotionally)

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Contaminants Control Treatment Principles

- iglo **in case of need**
  - prescribes chemicals to be applied
    - preferentially **one** active principle per issue
    - quantum satis (often lower than recommendation of supplier)
    - method of use (distance from field ridge, brooks, disposal of residues, ...) concentrations, certification of spraying equipment (drift, uniformity of spray, ...)
  - controls residues
    - by own assessment of the degradation
    - by fixing a waiting period before approval
    - before harvesting for each field

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Quality Assurance

growing

bef. harvest.

Residues control

result not o.k.

result o.k.

Overall Check

result o.k.

harvest

Contaminants Control Experience with actual System

- internally
  - control of pests
    - satisfactory control of pests which are detrimental to the growth/quality
    - not all pests can be controlled
      - occasional problems with insects which may present a foreign body problem (which many consumer don't accept, claims for reparation, lawyers etc>)

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Contaminants Control Experience with actual System

- internally
  - control of residues
    - in all cases fully compliant with the legal requirements
    - in many cases below detection limit at the time of harvest
  - quality of vegetables
    - in most cases the specified quality is met
    - in few cases the raw vegetables must be destroyed

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Contaminants Control
Experience with actual System

- external relations - inquiries, complaints
  - authorities
    - no complaints for elevated residues ever
  - our system provides efficient customer response for
    - status requests in case of public issues
  - our system provides efficient consumer response for
    - occasional inquiries for residue status
    - complaints about insects as foreign bodies (treatment limited to plant protection, not to avoid foreign bodies, this is not accepted by several complainants)

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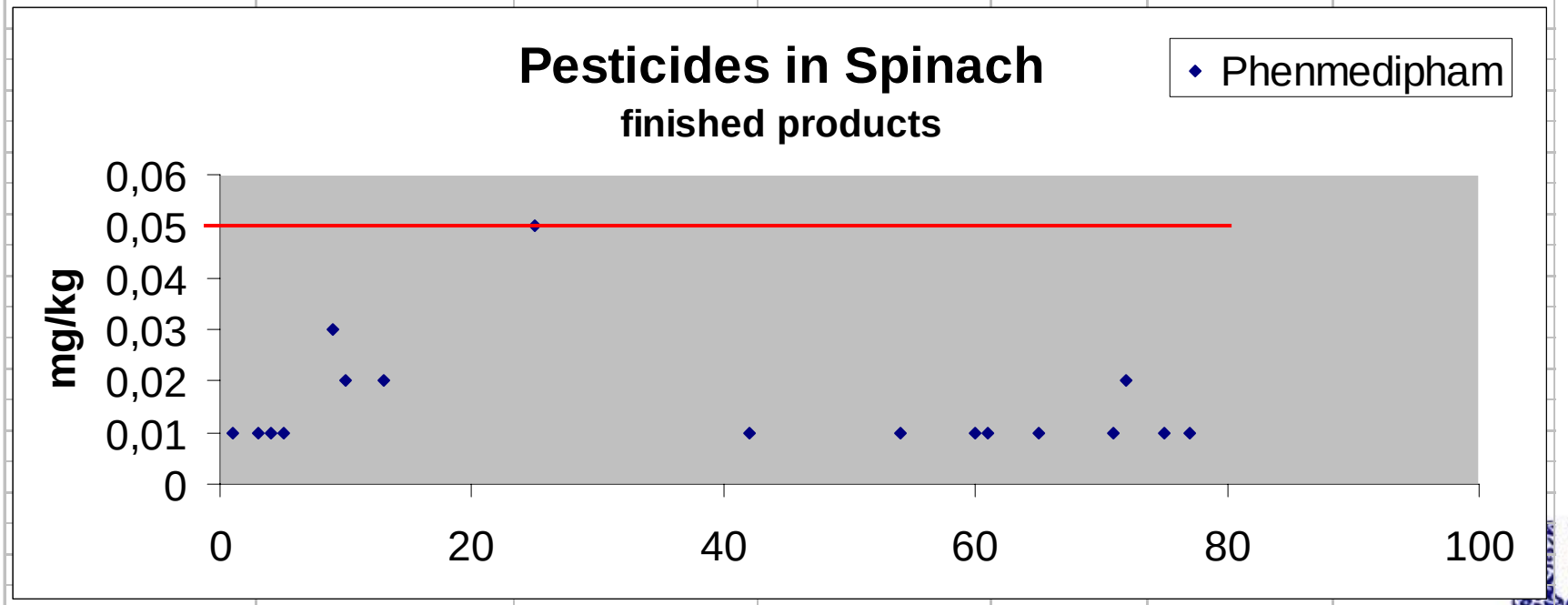
Spinach - analytical results 2004

Samples	85 finished products	2500 total

Compounds	Phenmedipham	Dimethomorph	Pendimethalin	Metalaxyl	Cyhalothrin	Cypermethrin
legal limit mg/kg	0,05	0,1	0,1	0,05	0,5	0,5
> legal limit	0	0	0	0	0	0
not detectable	80%	98%	98%	99%	67%	89 %
multi residues	7 x 2 compounds		1x 3 compounds			



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Contaminants Control sustainability - first steps

- Unilever sustainability initiative for
  - agriculture (fish-MSC, water)
- guidelines for key crops 1998
- pilot projects since 2000
- first results regarding contaminants control for spinach 2003

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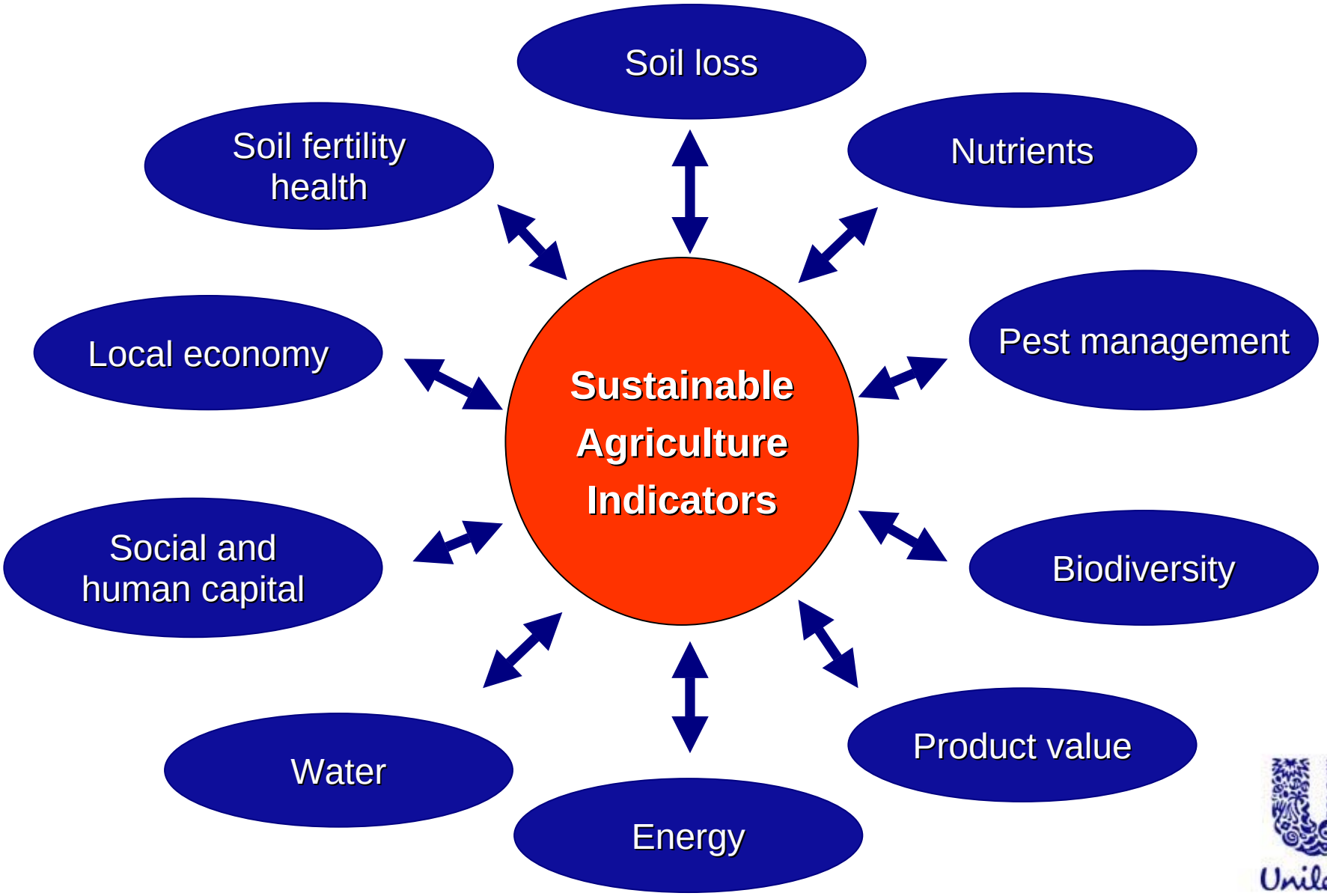
Sustainable Agriculture



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Sustainability
Activities in 2002

- **GPS mapping of all fields completed**
- allows harvesters to find field/check field
- allows for ArcView/GIS use for other purposes (e.g. soil maps, risk assessment, optimised application of agro chemicals)

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Sustainable Agriculture

Pest Management

- Pest Monitoring + Strategy

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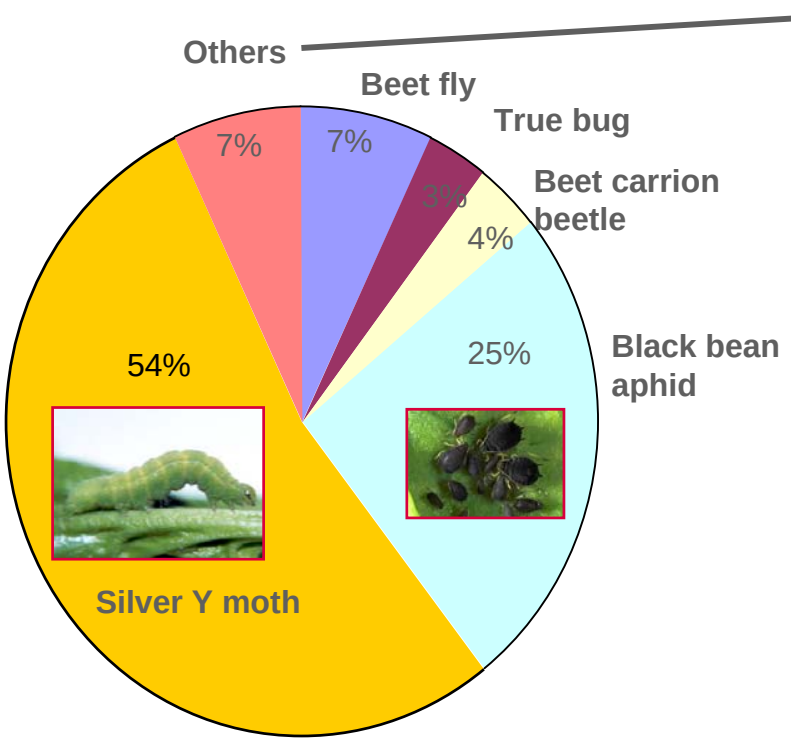
Pest management

Main Pest Species



Proportion of different insect species found on spinach field

- <u>Frequent Finding</u>: Beetle (Ladybeetles), Moth, Larva
- 7 % Others which are not associated with spinach like ladybeetles cannot be combat by pesticides
- Agricultural treatments to those are limited
- to avoid foreign bodies effective washing is necessary

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Pest Management
GIS-Analysis of landscape structure

Impact ?

- **2003 data show significant correlation of caterpillar abundance with percentage area cropped to potatoes**
- No effects for other land uses

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Alternative Pest Management summary of results

- Use of Bio-Insecticides
  - Neem not effective
  - Bacillus thuringensis promising
    - dependant on climatic conditions
    - combination of Bt and pheromone trap
      - trap as forecasting tool (number of trapped moths -> treatment)
      - Bt treatment is effective only at an early development stage of caterpillars

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