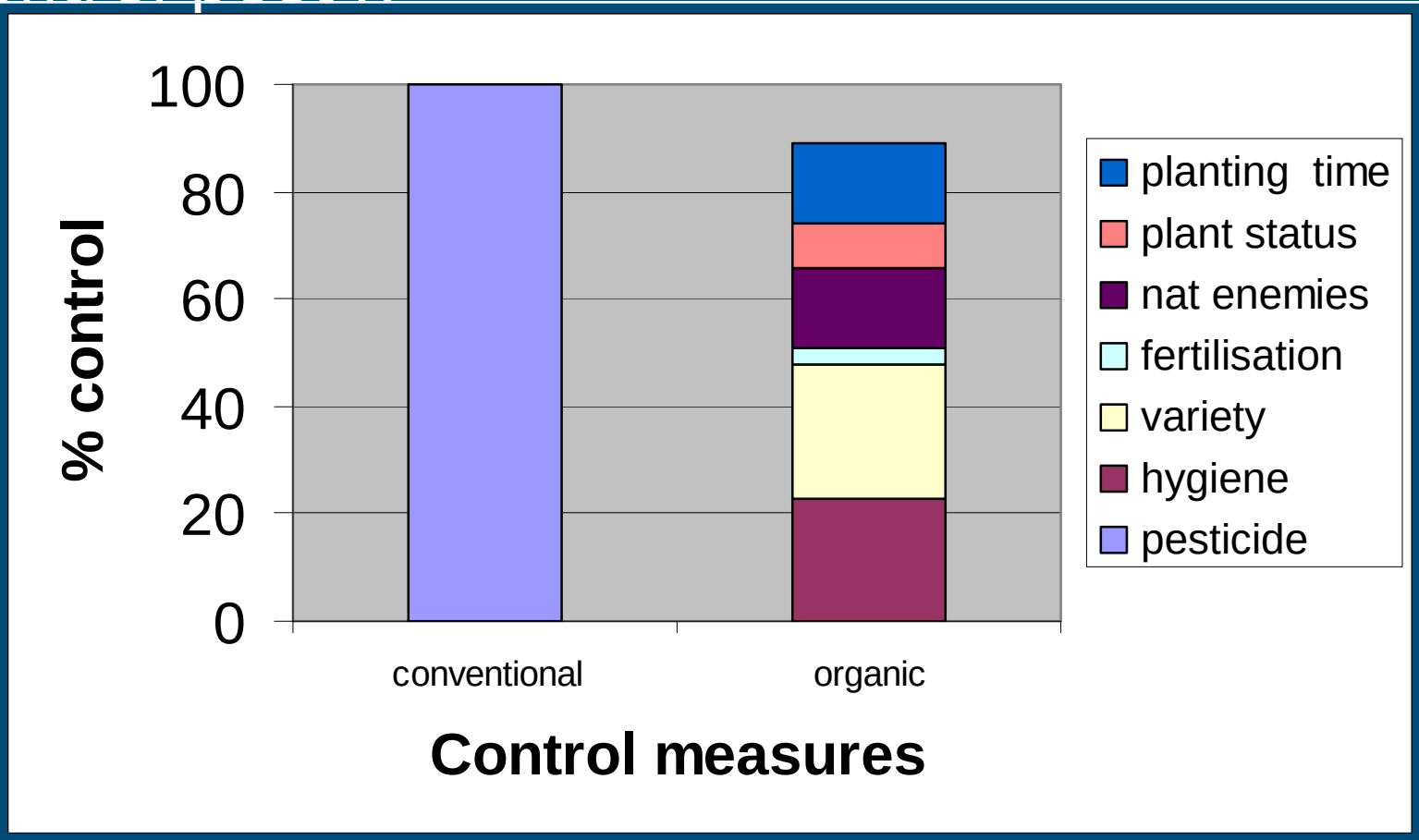
From intentions to practice

Content

- Different ways of looking
- Intentions and objectives
- From intentions to realisation
- Participatory learning and knowledge construction
- Performance
- Some results and experiences

Control pest x



Organic farming

intentional level	natural, species integrity, environment- friendly etc.
↓	
guidelines	crop rotation etc.
↓	
rules, prescriptions	input use fertilisers, biocides

Intentions, guidelines and legislation

- IFOAM general principles and basic standards
- label demands and guidelines
- EU-regulation 2092/91

intentions, guidelines and legislation need to safeguard a good actual performance

General principles (IFOAM)

- enhance/safeguard biodiversity -genetic diversity
- Use of natural cycles
- avoid pollution
- renewable resources
- balance animal- and plant/ production
- local/regional production
- socially just respect species integrity
- respect species integrity
- food chain GMO free

EU-legislation

EU regulation 2091/92

- No synthetic pesticides
- No synthetic fertilisers
- No GMO's

Other EU-legislation

- Drinking water guideline (50 ppm NO_3)
- Input maximum N in animal manure (170 kg/ha)

Conflicts

ecology ⟷ economy

diversity ⟷ homogeneity

Need for:

- farming methods designed to overcome these conflicts
- social and political solutions

Principles, legislation and guidelines

- society embraces the intentional level of organic
- say little about the how
- principles sometimes poorly translated to legislation and guidelines
- is organic farming effective in delivering the intentions?

Dutch agricultural problems

Agronomical

- soilfertility and soilhealth
- control of pests diseases and weeds
- high quality demands

Economical

- lower prices, basic income under pressure
- availability and costs of labour

Dutch agricultural problems

Environmental/ecological

- pollution of air water and soil with nutriënts and pesticides
- decline of nature and landscape

Society

- concern for food safety
- claim for multifunctional land use

Actual performance (compared to conventional)

- higher biodiversity (soil, field, farm)
- lower pollution (air, water, soil)
- more sustainable use of resources (soil, inputs)

- lower production
- lower (cosmetic) quality

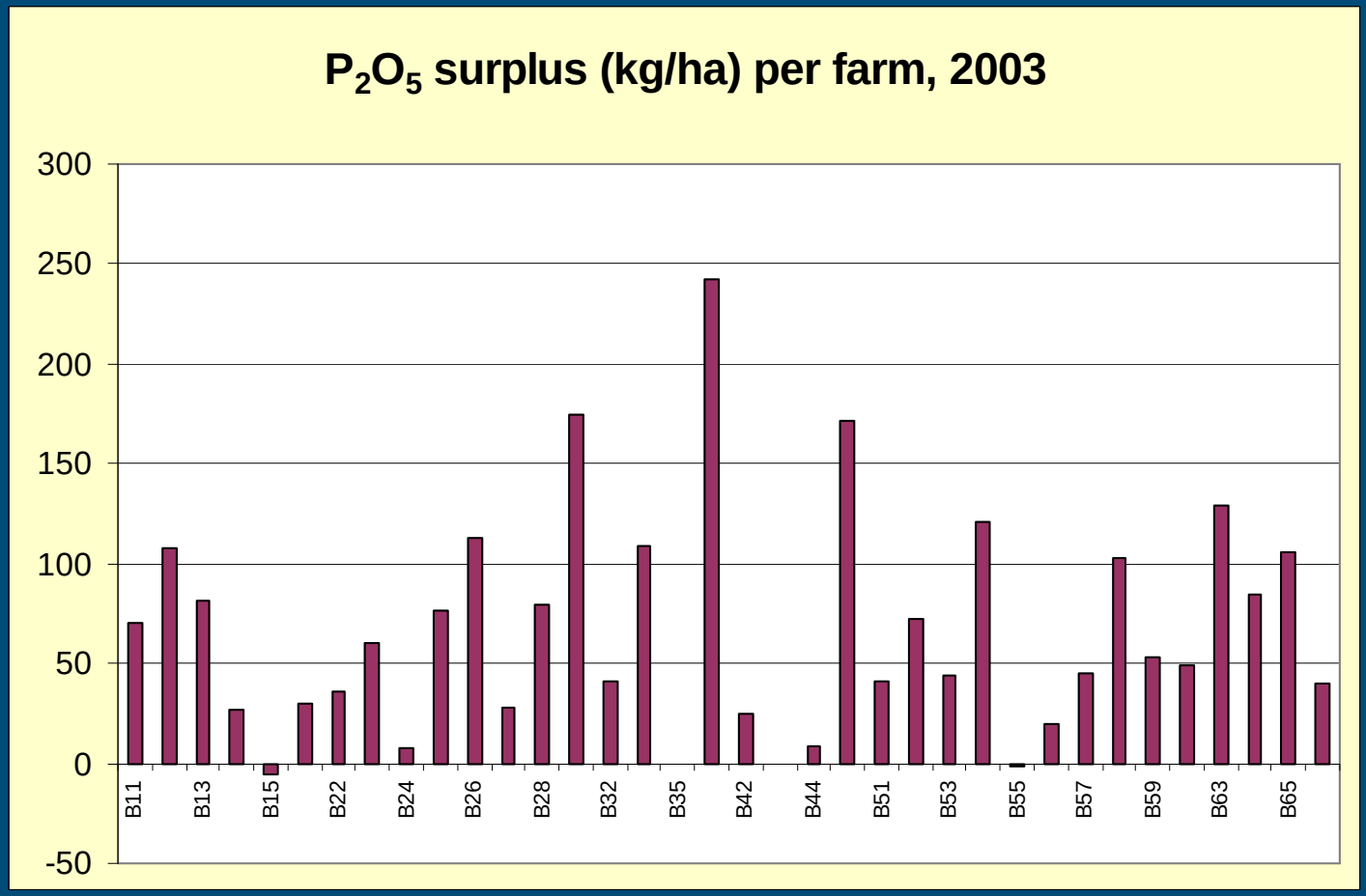
- taste, food safety, food health, social aspects??

Performance nutriënts

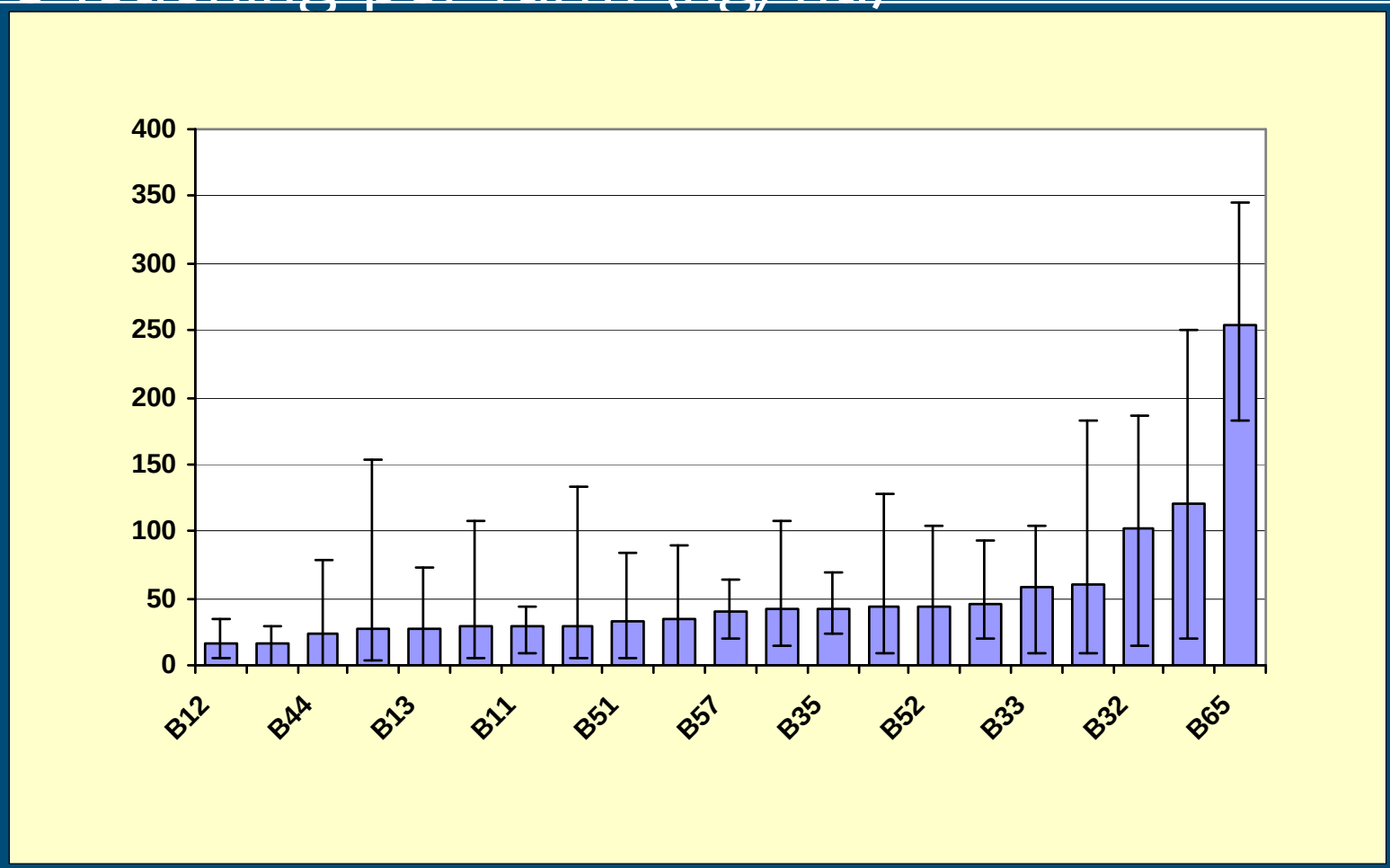
Results farmers groups the Netherlands 1999-2001

	NO_3 drain mg/l	N-min autumn kg/ha	N-surplus kg/ha	P_2O_5-surplus kg/ha
Organic farms	25	45	135	50
Conventional farms	53	-	180	-
Integrated farms	-	85	130	37

P_2O_5 surplus Dutch organic farms



NO3 leaching per farm (kg/ha)



Biological control?

Manure storage

Weeding by hand

Actual performance

- variation is high
- intentions and legislation do not guarantee a good actual performance

Potential shortfall

- Nitrate leaching, Phosphate accumulation
- Copper accumulation, high input of bio-pesticides, bio-pesticide dependency
- poor on farm genetic diversity

Causes shortfall

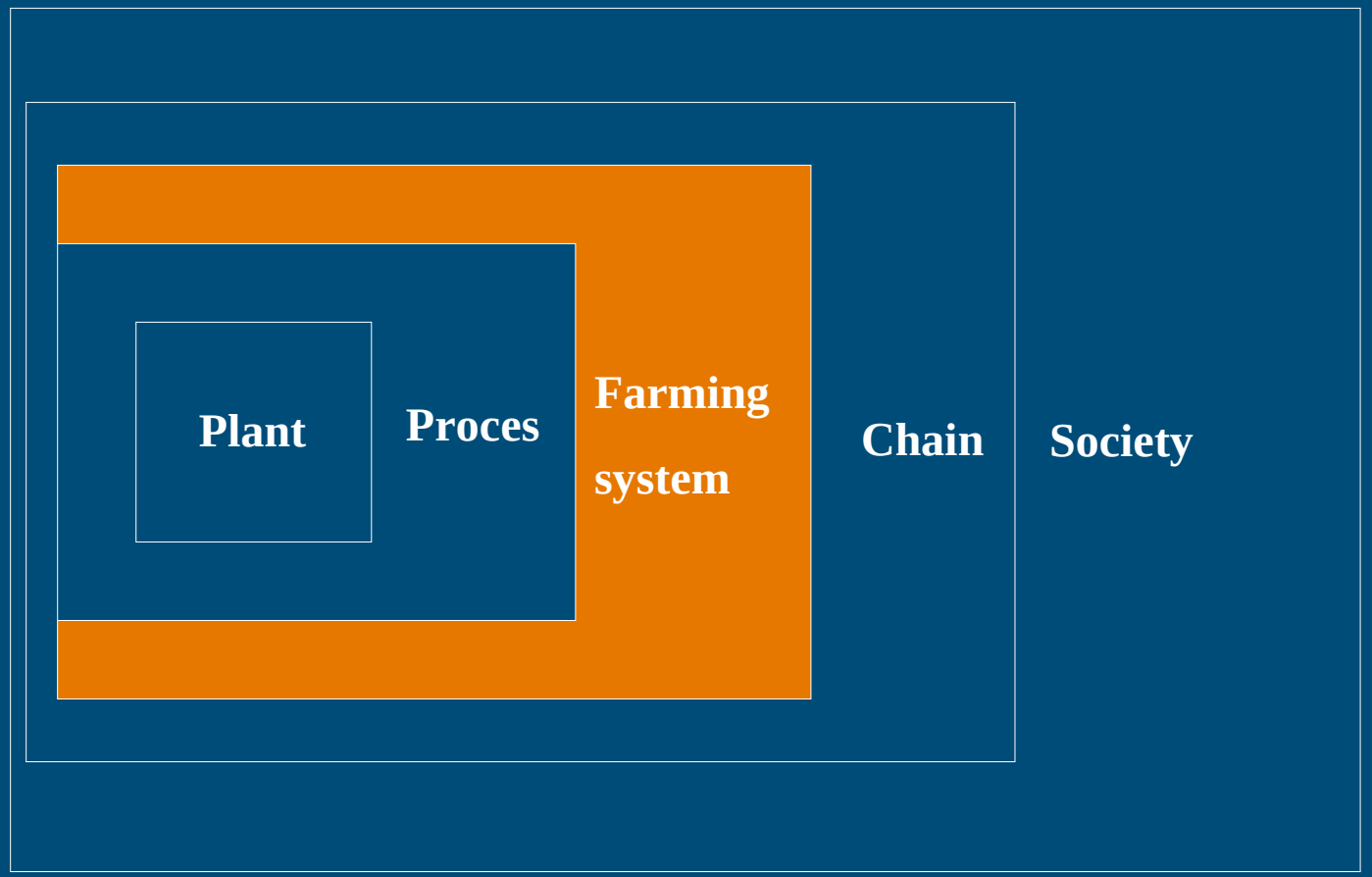
- nutrients manure ≠ plant uptake
- N-mineralisation ≠ crop demand and growth period
- pest and diseases

- awareness, knowledge
- conflicting objectives

Different approaches

- Socio-political oriented solutions
- Technological solutions
  - system innovation
  - process integrated solutions
    integrated technology
  - end of pipe solutions

Systeem innovation



Ingredients for system innovation

- Hardware
- Software
- Orgware

Farming systems research

- System innovation: coherent overall concept, multi-objective
  - Agronomical
  - Ecological
  - Economical
- Integrated technology
  - agro-ecological principles, agronomy and technology Whole farm

Main search directions

- integrated production
- organic production

Prototyping (Vereijken)

- Analysis en Diagnosis
- Design
- Testing and Improving
- Dissemination and implementation

Analysis and diagnosis

- Regional farmstructure
- Constraints
- Policy and regulations
- Future developments

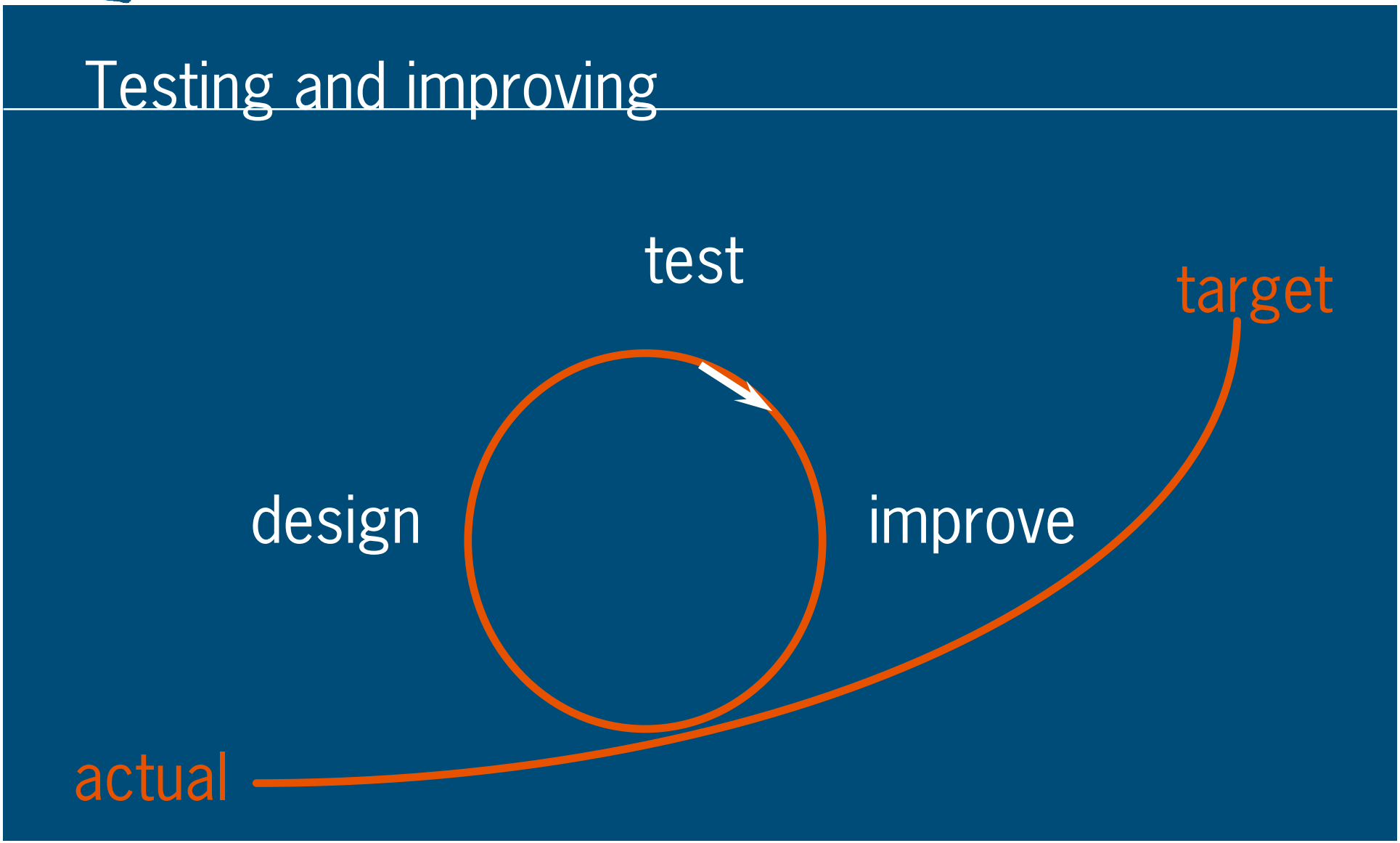
Design

- Establish objectives
  - Measure them with Yardsticks (parameters) and
  - Quantify them with target values
- Design farming methods
- Design operational plan

Testing and improving

- Measure performance (yardsticks)
- Comparison actual - target
- Analyse shortfall
- Improve farming methods/design

Testing and improving



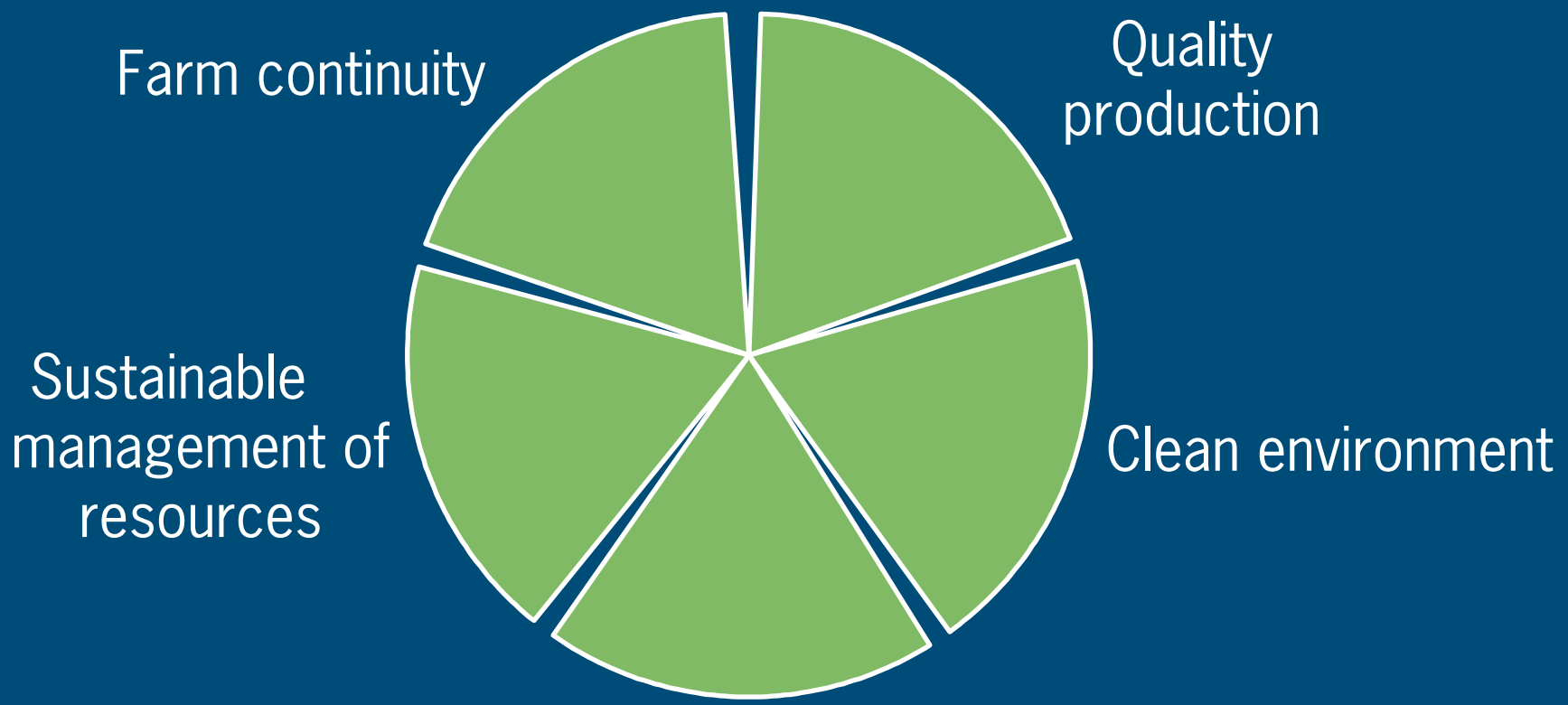
Dissemination, practice implementation

- Translation into practicable concepts
- Testing on Pilot farms
- Software and Orgware
- Study groups, demonstration etc.

Design: Objectives

- Abiotic environment
- Food Supply
- Nature and Landscape
- Basic income/profit
- Health well-being
- Employment
- Others??

Design: Thematic approach



Design: Themes and parameters

- Farm continuity
  - Net profit
  - labour input (specified topics)
- Quality production
  - quantity and quality of produce
- Multifunctionality (in relation to on farm nature)
  - no of target species, no of target biotopes
  - infrastructure, area, connectivity, circuitry

Design: Themes and parameters

- Sustainable use of resources
  - use of (fossil) energy and mineral P and K
  - soil fertility, soil cover, soil health
- Clean environment
  - use, emission and damage risk pesticides
  - use, surplus and emission nutrients
  - gas emissions

Design: Farming methods

Agronomic Toolbox to realise values

- Crop rotation
- Soil cultivation
- Fertilisation/Nutrient management
- Crop protection
- On farm nature (biodiversity) management

- Economic optimisation

Design: Farming methods

- General strategy (concept)
- Toolbox of methods and techniques
- Flexible integration into approach
- Region and farm specific interpretation of these strategies

- Objective: excellent agronomy

APPLIED PLANT RESEARCH

PPO farming systems research

WAGENINGEN UR

PPO farming system research

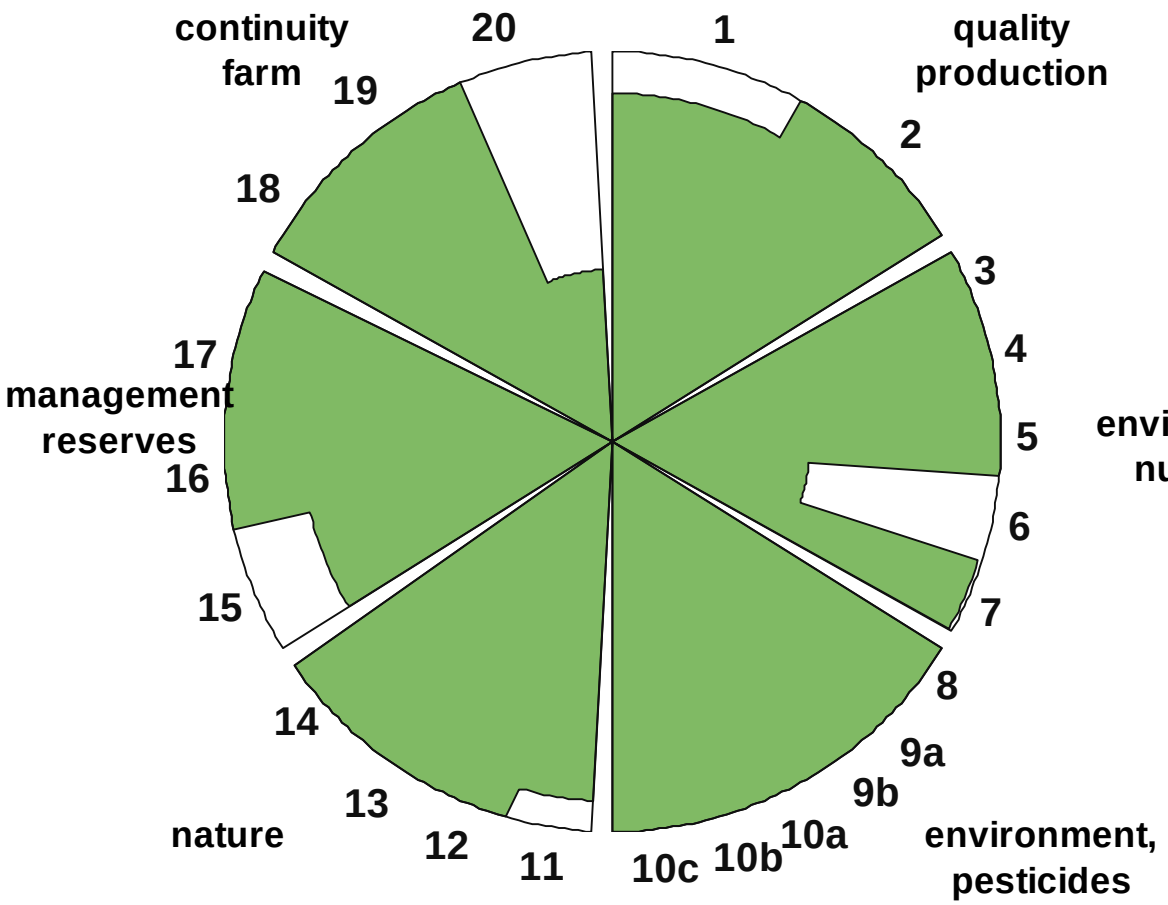
- (semi) practical scale
- no replications
- development path towards ‘all round’ farm
- until 1985 comparison conventional-integrated-organic
- later comparison with targets and average practice
- combination with pilot farm networks

Locations in the Netherlands (2003)

- Experimental locations
- Pilot farms organic
- Pilot farms integrated

Results

- Performance in terms of yardsticks
- Set of farming methods



1. quantity
2. quality
3. N leaching
4. N min November
5. N surplus
6. K surplus
7. P surplus
8. use active ingredient
9. Ecological Damage Index
10. Environment Exposure to Pesti
11. plant species diversity
12. plant species distribution
13. flower density
14. % ecological infrastructure
15. P soil reserves
16. K soil reserves
17. organic matter balance
18. net surplus
19. utilisation available labour
20. hours hand weeding

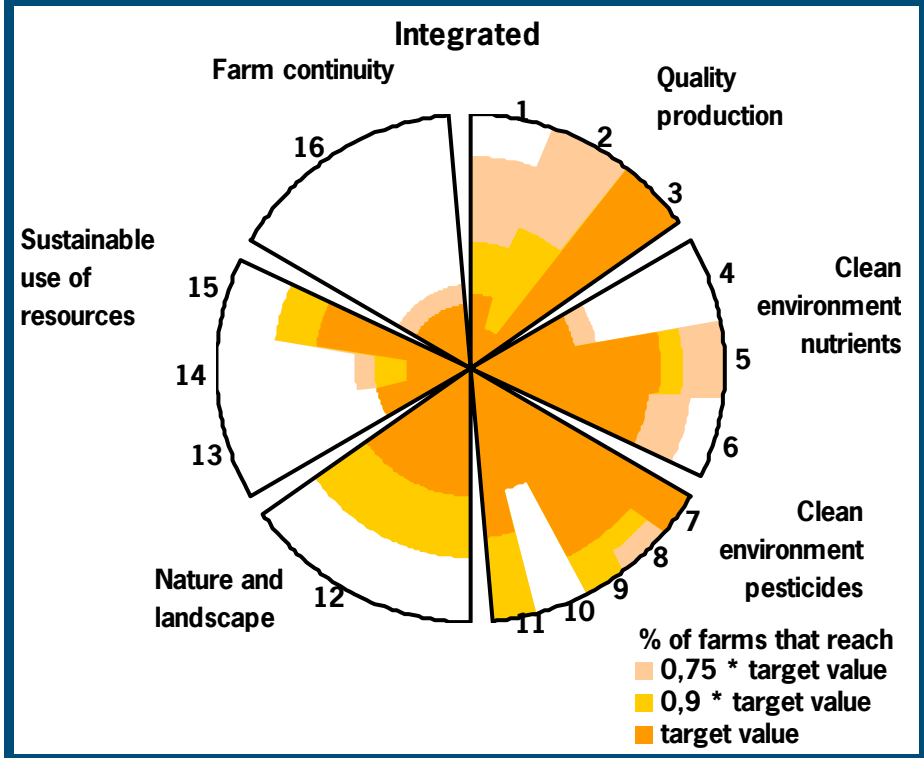
Percentage reduction pesticides

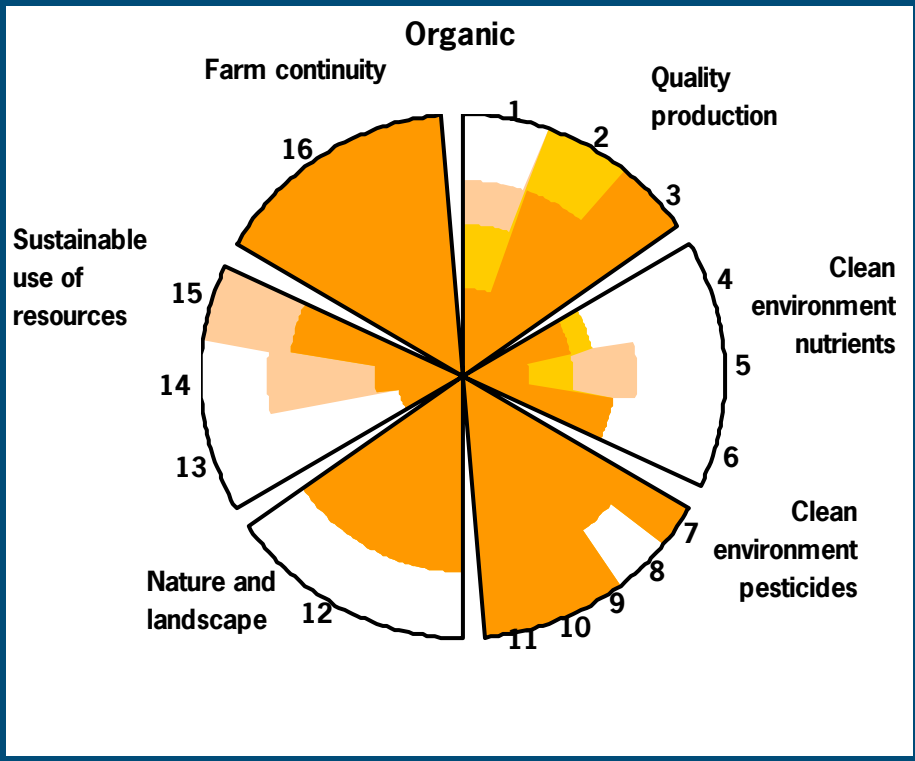
(OBS 1978-2000)

Yardstick	Percentage reduction
emission air	92
damage waterlife	99
emission groundwater	99
emission soil	83
damage soillife	81
active ingredient input	95

Comparison between integrated and organic systems

EU project Vegineco 1997-2002 (experimental farms)





Potential Organic farming

- Multifunctionality (production, recreation, care, nature and landscape)
- Sustainable and environment friendly
- Food safety (pesticide residues, allergies)
- Consumers preference (natural, healthy and tastefull)
- Biodiversity
- Employment
- Low input costs