



APPLIED PLANT RESEARCH

Good Agricultural Practice in Organic Farming

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Personal introduction

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APPLIED PLANT RESEARCH

Biological control?





Manure storage





Weeding by hand





Content

- Principles, standards, legislation
- Actual performance
- Agronomic toolbox

Delineation: Plant production, EU-situation, farm level



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)



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?



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??



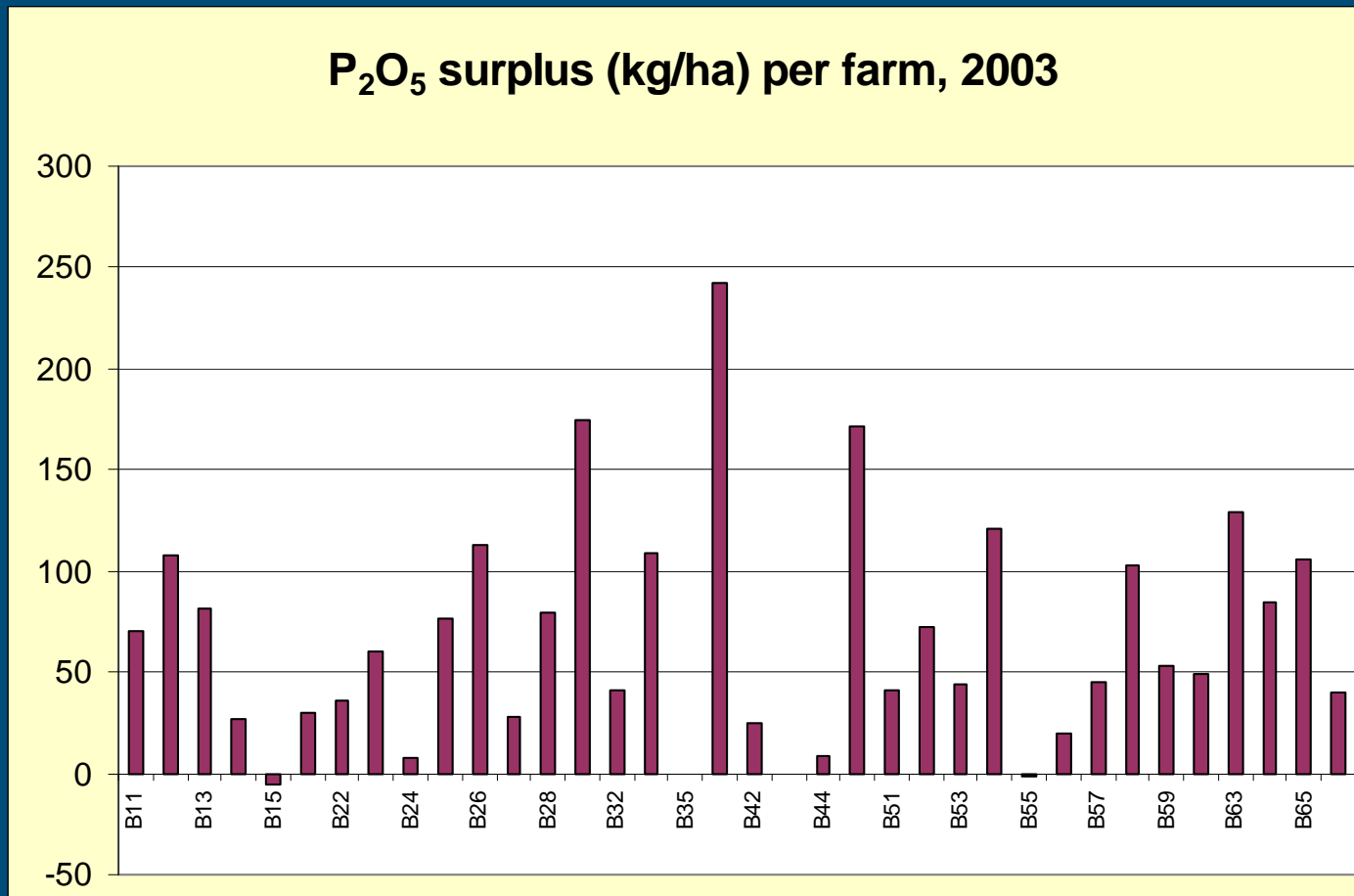
Performance nutrients

Results farmers groups the Netherlands 1999-2001

	NO₃ drain mg/l	N-min autumn kg/ha	N-surplus kg/ha	P₂O₅- surplus kg/ha
Organic farms	25	45	135	50
Conventional farms	53	-	180	-
Integrated farms	-	85	130	37

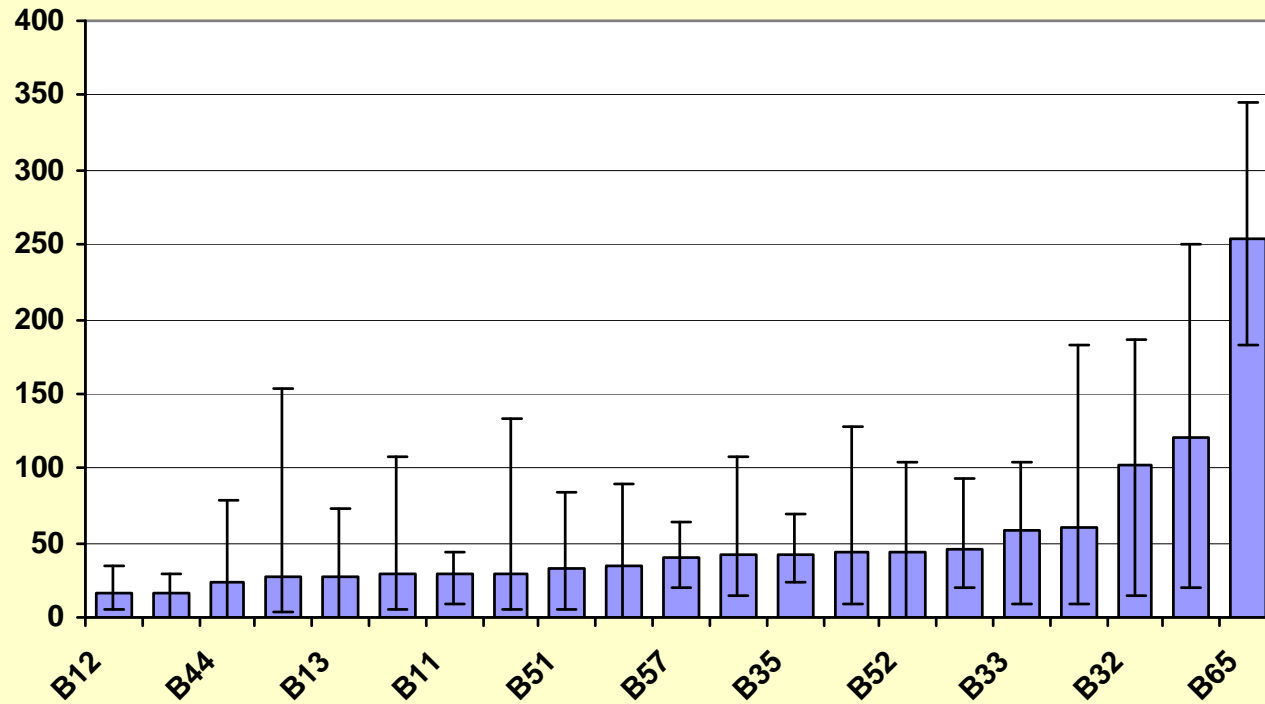


P₂O₅ surplus Dutch organic farms





N₀₃ leaching per farm (kg/ha)





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 \neq plant uptake
- N-mineralisation \neq crop demand and growth period
- pest and diseases

- awareness, knowledge
- conflicting objectives



Conflicts

ecology



economy

diversity



homogeneity

Need for:

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

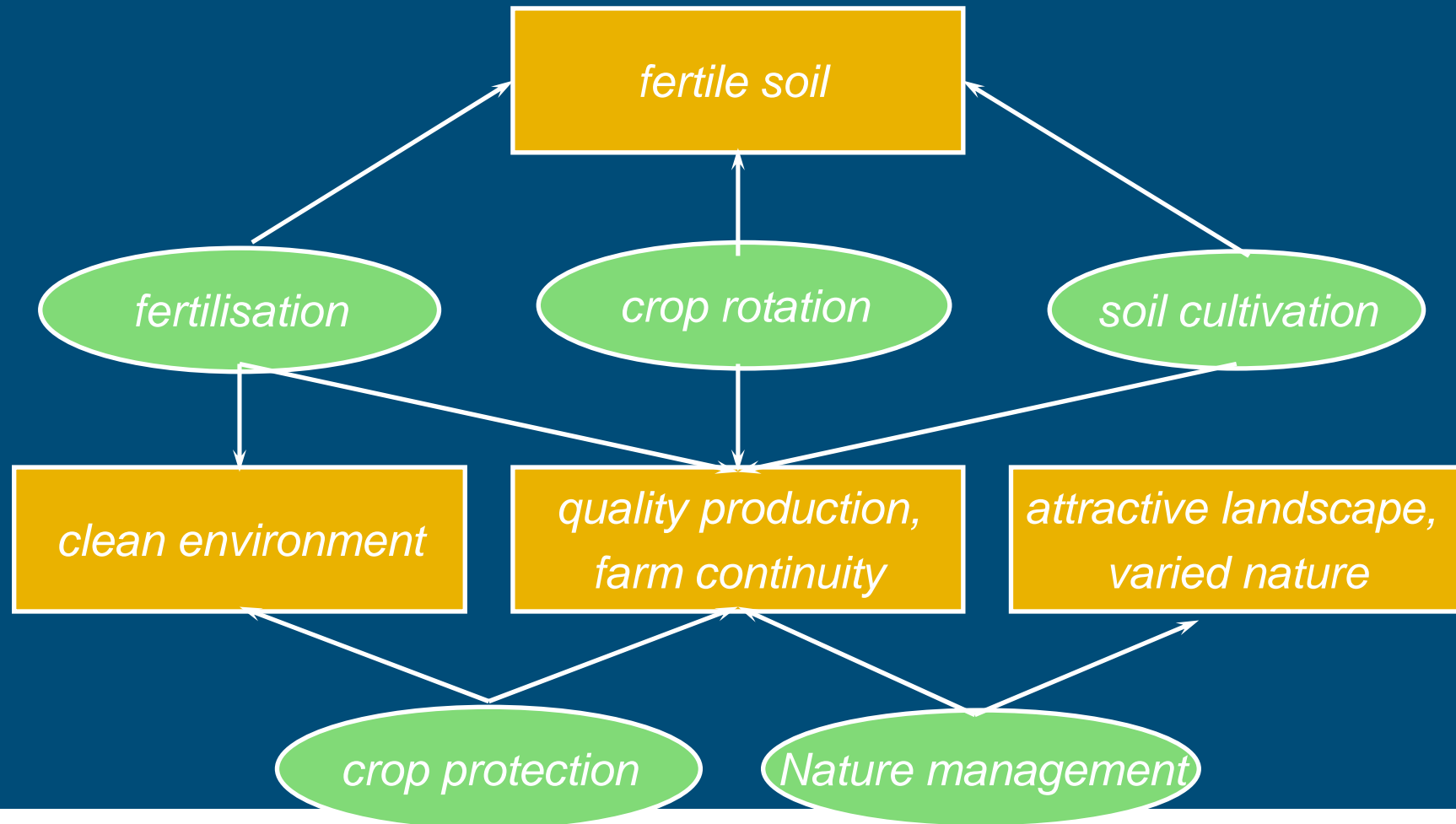


Toolbox: Farming methods

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

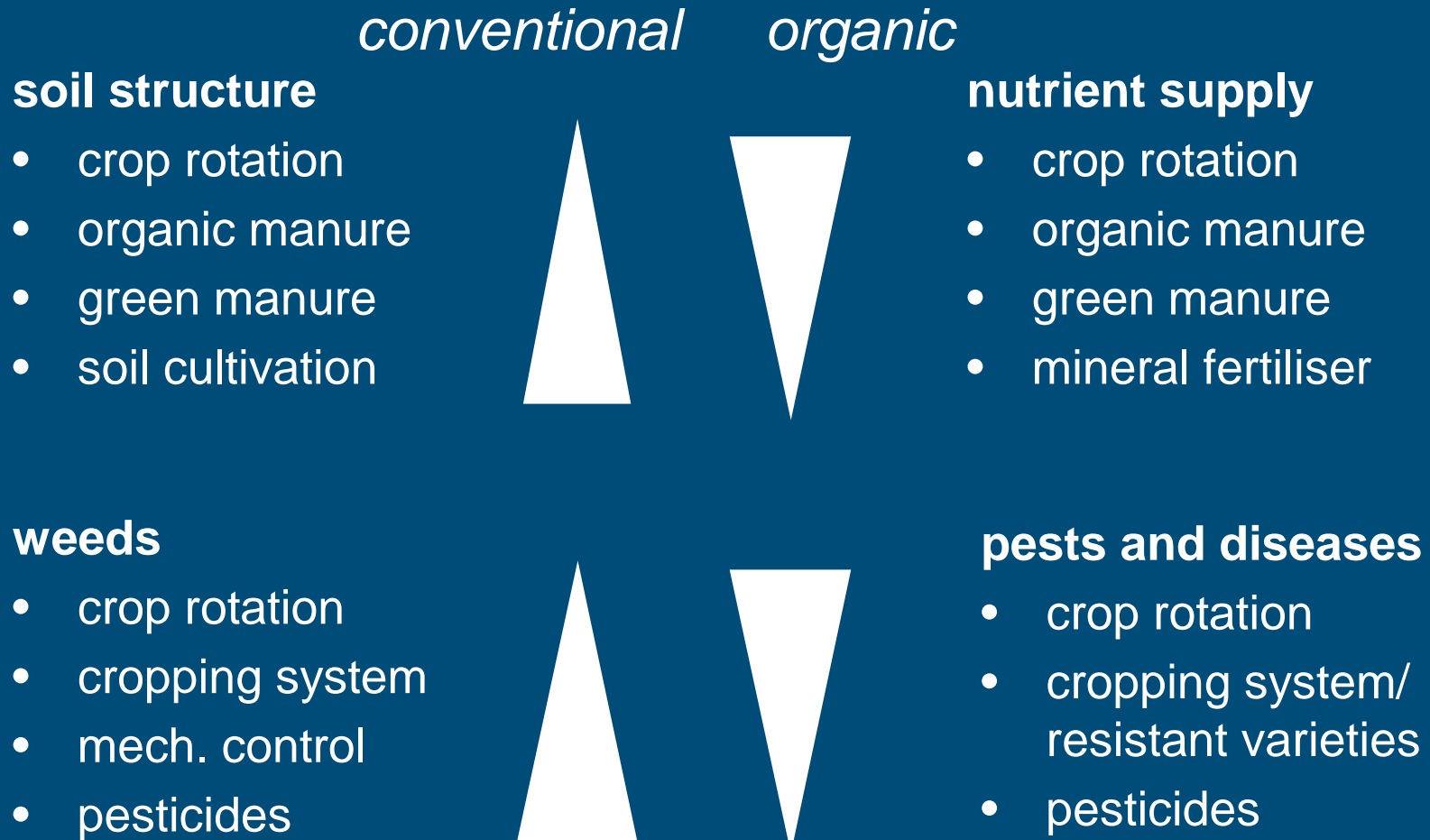


Farming practices and intentions



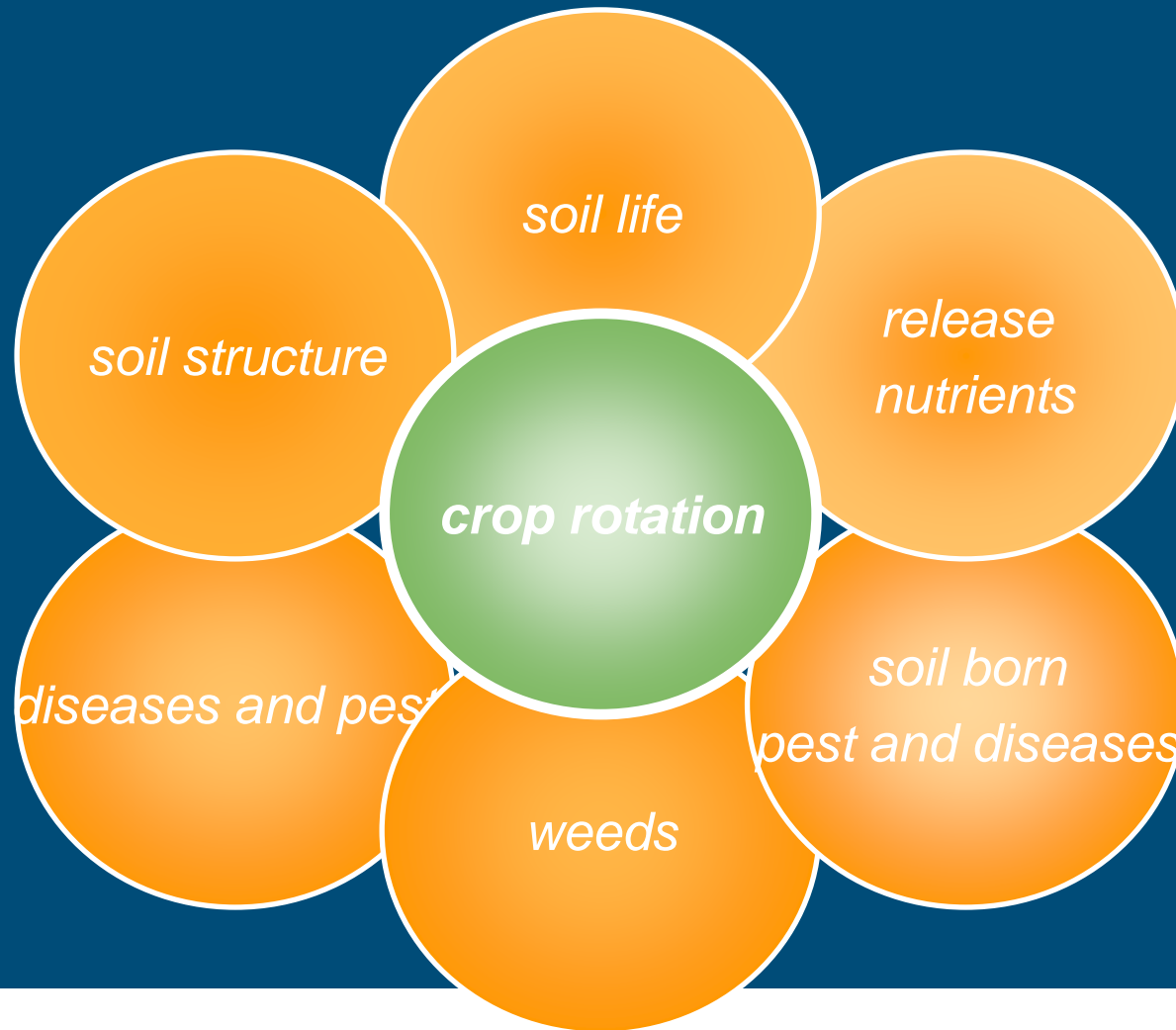


Emphasis in farming strategies





Influence crop rotation



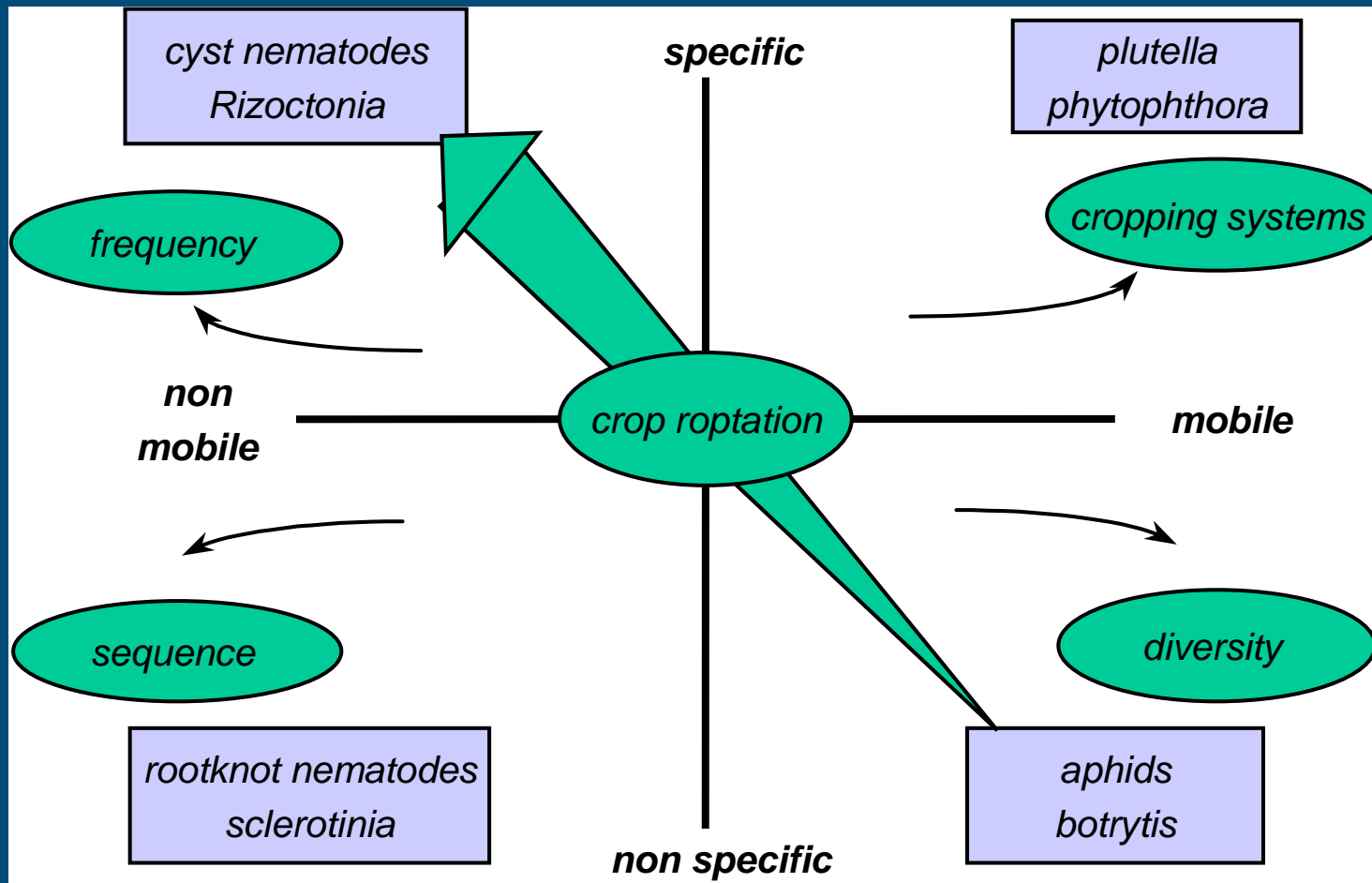


Multifunctional Crop Rotation (MCR)

- basis for
 - soil fertility
 - healthy and vital crops
- optimise positive and minimise negative interaction
 - pest and diseases,
 - nutrient recovery etc.
- well balanced team of players
 - Sequence, frequency, spacial



Crop Rotation, prevention of pests and diseases





Strategy crop protection

- Prevention
 - crop rotation, farm hygiene, farm lay-out
- Need of control
 - asses if control is necessary
- Control
 - non-chemical control (mechanical, biological)
 - Chemical (bio-toxins),
 - bio pesticide selection
 - application technique, timing



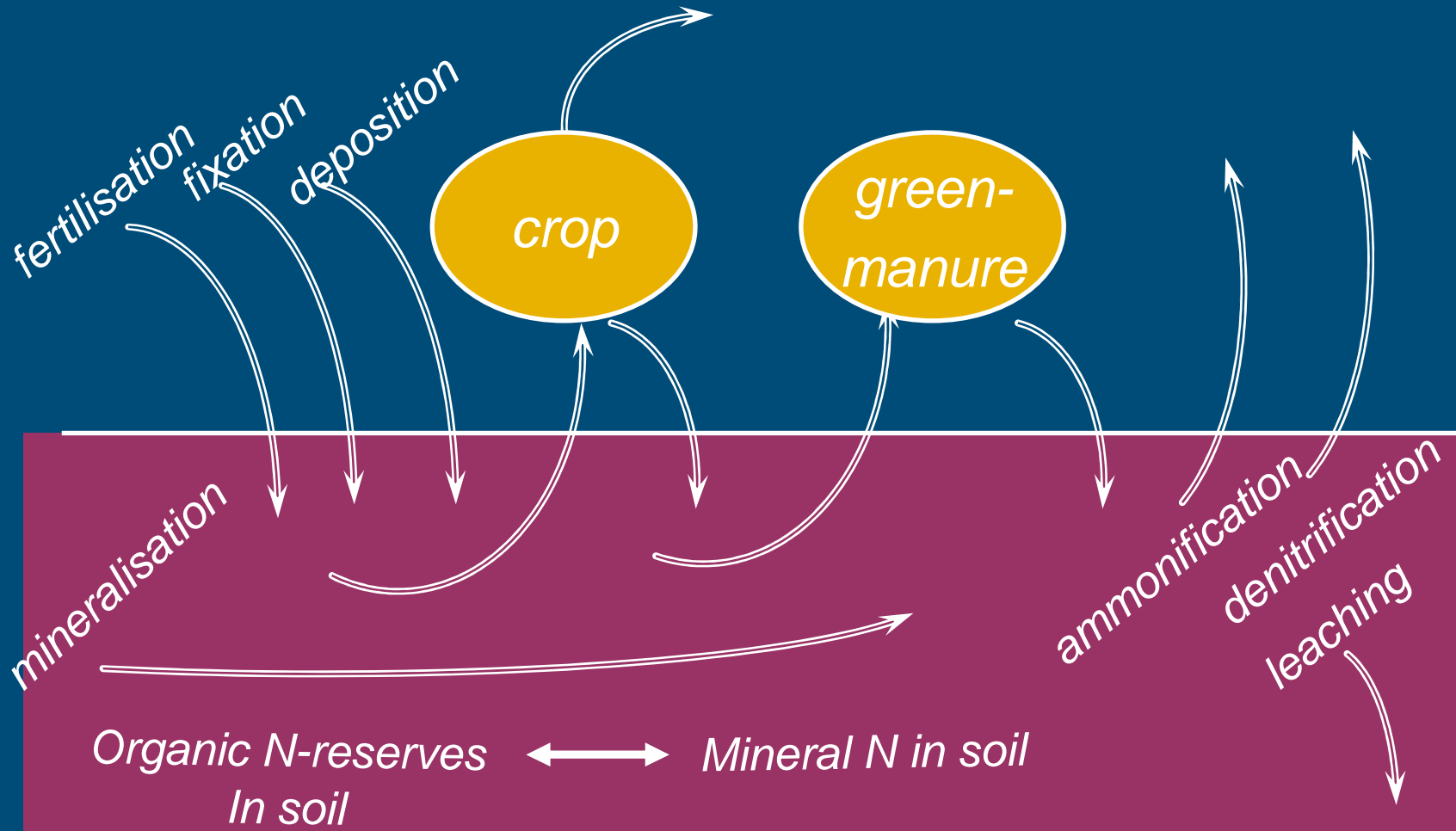
Nutriënt management

Principles:

- maintenance of soil reserves in agronomic desired and ecologically acceptable range
- input = oftake (+ unavoidable losses)
- minimising losses
- optimising quality production



Nitrogen Cycle





Tools nutriënt management

- crop rotation,
- soil cultivation
- organic fertilisers
- green manure, catch crops
- nitrogen fixation

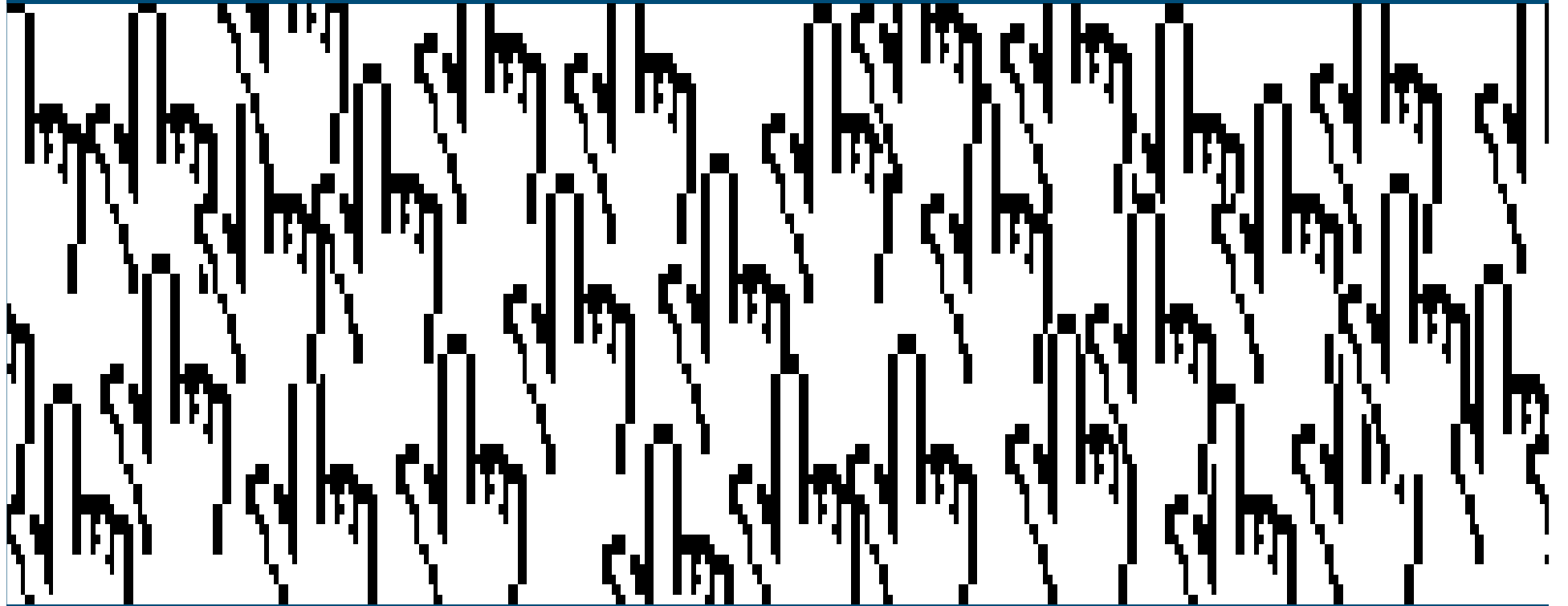


Concluding remarks

- intentions and regulations do not safeguard a good actual performance
- performance is made by the farming in practice
- enclose and disseminate available knowledge
- further development of organic farming practices is needed
- practice, extension and research work closely together

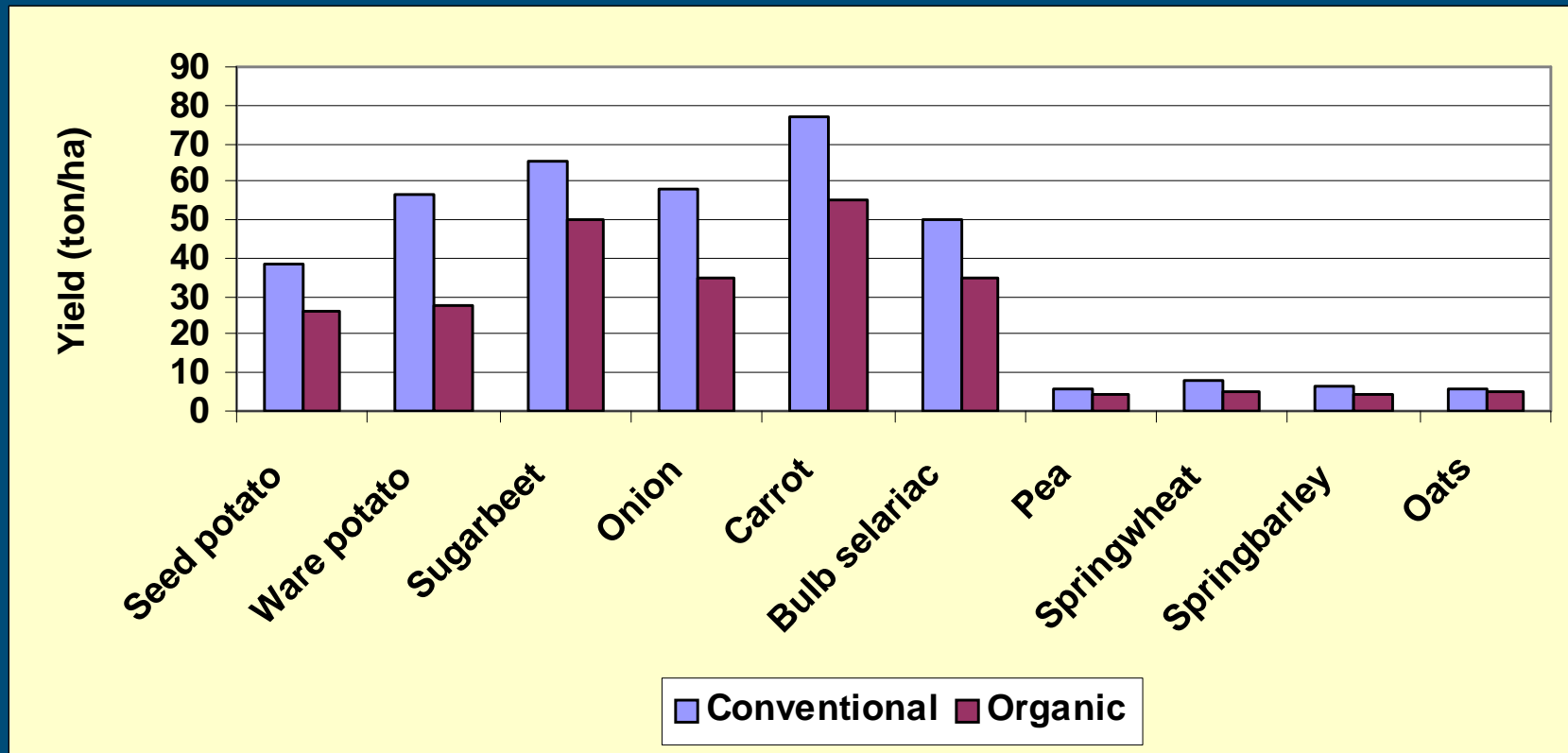


Questions?





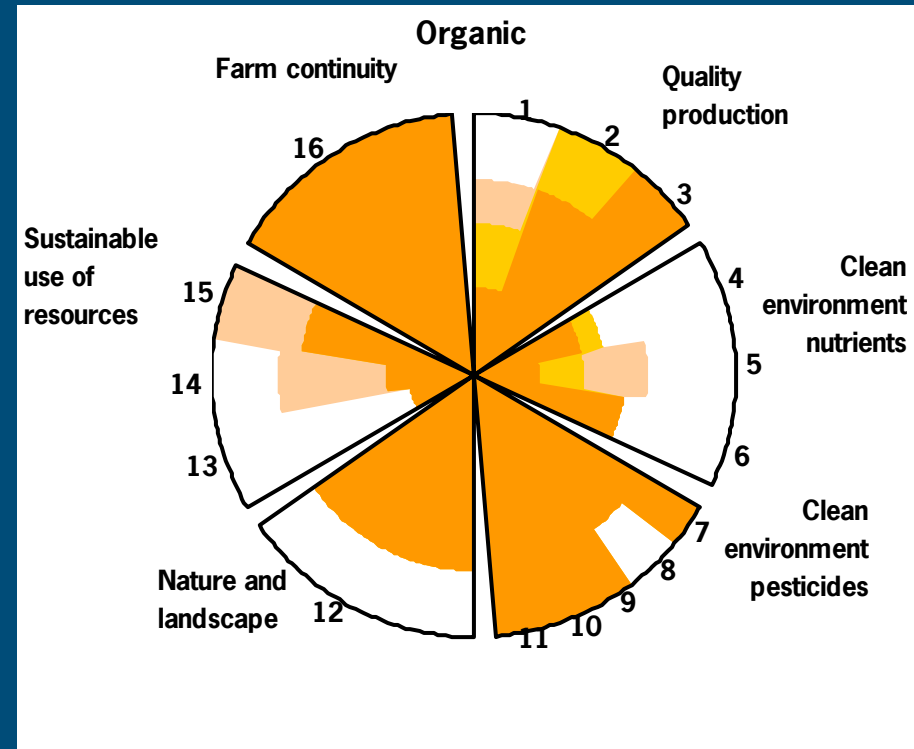
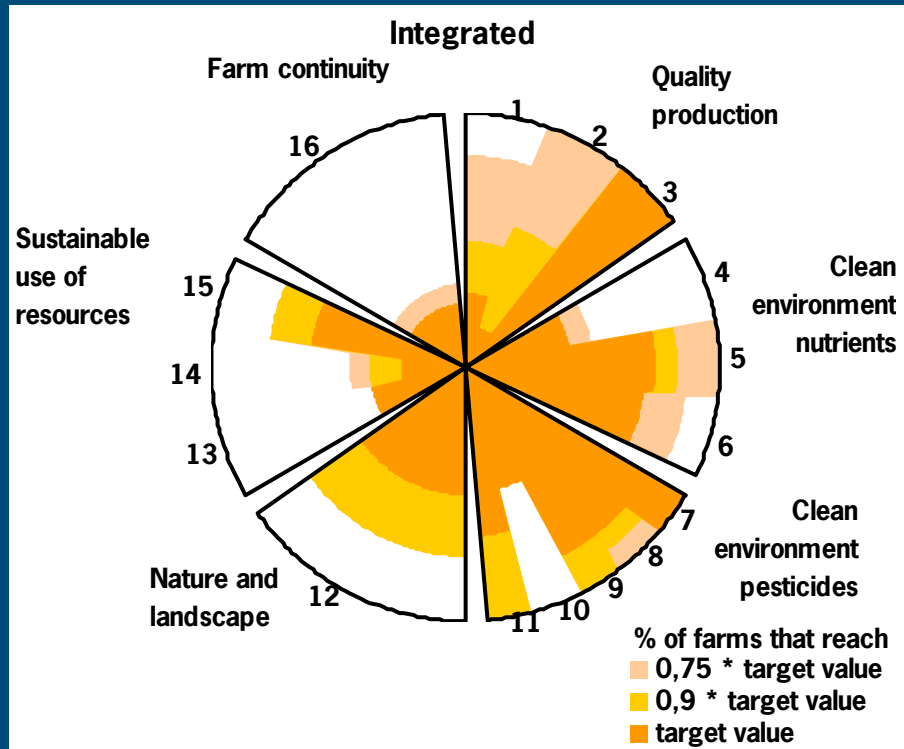
Comparison yield organic-conventional

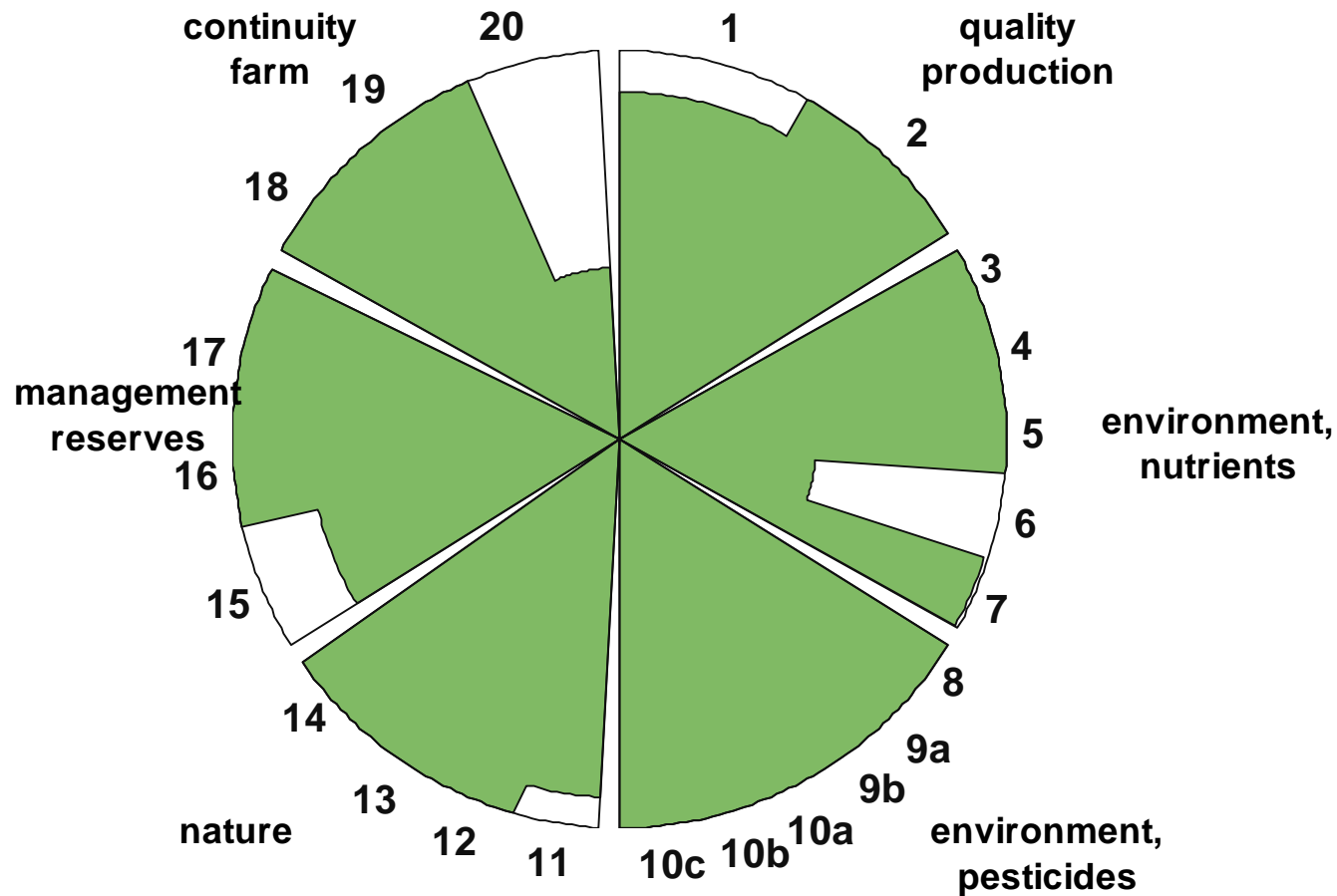




Comparison between integrated and organic systems

EU project Vegineco 1997-2002 (experimental farms)

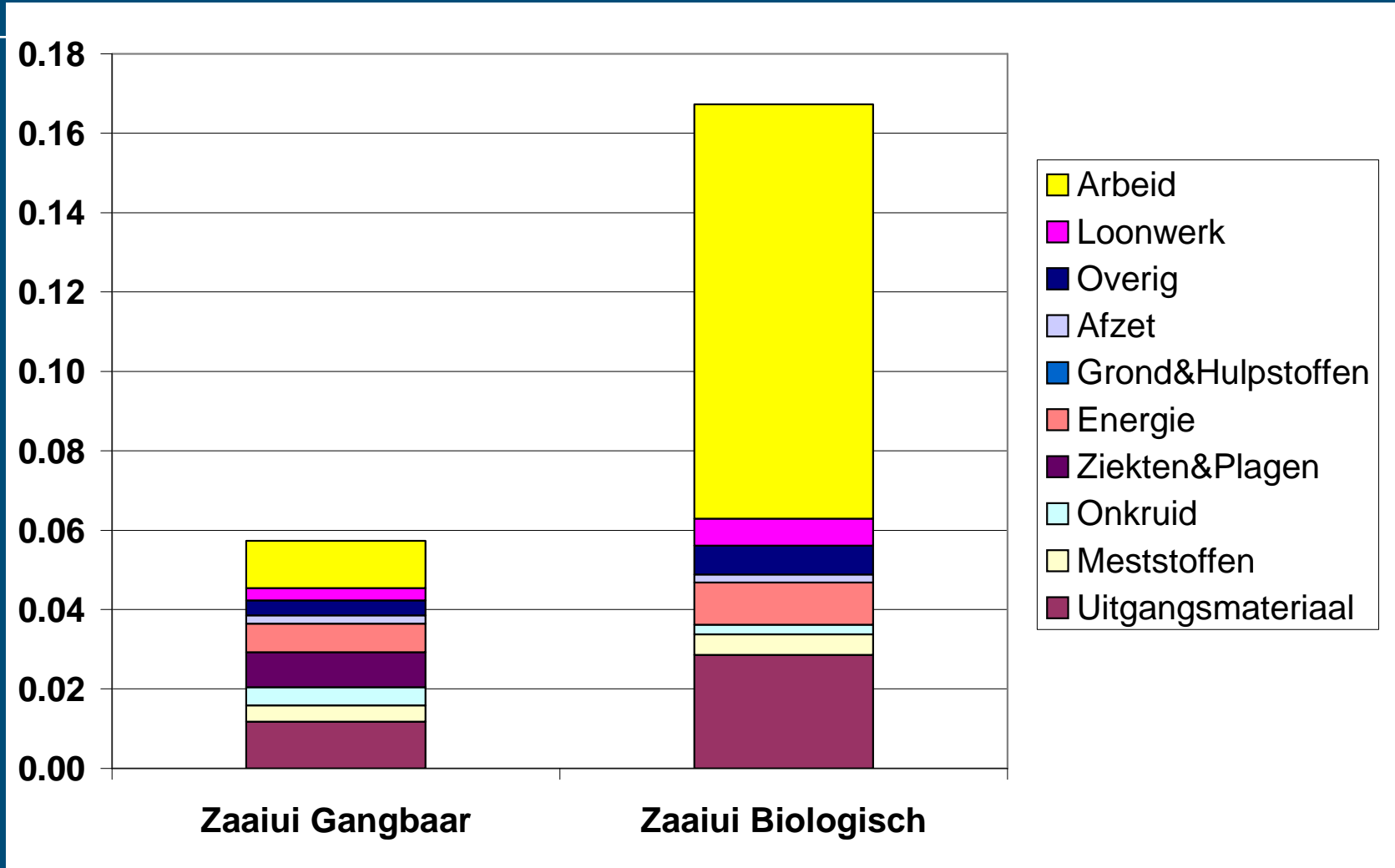




1. quantity
2. quality
3. N leaching
4. N min November
5. N surplus
6. K surplus
7. P surplus
8. use active ingredient
9. Ecological Damage Index
10. Environment Exposure to Pesti
11. plant species diversity
12. plant species distribution
13. flower density
14. % ecological infrastructure
15. P soil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



Teegenerende productiekosten (€/kg)





Emission and damage of pesticides

