



Achievements of Integrated Farming



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Dr. Andreas Frangenberg

Technical Director, EISA

Structure of this presentation:

- Introduction
- The challenges lying ahead
- General principles of Integrated Farming
- Field trials from Northern Germany
- Cooperative “Above and Below”
- Examples from the UK
- PhD thesis Stephan Deike
- Data from the UK
- Conclusions
- Closing remark



Figures well-known:

World population:

1.6 billion in 1900, about 2.5 billion in 1950, about 6.0 billion in 2000 and an estimation of up to 9.0 billion in 2050

Decreasing productive agricultural area per capita due to population growth and land degradation:

4 400 m² in 1960, 2 700 m² in 1990, predicted: only 1 700 m² in 2025

Increasing demand for meat, milk and eggs:

as income grows, emerging markets show different consumption patterns compared to the past – they demand more protein from animal sources

Increase in land use for bio-energy:

currently about 20 million hectares – increasing

Climate change:

thread that productivity of some regions will be reduced or even lost due to water scarcity – and argument for more bio-energy



What are the consequences?

Beyond granting access to food in the sense of better distribution worldwide...,
beyond reducing potential trade restrictions...,
beyond helping the poor to help themselves...,
beyond trying to help establishing more stable and fair political systems in Third World countries...,
which all are issues we will not deal with today...,

We will need to improve agricultural productivity!

And whilst doing that,
we will need to take care of and protect nature and the environment,
we will need to look at the people, their skills and their quality of life
and at the economic situation, i.e. the income of people living and working in agriculture.

However – can these targets be achieved, and if so – how?

In theory: The EISA Integrated Farming Framework

- is a holistic system, looking at the whole farm,
- dwells on the best possible mix of tradition and innovation,
- includes thorough planning and target setting,
- includes evaluation of results achieved in comparison to targets set,
- depends on permanent “knowledge input” in the sense of advisory services, training, use of agricultural magazines, internet based information ...

It is not manage-
ment of confusion



but management of
abilities and knowledge





And in practice?

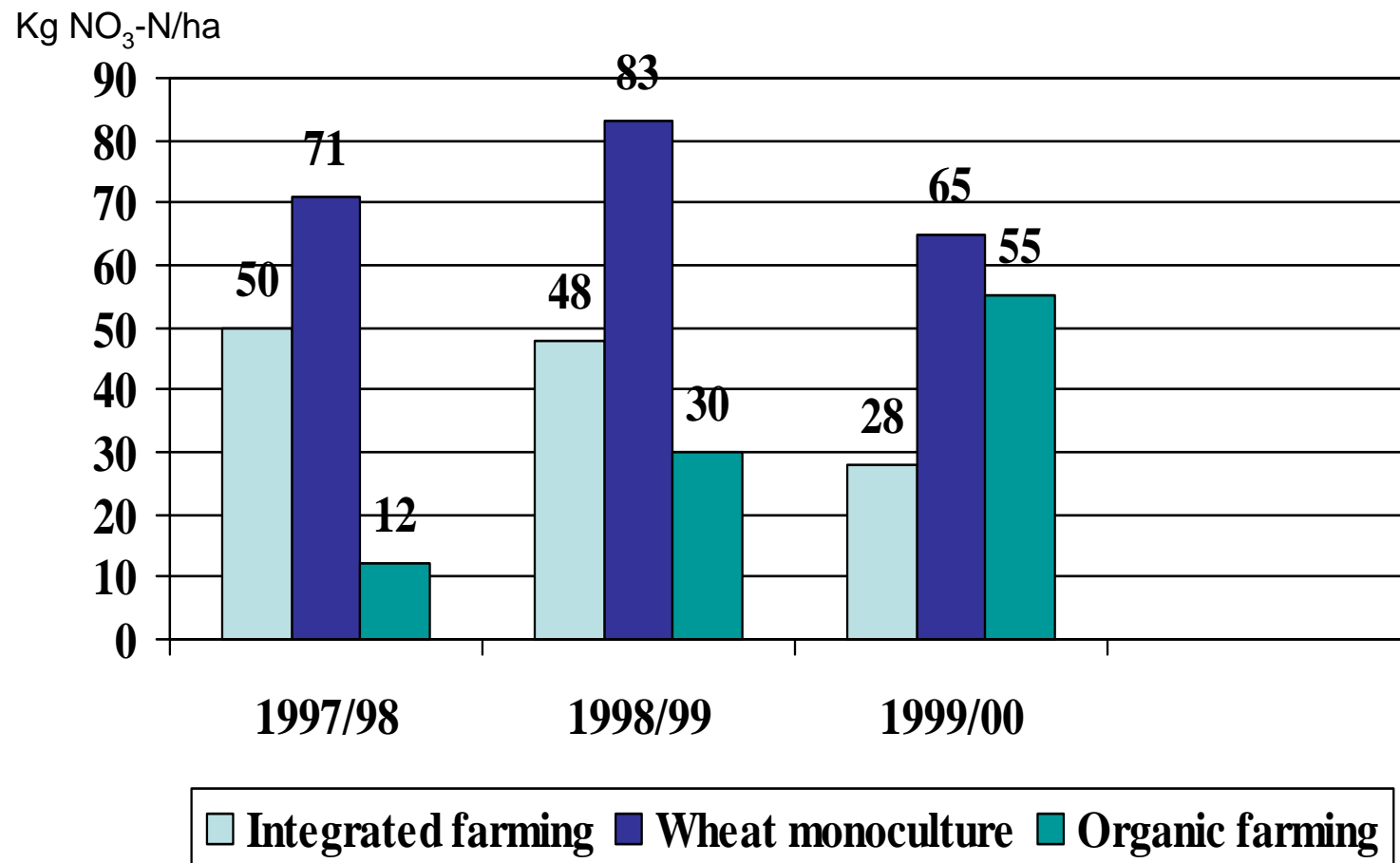
The following slides will present data from various scientific field trials as well as from various farming enterprises and / or cooperatives.

A big “Thank you” goes to numerous farmers in the UK and Germany who have provided their data via the national EISA members LEAF (UK) and FNL (Germany).

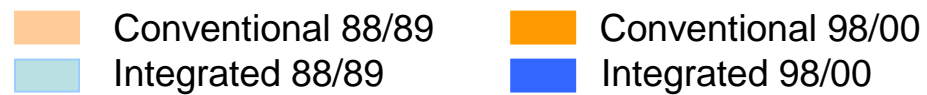
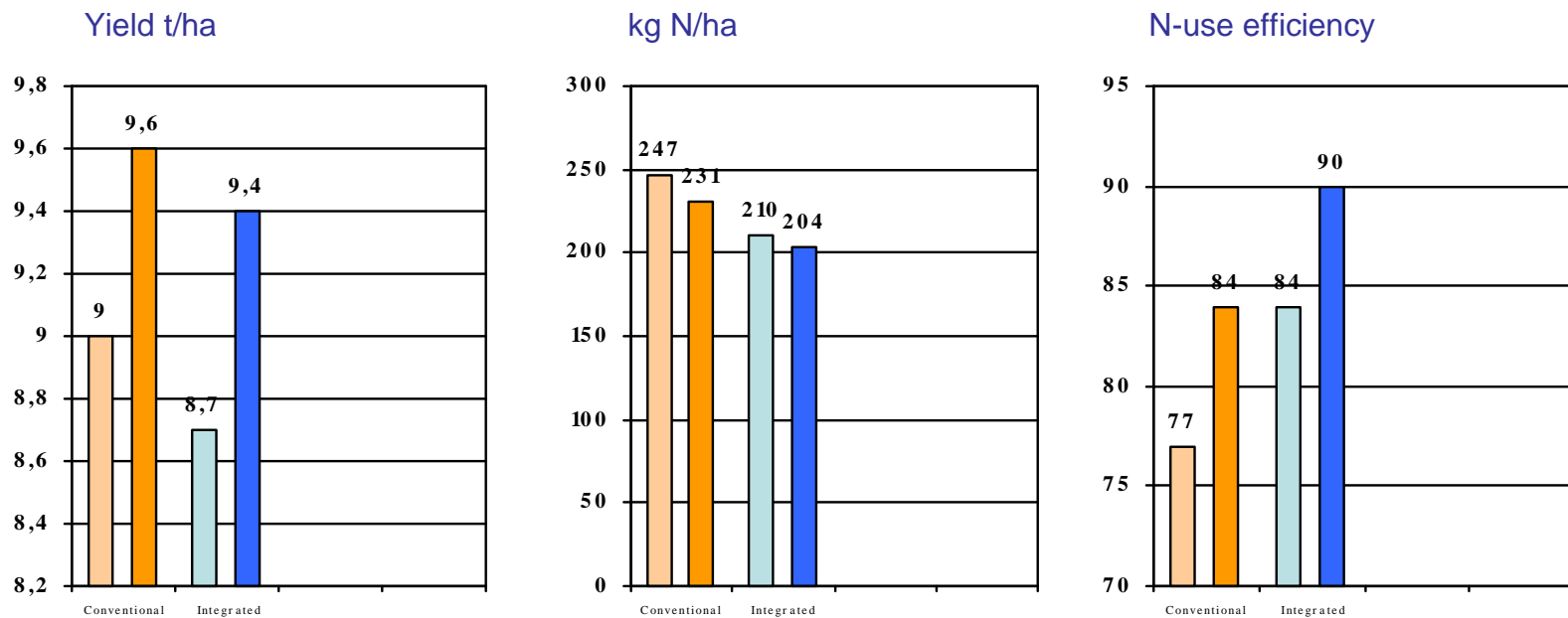
A big “Thank you” also goes to the cooperative “Above and below” (Drüber und Drunter) in the area “Langeler Bogen” south of Cologne, Germany.

And a particular “Thank you” goes to Stephan Deike, University of Halle, who has passed his PhD exam on Monday last week and who has sent his slides to EISA the next day.

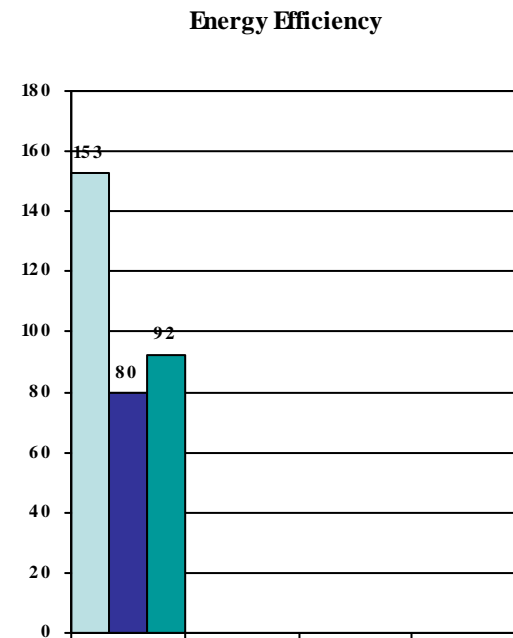
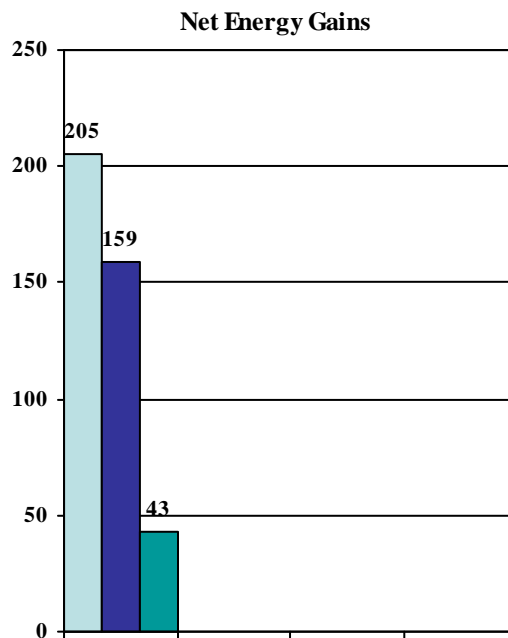
Nitrate leaching in different winter wheat production systems



Nitrogen efficiency of different winter wheat production systems



Energy balance of different farming systems



Integrated

Mono

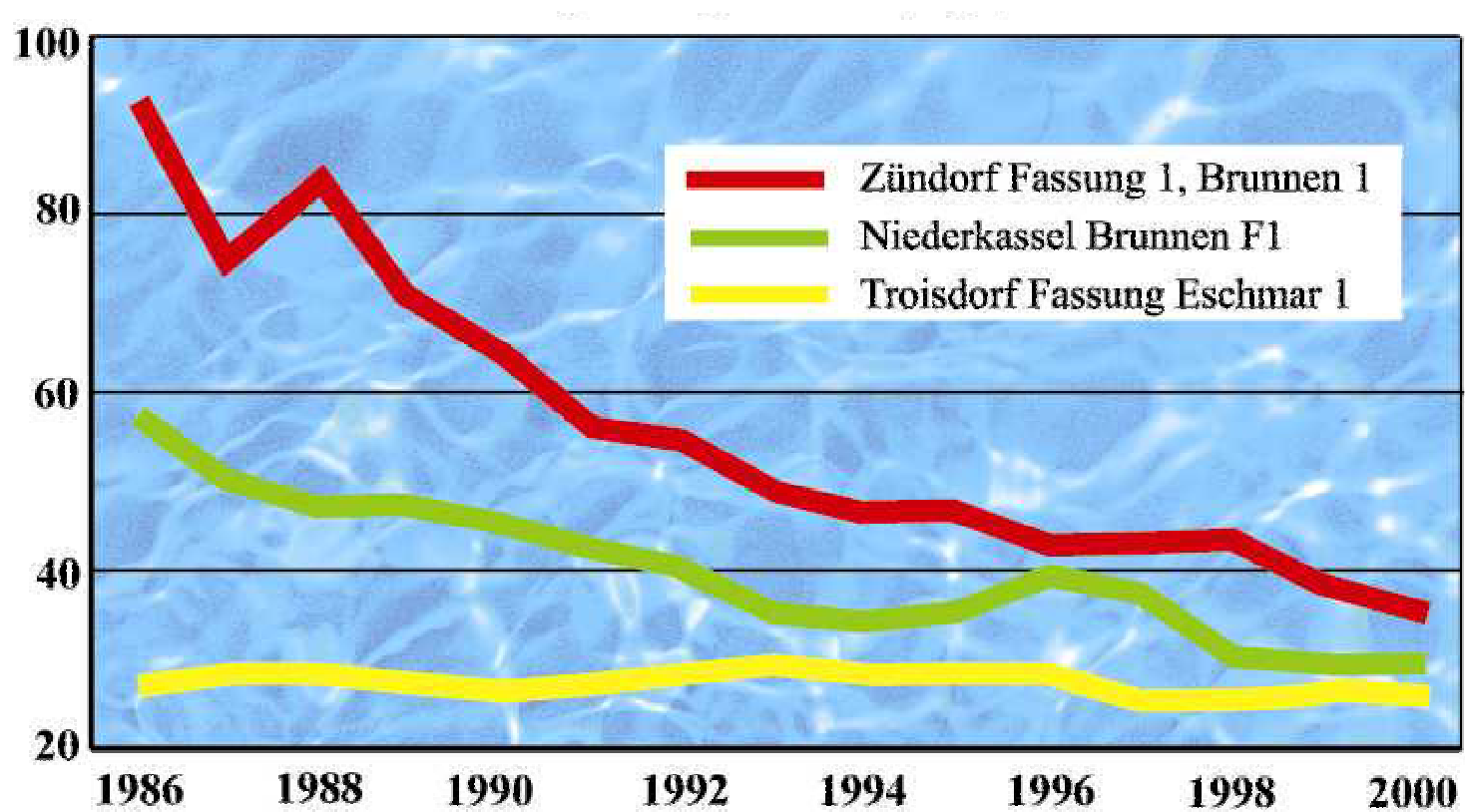
Organic

Biodiversity in different farming systems

Example: Carabides (average figures)

	Integrated Farming	Wheat Monoculture	Organic Farming
Individuals/trap/day	3,44	1,69	4,5
Number of species	47	35	38
Endangered species	7	3	4

Nitrate content of 3 drinking water wells (mg/l)



Measure:

Thorough soil sampling and testing

Savings per ha: 250 £

Using GPS for variable rate of fertiliser application

Savings per ha: 35 £

Explanation:

Awareness plus investments in knowledge and innovative technology pay off – economically as well as environmentally!



Measures:

Environmental measures such as buffer strips, beetle banks, maintenance of hedges etc. – in some cases allowing to reduce the usage of plant protection products ...

Savings per ha: 250 £

... and even allowing to reduce insecticides in some crops, some locations, some years to zero.

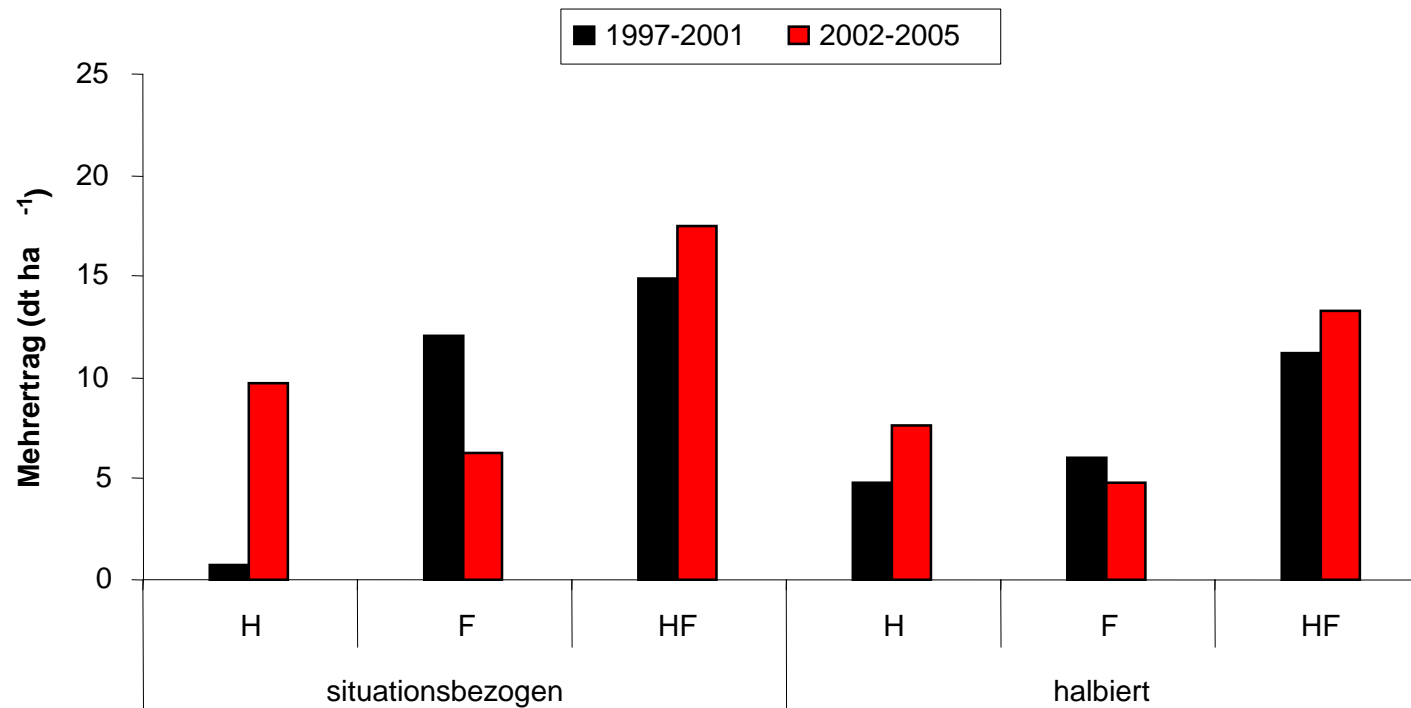
Savings per ha: 125 £

Explanation:

Awareness for and maintenance of ecological structures in the landscape may in some cases help to reduce the PPP-input needed.

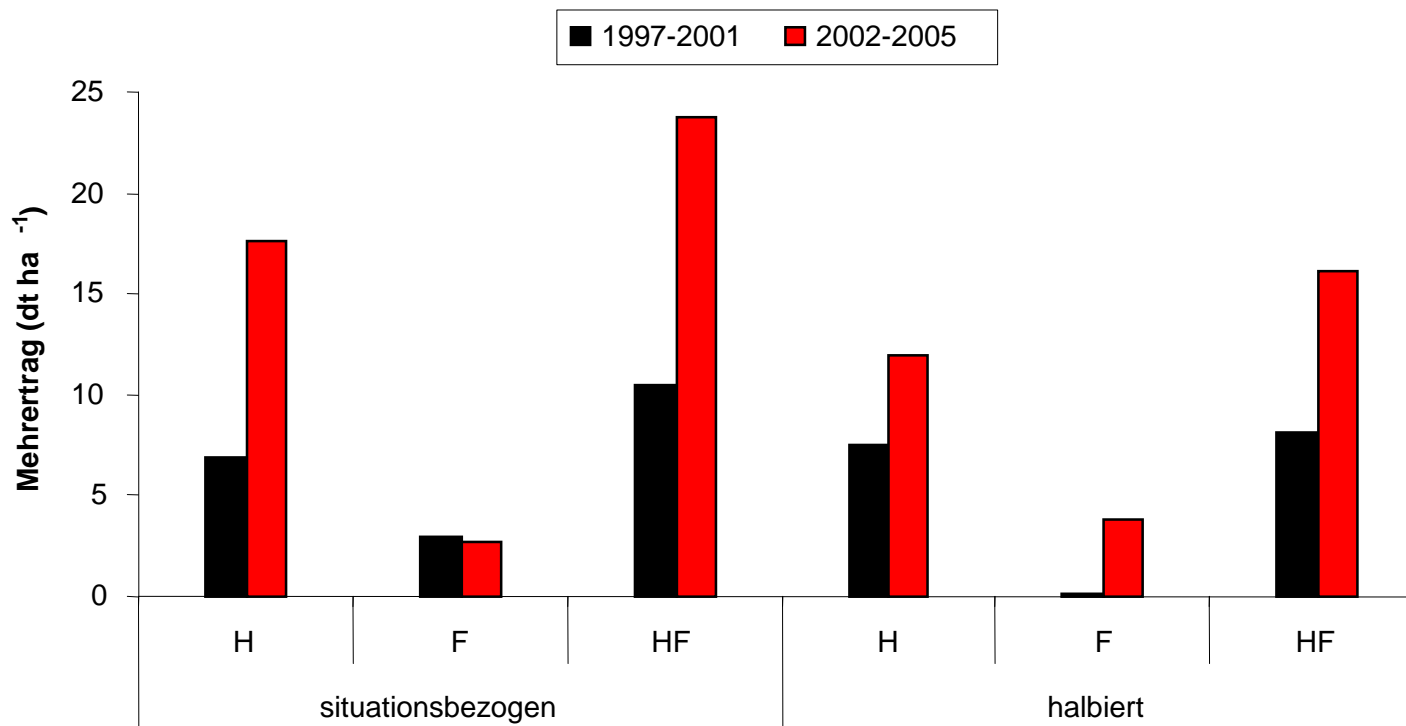


Mehrerträge bei Winterroggen* in Abhängigkeit von der Pflanzenschutzintensität (Dahnsdorf, 1997-2005)



* Mittelwerte des Marktfrucht- und Futterbausystems.

Mehrerträge bei Winterweizen* in Abhängigkeit von der Pflanzenschutzintensität (Dahnsdorf, 1997-2005)



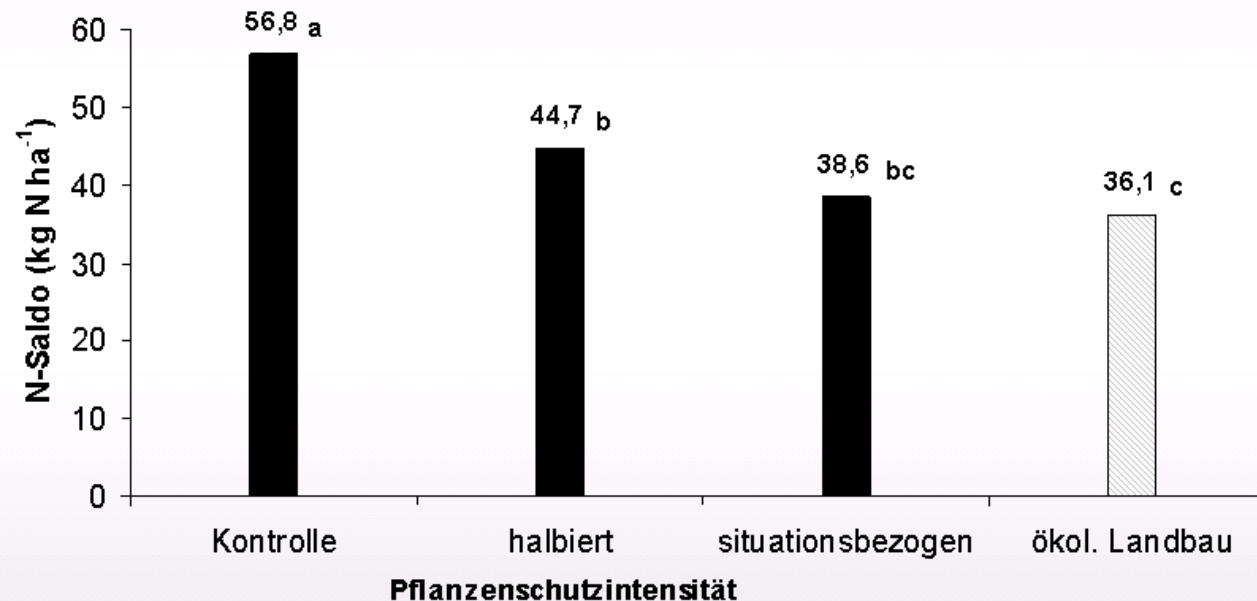
* Mittelwerte des Marktfrucht- und Futterbausystems.



Investigations on the resource efficiency of different farming systems
with specific emphasis on pesticide use intensity



N-Saldo in Abhängigkeit von Anbausystem und Pflanzenschutzintensität (Dahnsdorf, 2002-2006)



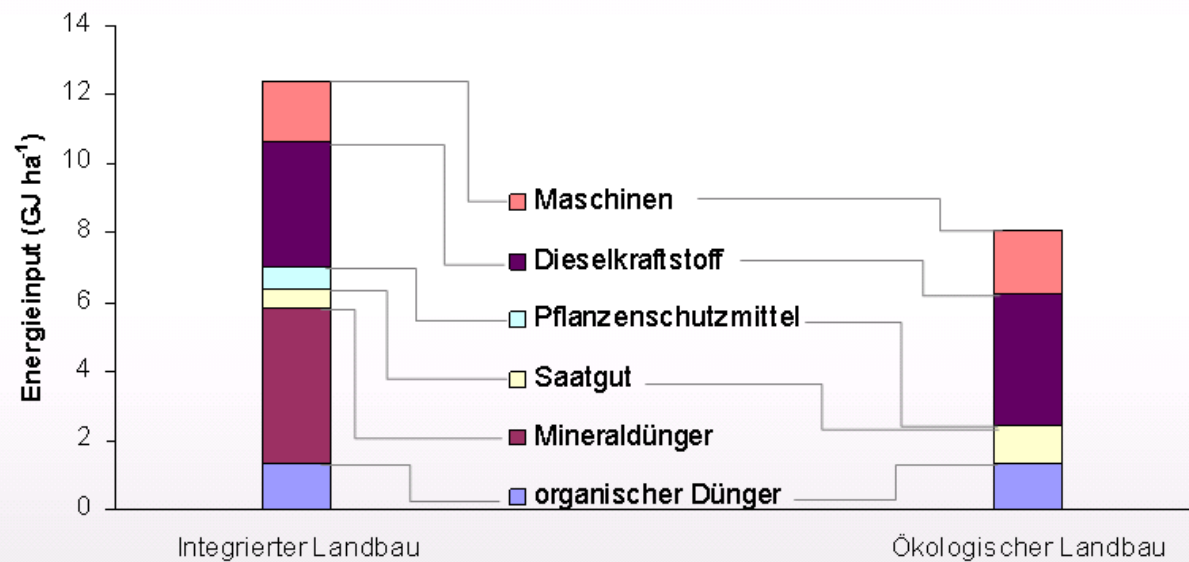
* Mittelwerte mit gleichen Buchstaben sind nicht signifikant verschieden ($P_{\alpha} = 0,05$). Die Untersuchungen beziehen sich auf die gesamte Fruchtfolge des ökologischen Landbaus und des integrierten Futterbausystems.



Investigations on the resource efficiency of different farming systems
with specific emphasis on pesticide use intensity



Einsatz fossiler Energie im integrierten und ökologischen Landbau (Dahnsdorf, 1997-2006)



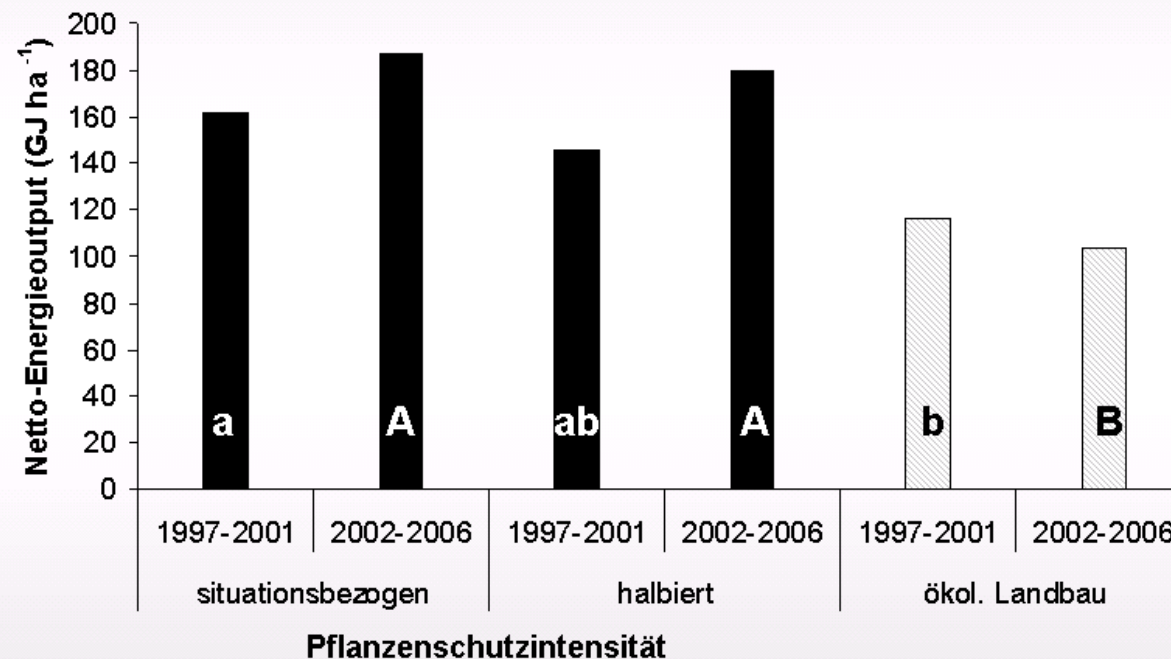
* Daten des integrierten Landbaus beziehen sich auf die Variante mit situationsbezogener Pflanzenschutzintensität im Futterbausystem.



Investigations on the resource efficiency of different farming systems
with specific emphasis on pesticide use intensity



Netto-Energieoutput in Abhängigkeit von Anbausystem und Pflanzenschutzintensität (Dahnsdorf, 1997-2006)



* Statistische Auswertung bezieht sich auf logarithmisch transformierte Werte im Mittel der Fruchtfolge. Grundlage der Berechnungen für den integrierten Landbau ist das Futterbausystem. Mittelwerte im gleichen Versuchsabschnitt mit gleichen Buchstaben sind nicht signifikant verschieden ($P_a = 0,05$).

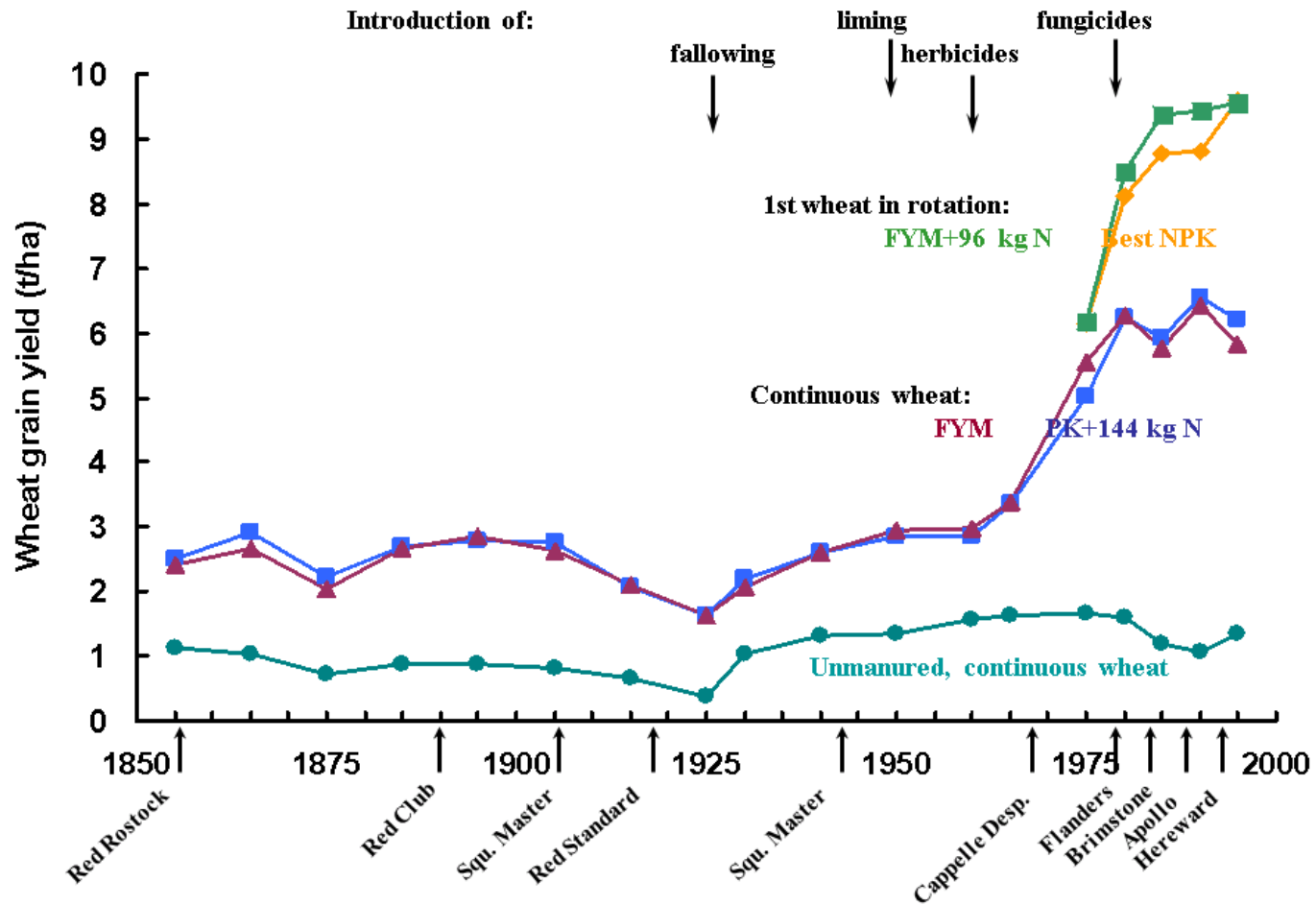
Interpretation of results I

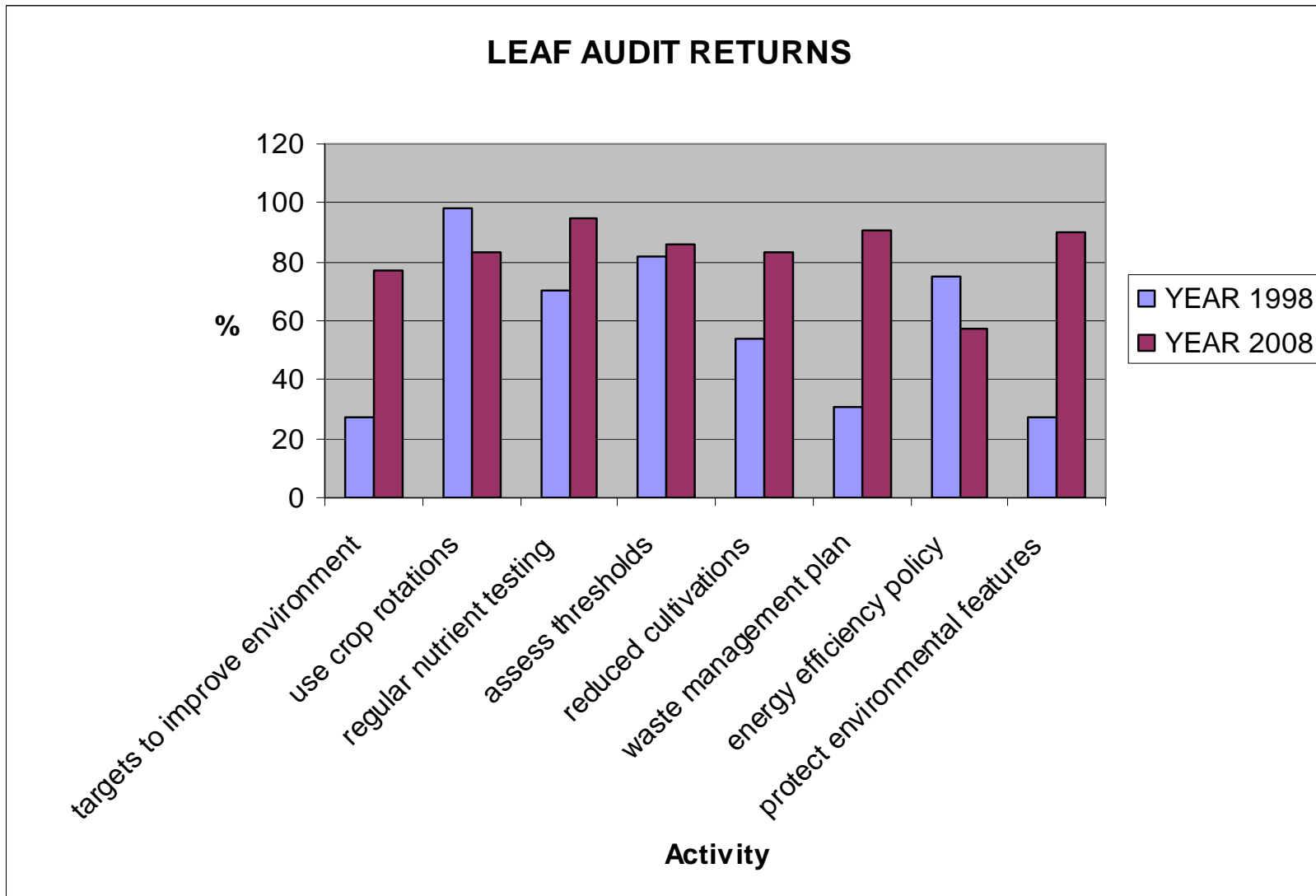
- The nitrogen and energy efficiency are „integrating“ indicators (covering various aspects) for the assessment of environmental effects of agricultural production systems as they are directly connected to other environmental indicators.
- If the use of plant protection products and the application of fertilisers are adapted to site and situation, Integrated Farming allows for N-balances which are about as low as N-balances in Organic Farming.
- If no plant protection products are used or if their use is reduced below the intensity needed, this will lead to higher N-balances and hence an increased N-loss potential.

Interpretation of results II

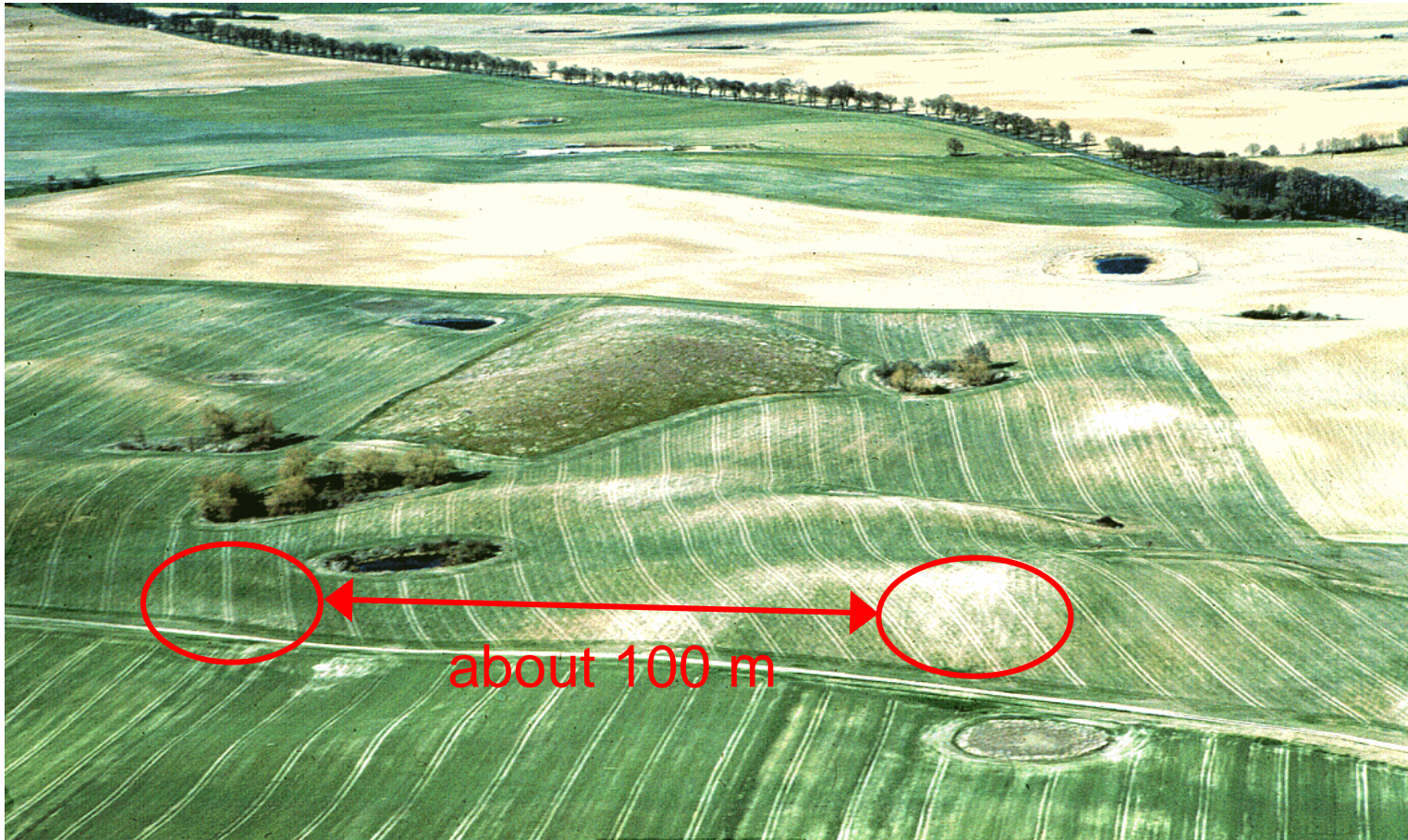
- The application of plant protection products leads to an increasing energy input per area unit (i.e. hectare). However, the net energy gains are increased to a greater extent if plant protection products are applied according to site and situation.
- Preferably, the N- and energy-efficiency of different cropping systems should be evaluated on the basis of complete crop rotations and extended periods of time rather than on the basis of individual crops and/or annual results.
- In order to achieve the high resource efficiency needed, i.e. in order to achieve high productivity and environmental compatibility, the use of input factors must be adapted to the yield potential of a given site and situation.

Wheat yields, varieties and major changes





Why an intelligent and site-specific approach makes sense, and why crop specific standards for Integrated Pest Management don't!



A **solution** will **neither** be achieved **by maximising** nor **by minimising** inputs **but** **by optimising** their use!

The decisive questions are:

- How **efficient** do we use limited resources such as soil, water, energy, plant nutrients etc.?
- What are the net **energy-gains** which can be achieved in a production system?
- Do we **protect** soils, groundwater, nature and generate sufficient **income** for the farming businesses at the same time?
- Are farmers able and willing to adopt **innovations** – i.e. does society accept that agriculture evolves just as any other business does?
- Do **politics set the frame** as to allow farmers to act site-specific and efficient at the same time?

Society depends on modern and sustainable agriculture in the sense of Integrated Farming – and Integrated Farming depends on the acceptance by politics and society!

All in all: The challenges lying ahead definitely need **intelligent solutions**.

These solutions must equally be

- **resource efficient**
- **high yielding**
- **environmentally friendly**
- **economically successful**
- **socially acceptable**

and must deliver **safe and high quality produce** for food, feed, fibre and energy.

Integrated Farming offers these intelligent solutions if – but only if – it is not regulated down to the last bit, **if the „tool box“** for farmers remains **big enough** to choose the right strategies and instruments according to their site and situation.

To achieve what is possible in theory, Integrated Farming needs your understanding and support in practice!

In his masterpiece „Gulliver’s Journeys“, the famous Irish writer Jonathan Swift makes his hero quote a sentence of the king of Brobdignag:

„Someone who can make two maize cobs or two blades of grass grow on a piece of land where just one grew before, does more for mankind and for his country than all politicians together.“

This sentence makes me wonder:
What would the king have said if he saw politicians setting the frame as to allow farmers to grow these two maize cobs instead of one?

