

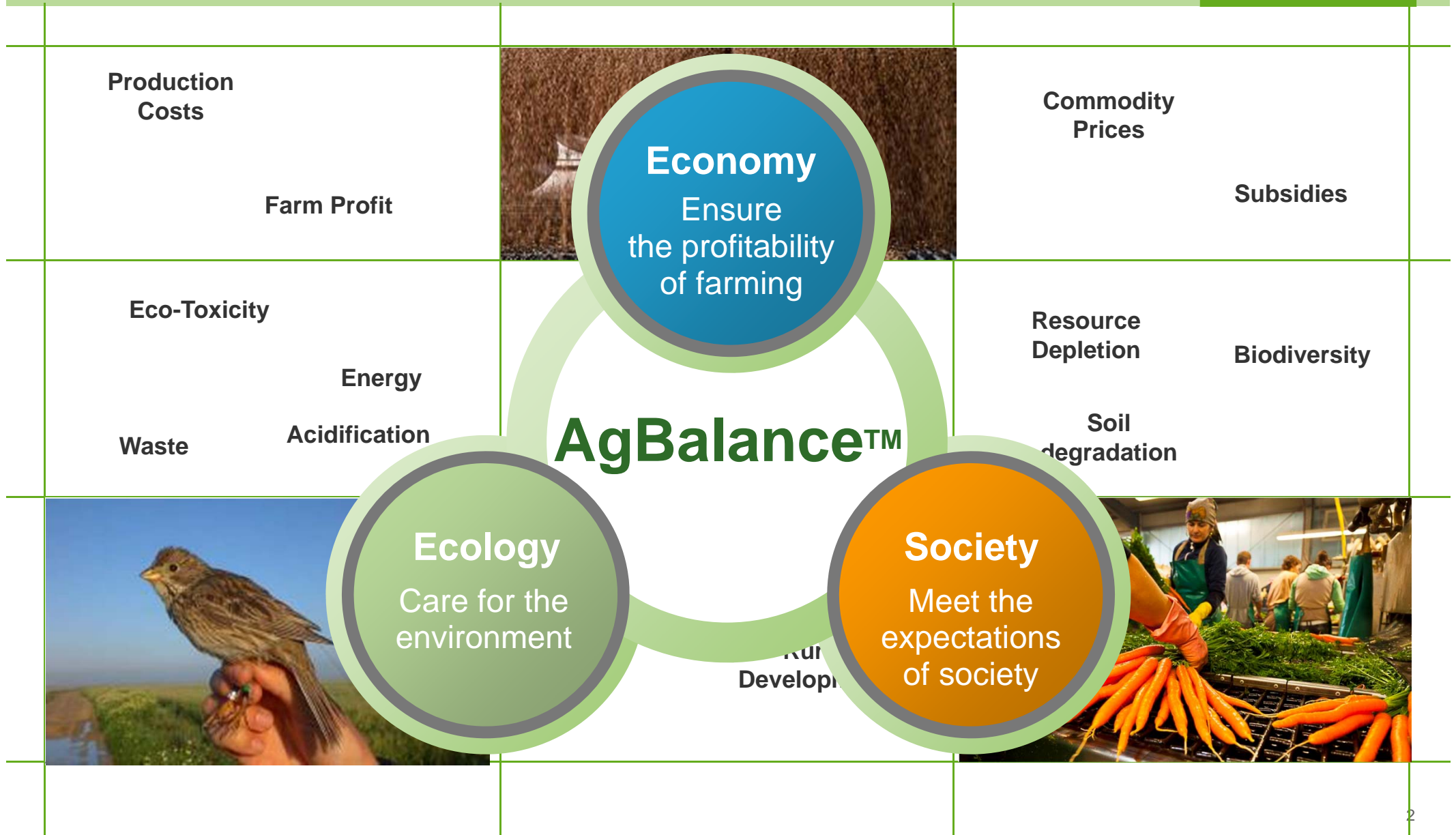


**AgBalance™**  
A clearer view of agricultural sustainability

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# Sustainable Agriculture

## Balancing all three dimensions



# BASF's motivation to develop AgBalance



- Increase knowledge on sustainable agriculture and use as guidance for own R&D
- Design innovative, more sustainable solutions for our customers
- Foster more rational debate on sustainability in agriculture

# AgBalance Method Development

## Measure sustainability in agriculture

- Holistic method for life cycle assessment in agricultural and food value chain production processes
- Helps to make informed decisions on how to manage improvement
- 16 categories, 69 indicators, more than 200 evaluation factors
- Independent assurance of functionality and coherence received by

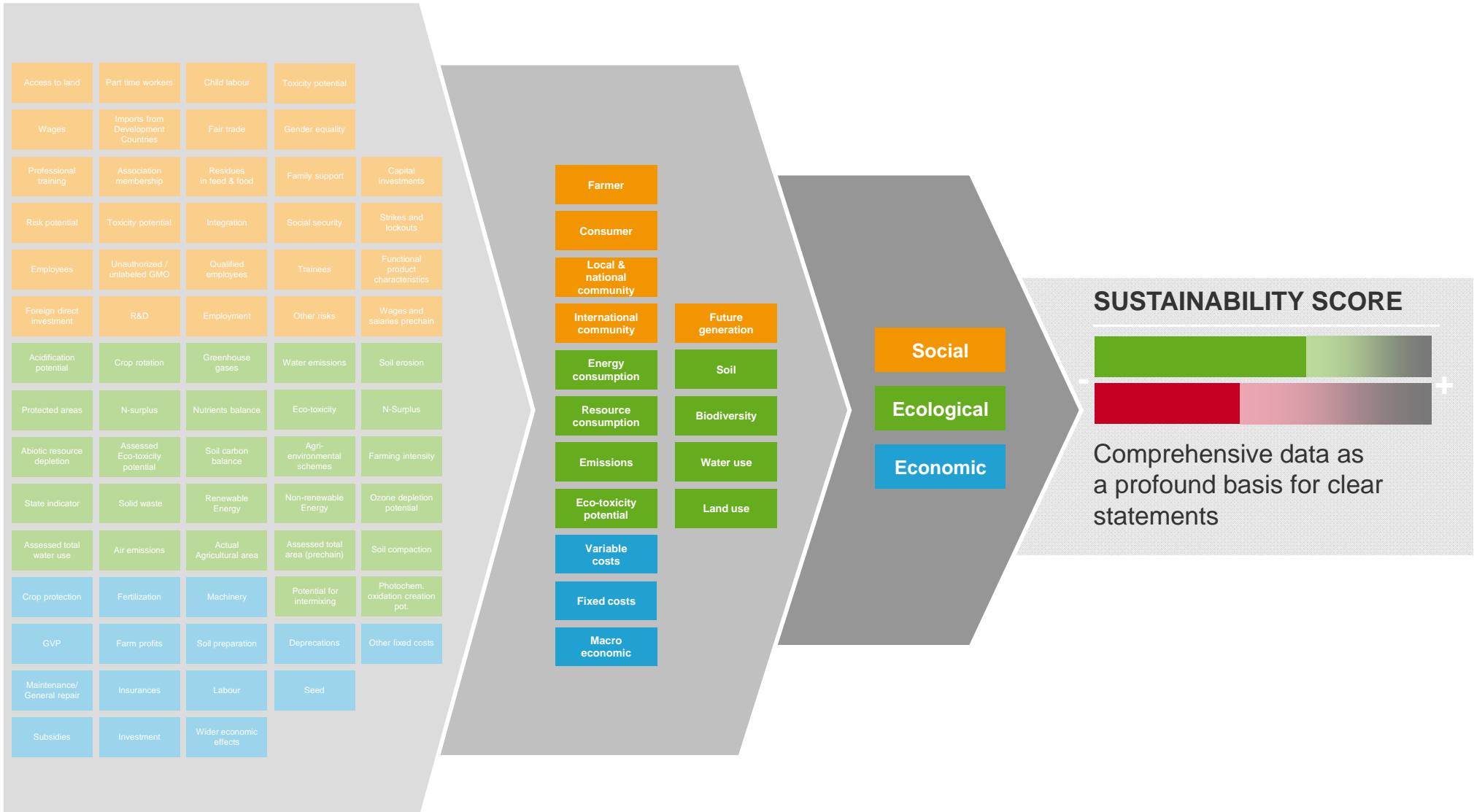


# What does AgBalance assess?



→ Scalable depending on scope and boundaries of study

# From complexity to clear conclusions



# Looking closer at AgBalance

## Dimensions, categories and indicators



**Ecological impact** is assessed in effect categories like **water use, land use, emissions and resource efficiency** as well as indicators related to **soil health and biodiversity**.



**Economic aspects** considered include indicators like **variable costs** and fixed costs, but also macro-economic indicators such as **subsidies, share of agriculture in GDP** and **farm profits**.



**Social impact** is assessed in stakeholder categories and includes indicators like **working conditions and salaries**, but also consumer attitude and on a more regional scale **access to land, employment, fair trade and social security**.

# Case study

## Winter oilseed rape in Northern Germany

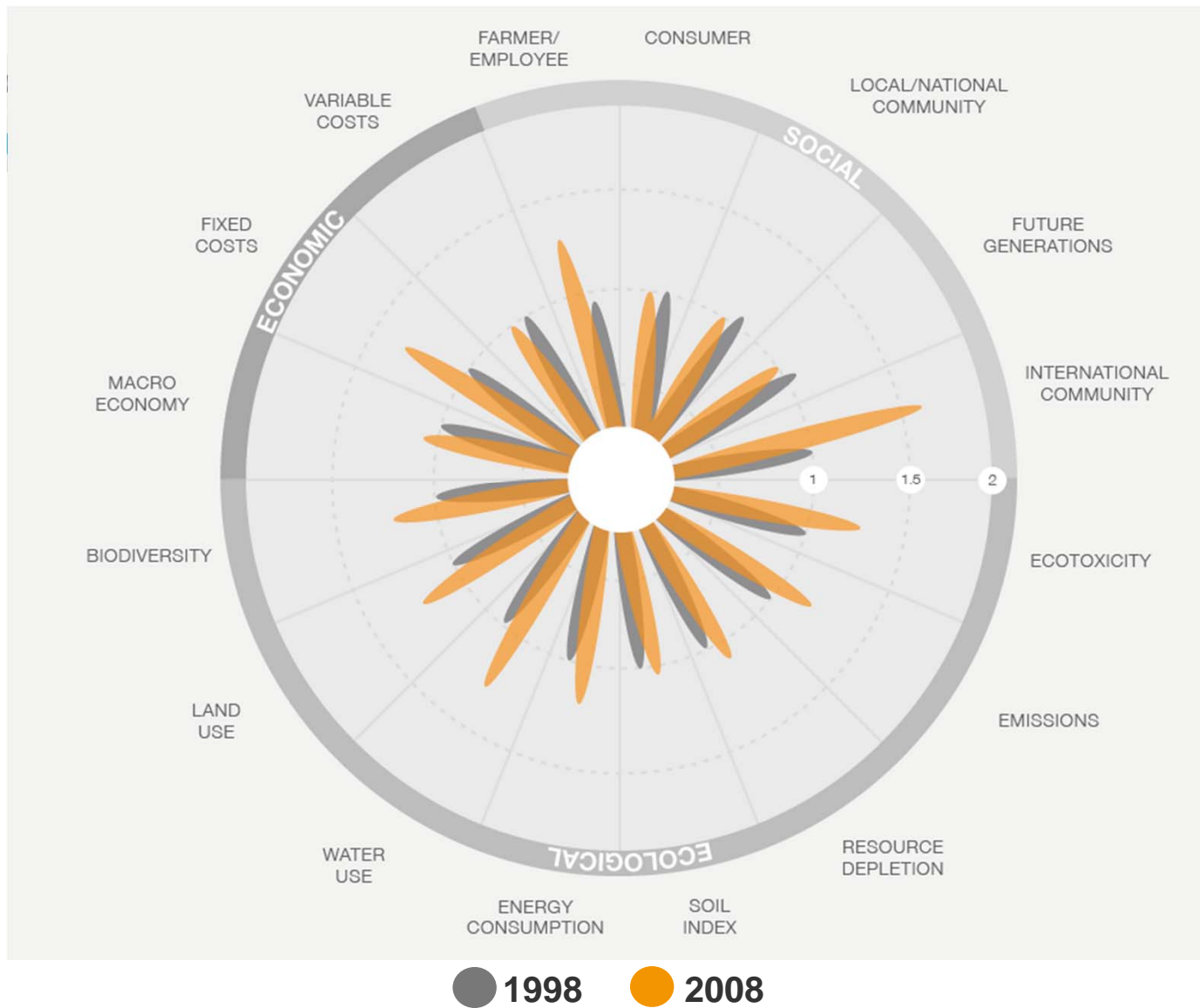


- **Winter oilseed rape production in Mecklenburg-Vorpommern (Northern Germany)**
  - **User benefit: 1 ton of rapeseed at field gate**
  - **Alternatives: Good Agricultural Practice in 1998 and in 2008**
  - **Data sources: Landesforschungsanstalt, KTBL, farmers polls, EUROSTAT**
- **Yield: 2.7 tons/ha in 1998 and 4.0 tons/ha in 2008 (higher yield potential of OP varieties and introduction of hybrids)**

→ **Has productivity been increased at costs of sustainability?**

# Case study

## Results of 16 categories

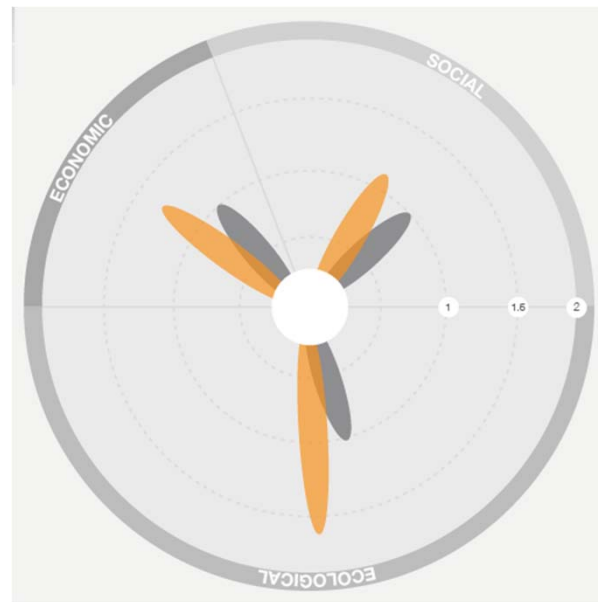


# Case study

## Aggregation and final score

**Economy**

**Society**



**Ecology**

**Total**



● 1998 ● 2008

# AgBalance

## Possible contributions

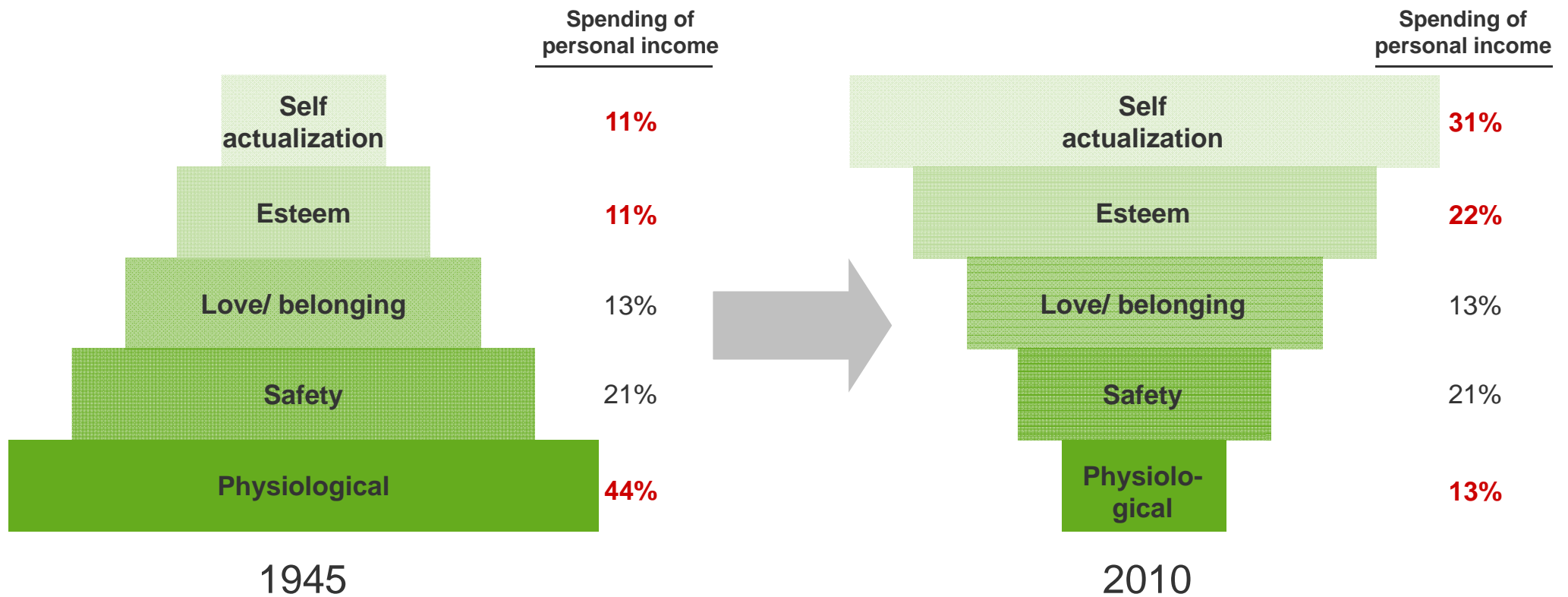
How can corn production systems be improved to make it more sustainable in water scarce regions?

How could sugarcane production become more sustainable, especially with regard to social aspects?

What are the most efficient solutions to come to a reduction of greenhouse gas emissions in the production of oilseed rape for biofuels?

In Asia, there are regions with little land availability and an intensive agricultural use of the remaining land. What crops and crop rotations are the most sustainable under these conditions?

# Maslow's hierarchy model - Change of spending in Germany since 1945



→ With the increased and secured supply of food, the needs shift

# The challenge.....

If a new technology does not address the unfulfilled needs of Maslow, the technology will have difficulties to prosper

- **Sustainable development in agriculture is also dependent on the introduction of new technologies**
- **For new technologies to gain acceptance, a fact-based dialogue between players in the value chain as well as with politicians and public is necessary**
- **Sustainability assessments like AgBalance can contribute to this dialogue if they are**
  - » considering responsible and sustainable behavior holistically
  - » based on life cycle thinking to identify burdens in the value chain
  - » fact-based and decision oriented
  - » transparent



The Chemical Company