



**VII International conference on Life Cycle
Assessment in the agri-food sector
- Bari, 22-24 September 2010**

Measuring sustainability in the agri-food sector: BASF's Eco- Efficiency and SEEBALANCE Analysis



The Chemical Company

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BASF 2015

BASF
The Chemical Company

**Ensure
Sustainable
Development**

**Help our customers to
be more successful**

**The
Chemical
Company**

**Form the best team in
industry**

**Earn a premium on
our cost of capital**

Sustainability Assessment Methods and Eco-Efficiency Analysis

- ISO 14040-14044
- Life Cycle Inventory**
... quantification of inputs and outputs
 - Life Cycle Assessment**
... evaluation of environmental impacts
 - Eco-Efficiency Analysis**
... comparison of products or processes
... including all life cycle costs
... ecological and economic aspects have equal weight in the assessment
... standard tool in the BASF Group; more than 400 analyses carried out
... method certified by TÜV and National Sanitation Foundation



SEEBALANCE
... including social aspects

Matryoshka principle:
each step „nests“ the previous one



Environmental Assessment

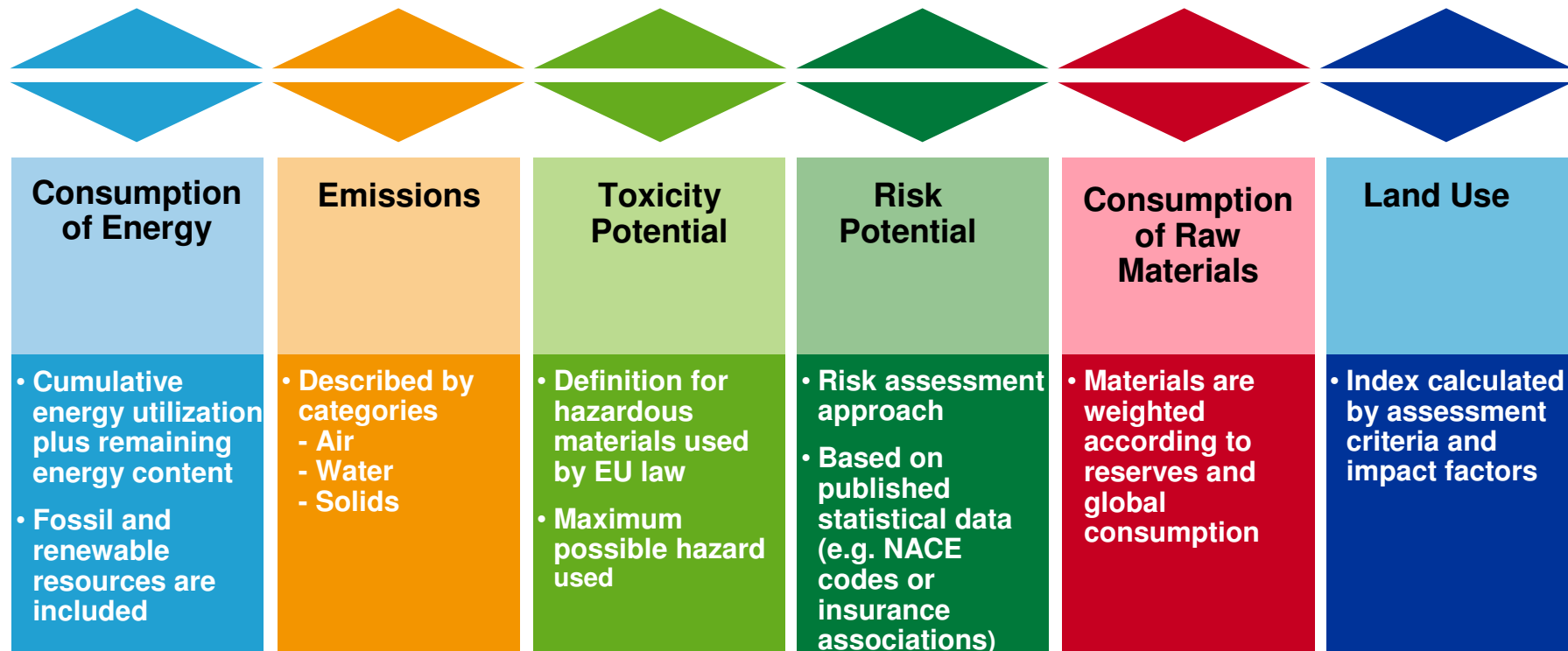


- **Eco-profile or Life Cycle Inventory**
- **Life Cycle Assessment**
- **Carbon Footprint**



Environmental Categories

Environmental impact over the entire life cycle*



*Data acquisition and calculation is done according to ISO 14040 and 14044 (ecological part)

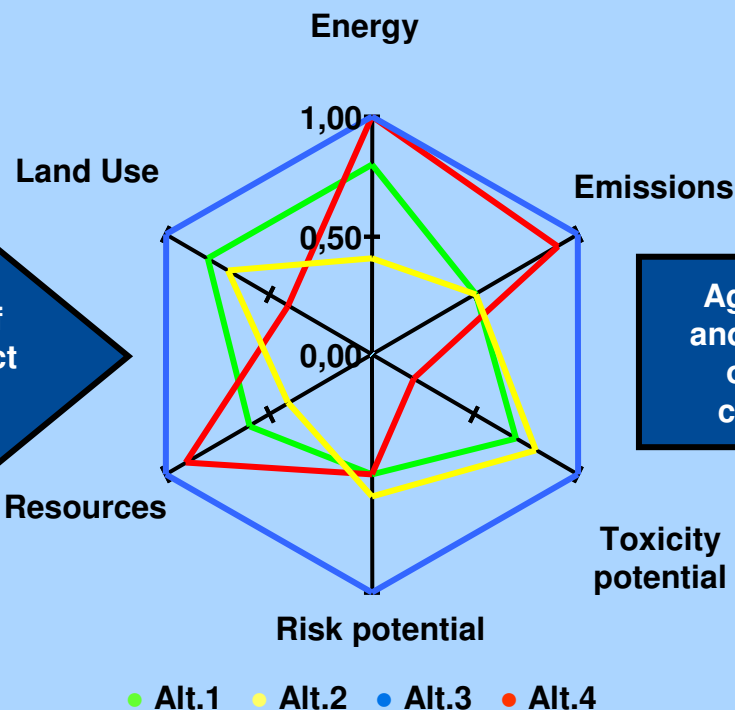
Environmental Assessment

Effect Category

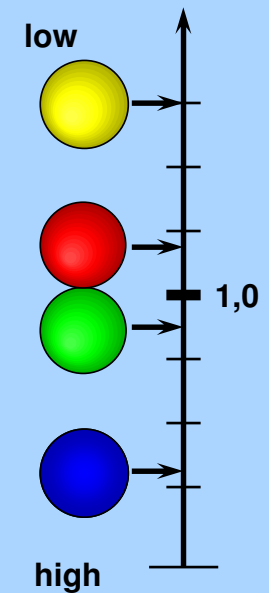
Resource Consumption
Energy Consumption
Emissions
Tox-Potential
Risk Potential
Land Use

Calculation of
relative product
position

Ecological Fingerprint



Environmental Burden



Calculation → Normalization → Weighting → Aggregation

Integration of cost assessment



What is the effect of the improved environmental performance in the costs of the product?

- **Life cycle costs (LCC)**
- **Total cost of ownership (TCO)**

Life Cycle Costing (LCC) Total Cost of Ownership (TCO)

Total costs to own a product throughout its life:

purchase



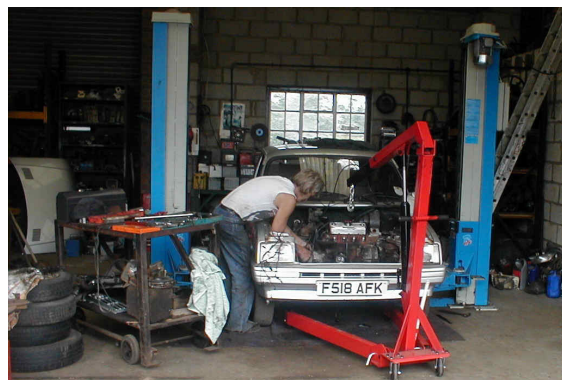
depreciation



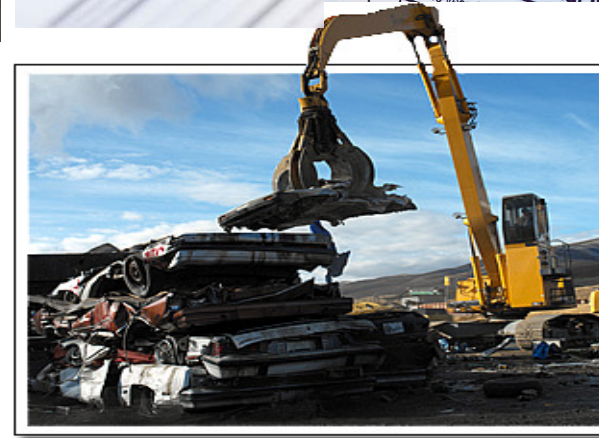
Insurance, taxes



consumption



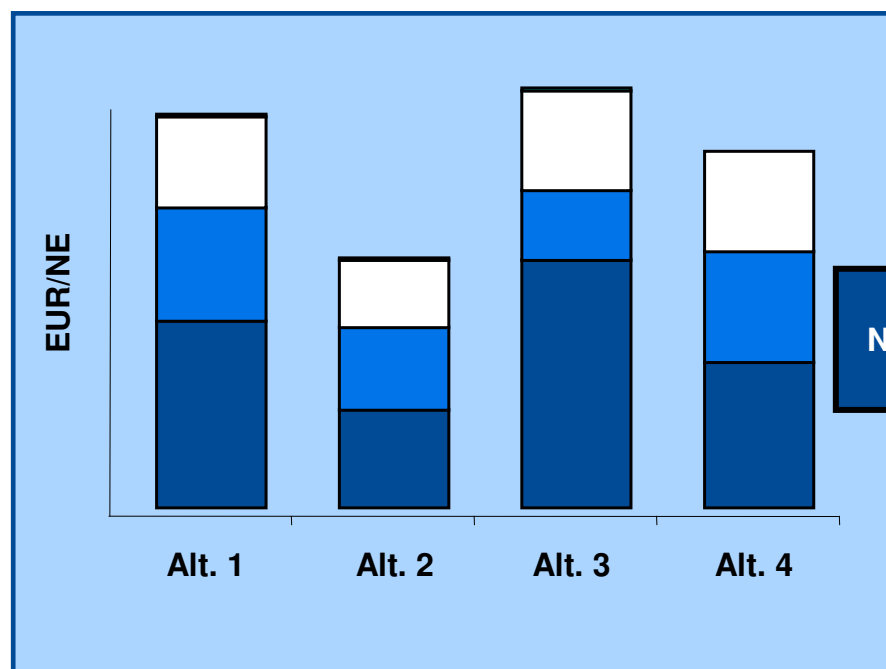
maintenance



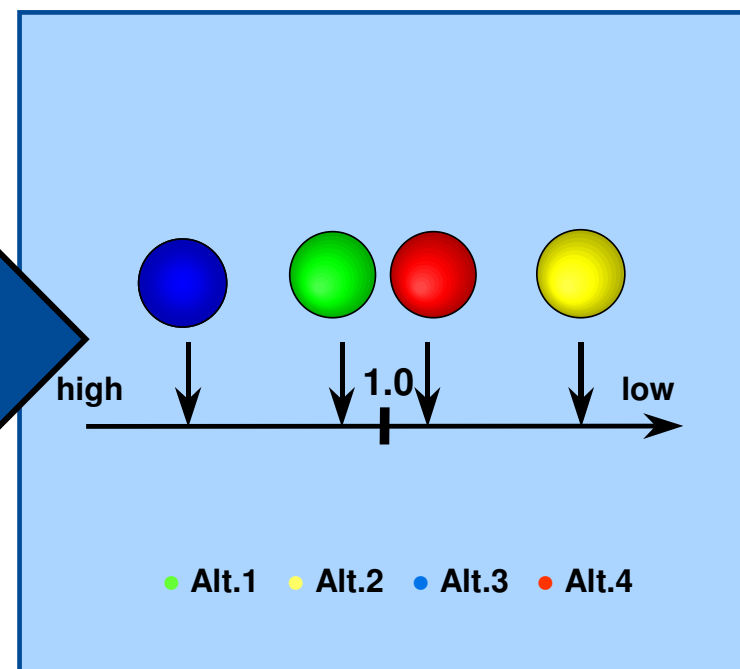
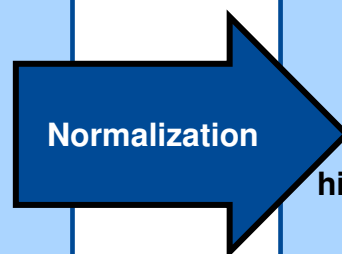
waste fees

Cost Analysis

Costs (absolute)

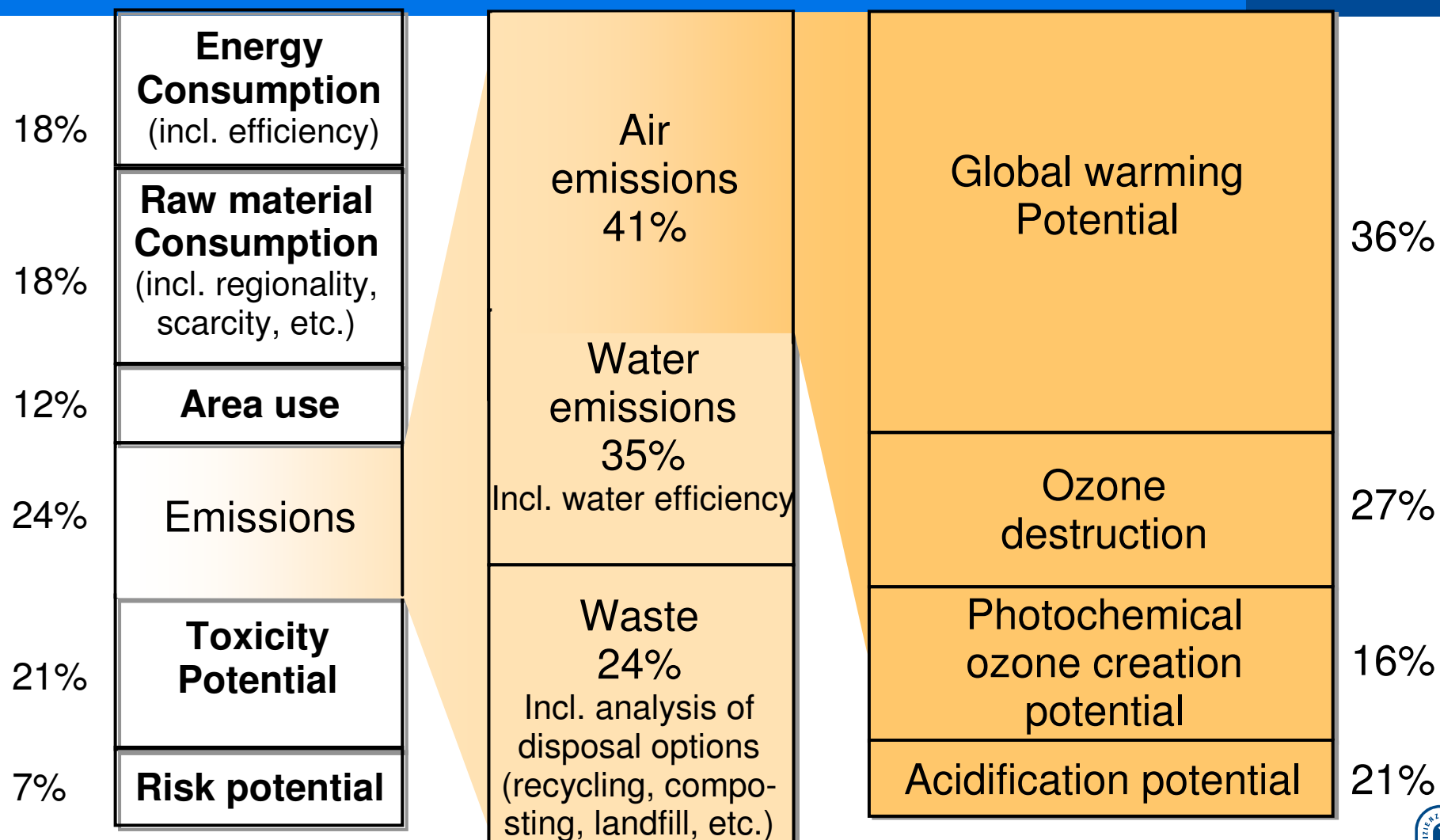


Costs (relative)



Addition of all real costs along the life-cycle!

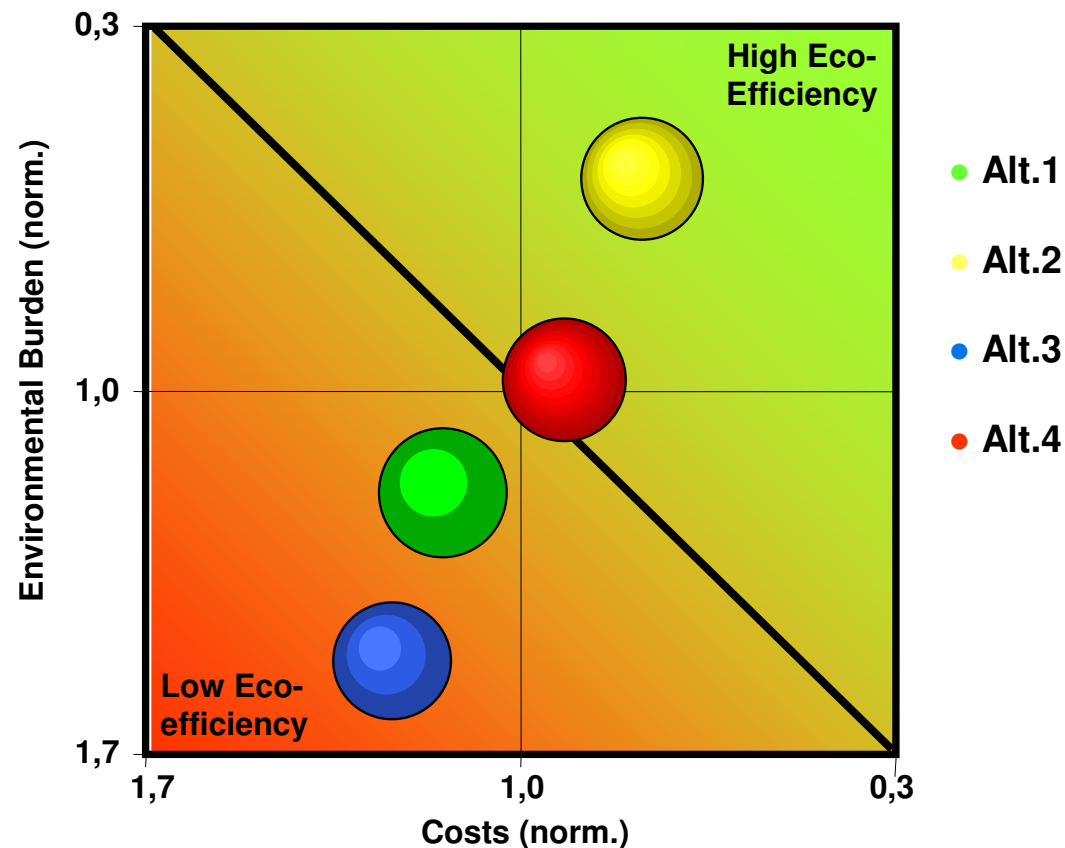
Eco-efficiency analysis: Determination of environmental impact



Eco-Efficiency Portfolio: Example

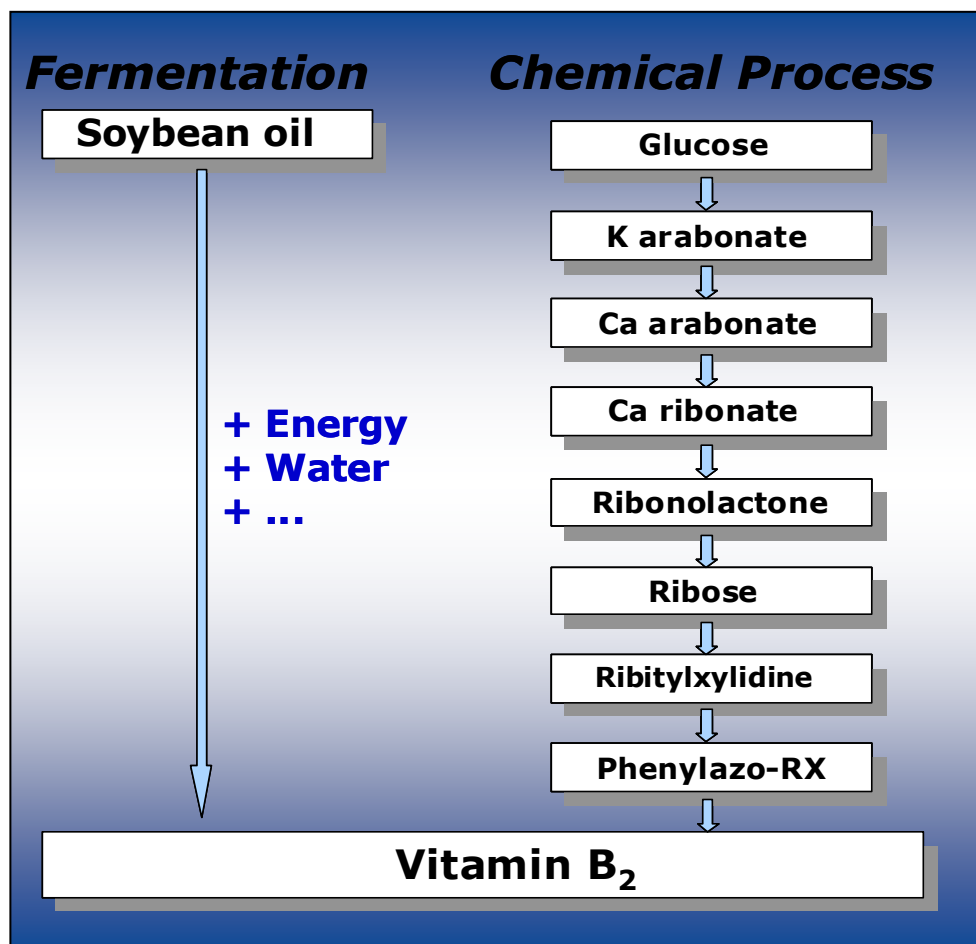
Customer
Benefit:

Production,
Use and
Recycling of ...

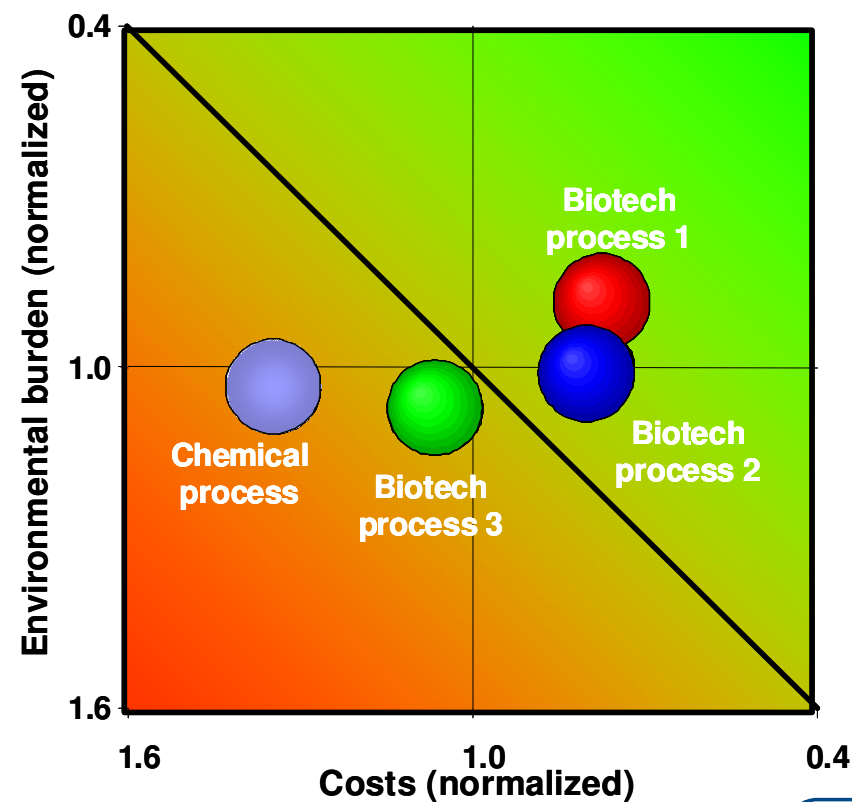


Bubble size can be used as a third indicator

The Three Pillars of Sustainable Development is the Basis of the SEEBALANCE



Vitamin B₂ for production of feed premixes



Example: Fish farming

Eco-efficiency analysis by our customers



- Partners: Fish farming industry and scientific institutes in Scandinavia
 - **Internet portal** for performance of independent eco-efficiency analyses
 - Feed composition can be selected from 30 ingredients for various fish species
- The eco-efficiency manager allows customers to optimize their formulas independently

www.eeaman.com

Eco-Efficiency Analysis Manager Online - Microsoft Internet Explorer

Adresse <http://www.eeaman.com/index.php>

Eco-Efficiency Analysis Manager Online
Fish diets

Logged in as **Peter Saling**
[Logout](#)

Inputs | Basics | Choose Manager **Fish diets** **Change**

Inputs

☒ Salmon diets | ☒ General factors | ☒ Fish diets A | ☒ Fish diets B | ☒ Fish diets C | ☒ Fish diets D | ☒ Feed production

[View Chart](#) [Save Current Values](#) [Restore Latest Saved Values](#)
[Restore Default Values](#)

Salmon diets

Customer benefit kg

Starting weight g

Final weight g

Volume per cage cbm

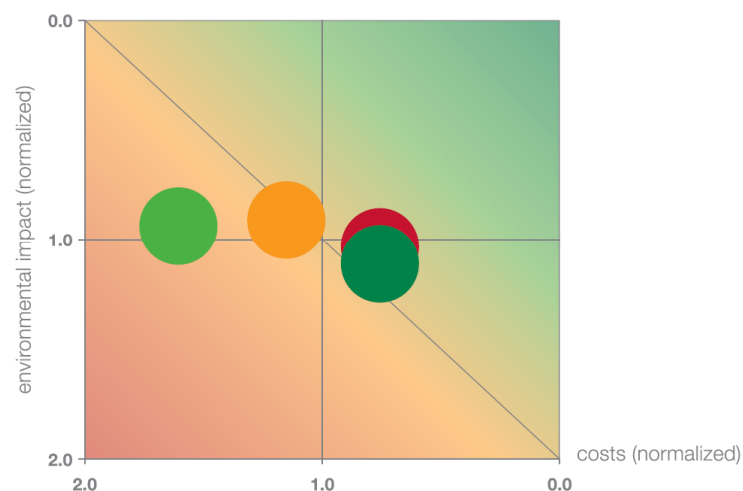
[View Chart](#) [Save Current Values](#) [Restore Latest Saved Values](#)
[Restore Default Values](#)

General factors

Title of diets [Alter](#)

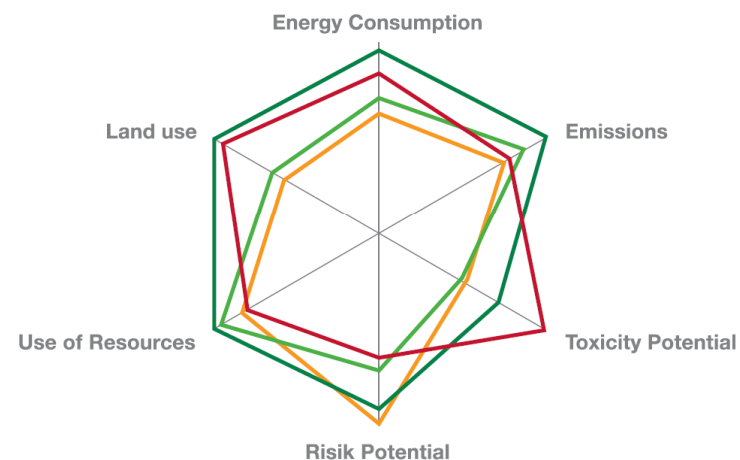
Eco-Efficiency example: Growing of Apples

Eco-efficiency of a Braeburn apple from Europe and overseas (Point of time: April)



■ Germany ■ New Zealand ■ South Europe ■ Chile/Argentina

Ecological finger print of the apples (Point of time: April)
(worst alternative equals 1, all other relative to it)

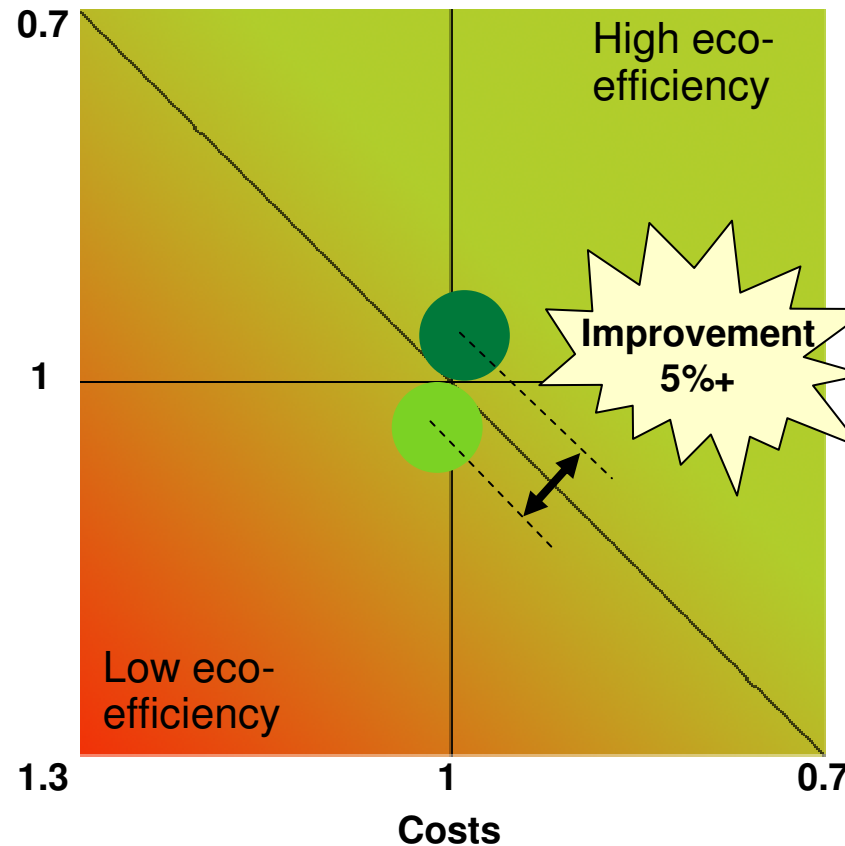


Greater Eco-efficiency of corn production in USA with Headline®

Case study

Per unit of
Corn (grain)
lowa case

Environmental impact



System

Bottom line: Greater eco-efficiency with Headline® use in corn

Sustainability Aspects of Agriculture

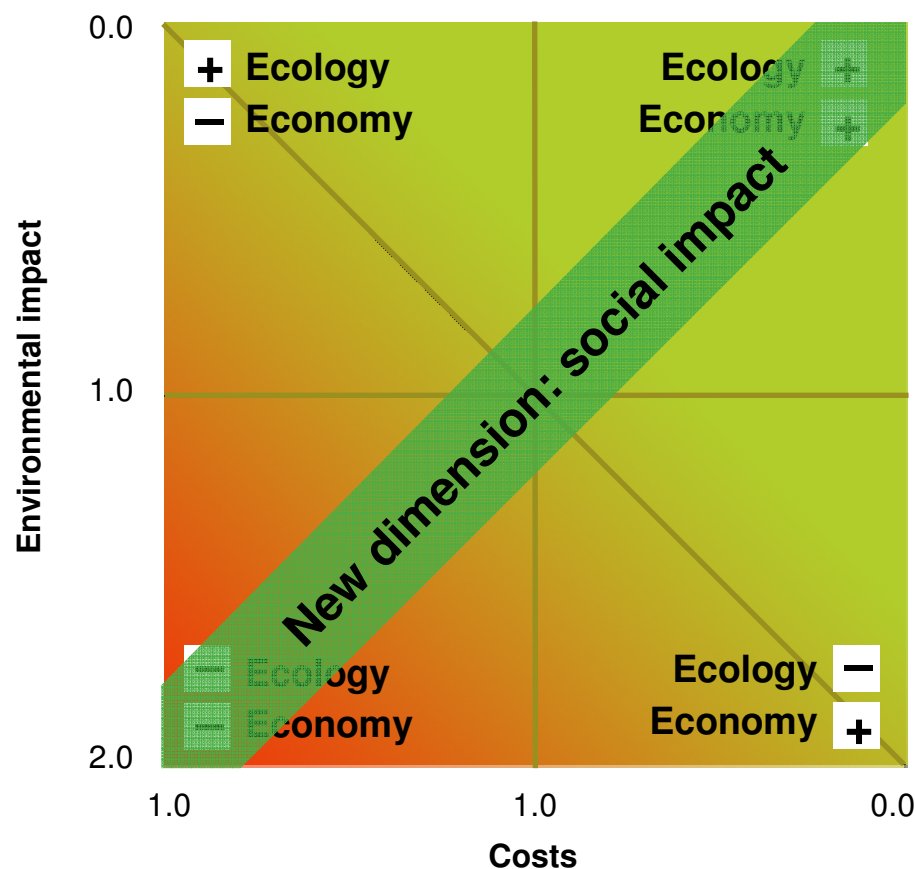


- Agriculture is beautiful green fields
- Agriculture is bountiful vegetables
- Agriculture is ripe fruit – **and agriculture** is much more.
- Improved varieties and crop protection products
- Growing more on less land, **preserving bio-diversity** and wildlife habitats
- More productivity with less labour
- More **choice for education**
- Agricultural innovation **inspires young farmers to adapt to changing farming conditions and markets**
- Higher yields provide higher incomes
- Opportunities for **schooling and health care**
- Knowledge of integrated pest management can improve **crop quality and marketability**

From Eco-Efficiency Analysis to AgBalance

New areas:

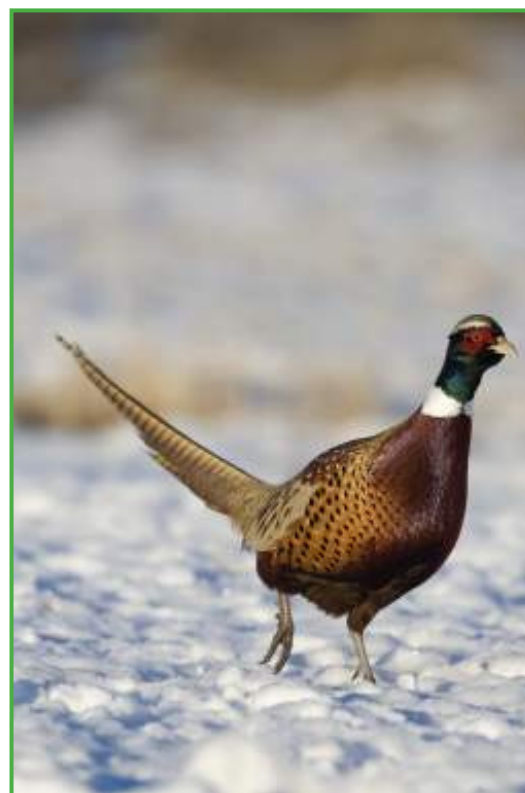
Biodiversity
Soil



Environmental Impact

Biodiversity:

- Agri environmental schemes
- Protected area
- Ecotox potential
- Farming intensity
- Fertilizer intensity
- Crop rotation

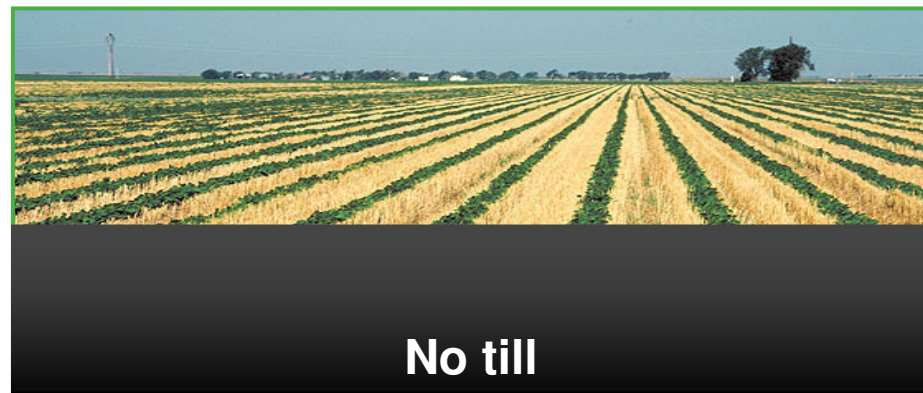


- Growing more on less land, preserving biodiversity and wildlife habitats

Environmental Impact

Soil:

- Organic Matter
- Nutrients
- Compaction
- Erosion



- Knowledge of integrated pest management can improve crop quality and marketability

Social Impact; Examples

- Working accidents/diseases
- Educational skills
- Average salaries
- Food supply security
- Migration trends



How does BASF use the Eco-efficiency Analysis and SEEBALANCE?



Strategic Decisions

- Investment decisions
- Technology decisions
- Site decisions
- Evaluate product portfolio

Marketing, Customers

- Demonstration of product advantages
- Improved customer relations
- Product Differentiation
- Better understand competitive advantages

Research and development

- Quantification of the most important factors
- Drive sustainable products and processes
- Drive production/process improvements

Stakeholder and Government Dialogue

- Communication with authorities
- Demonstration of Sustainability
- Government “approvals”

The competence center of product safety within BASF- your partner in questions of:



- **Eco-Efficiency Analysis, LCA**
- **Sustainability, SEEBALANCE**
- **Eco-Efficiency Internet managing tools**
- **Eco-Efficiency Label**
- **Business Development**
- **REACH**
- **Carbon Footprints**



Our Homepage: (<http://www.oekoeffizienzanalyse.de/>)

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