



Swiss Federal Research Station for  
Agricultural Economics and Engineering  
CH-8356 Taenikon

# ***LCA of Animal Products from Different Housing Systems***

## **Relevance of Feedstuffs, Infrastructure and Energy Use**

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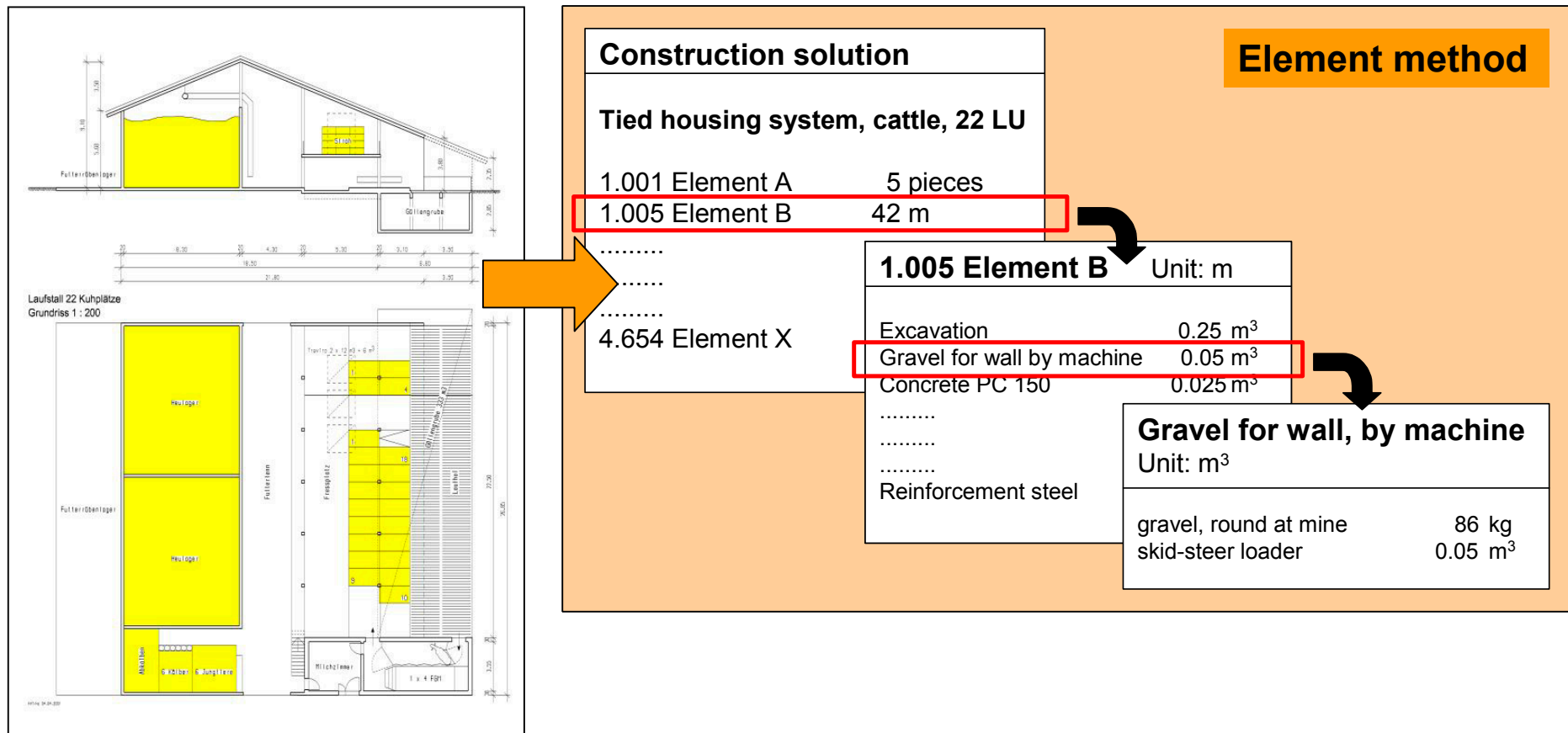
# Background & Goals

- ◆ **Increasing use of animal-friendly housing systems**
  - animal welfare legislation & direct payments
  - label schemes
- ◆ **Not much information on the environmental impacts of different animal housing systems**
- ◆ **Environmental impact assessment of animal products:**
  - Milk from cows in
    - ❖ tied housing
    - ❖ cubicle housing
  - Fattening pigs from
    - ❖ pens with fully slatted floors
    - ❖ multi-surface systems
  - Special emphasis on buildings (building material, energy)
  - Overall assessment including economic efficiency, animal welfare, product quality

# Methodological aspects

## ◆ Focus on infrastructure

### ● Buildings (construction and use)





# Case study milk



## Tied housing



- ◆ Milk yield: 7000 kg
- ◆ 60 days pasture

## Cubicle housing



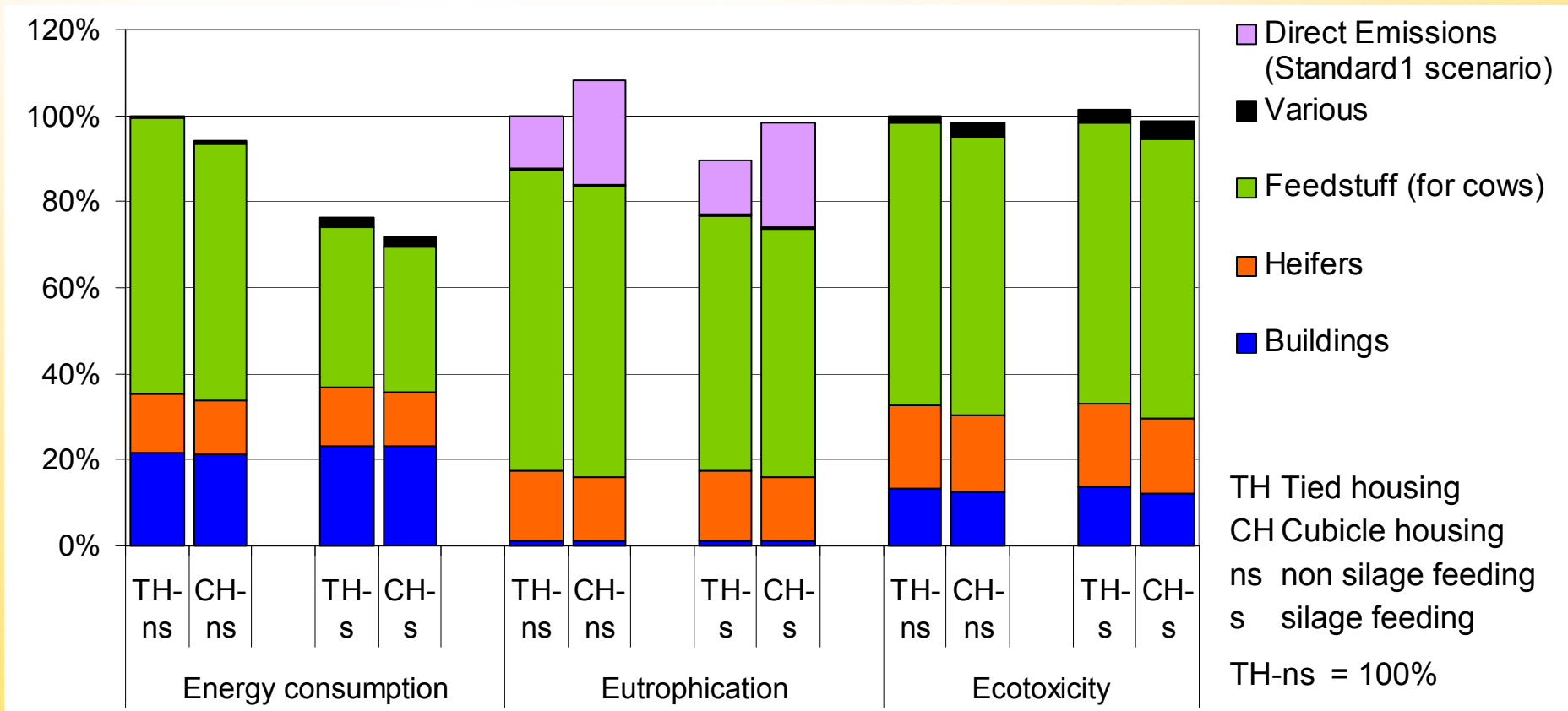
- ◆ Milk yield: 7100 kg
- ◆ 198 days pasture

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- ◆ Herd size: 20 & 40 cows
  - ◆ Feed:
    - silage (grass, maize, hay, concentrate) or
    - non-silage (hay, grass, fodder beet, maize, concentrate)
  - ◆ FU: 1 kg cooled milk at farm tank

# Milk - Results



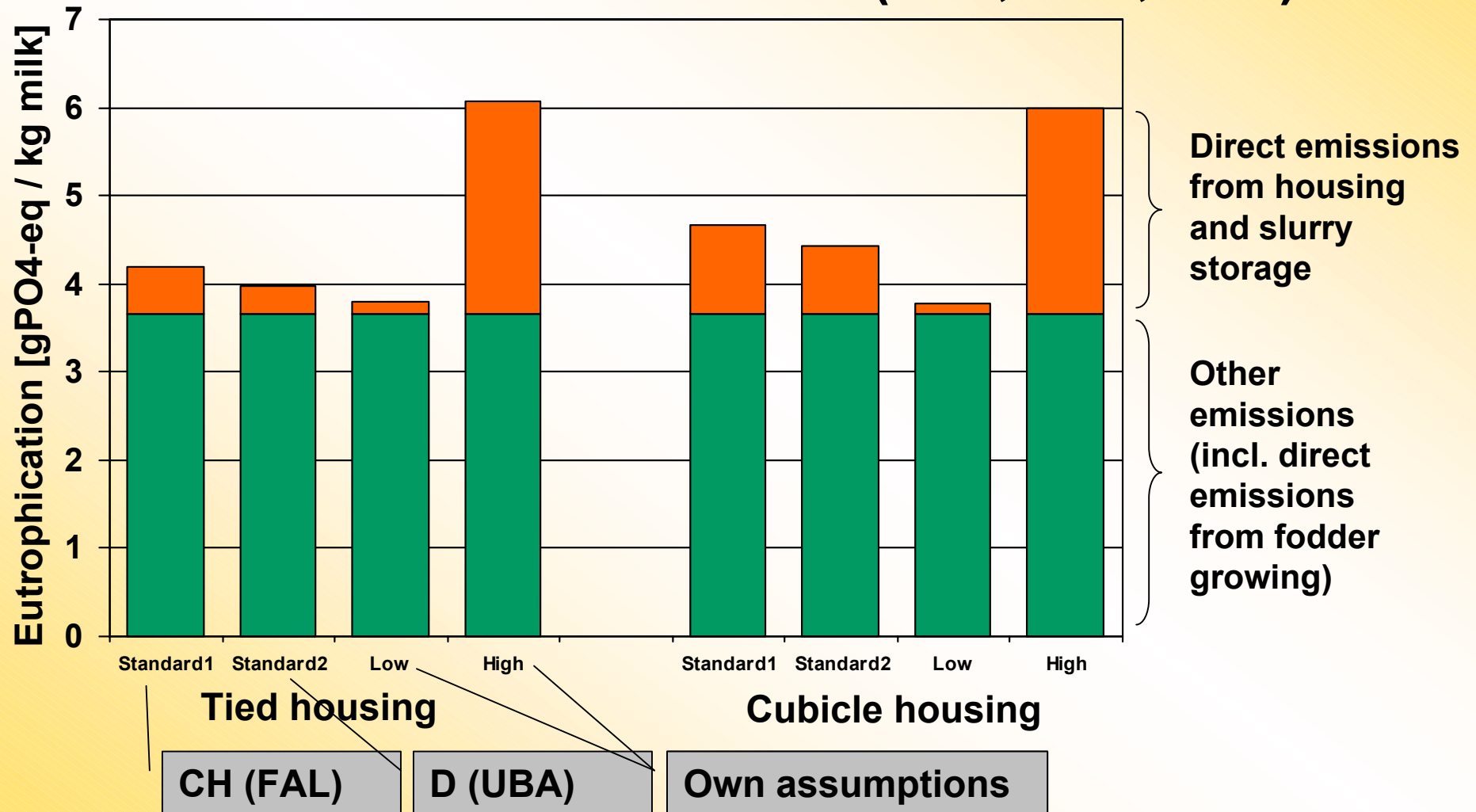
## Environmental impacts of different milk production systems (herd size = 40 cows)



# Milk - Results



## Relevance of direct emissions ( $\text{NH}_3$ , $\text{CH}_4$ , $\text{N}_2\text{O}$ )



# Milk - Discussion



- ◆ Small differences in the environmental impact of the building infrastructure and usage
- ◆ Little data on emissions from open housing systems
- ◆ The type of feedstuffs determines the potential environmental impact of milk production
- Optimisation of feed supply
  - extensive roughage production with low fertiliser use
  - more pasture, less grass harvesting
  - silage or field-dried hay instead of hay aeration and maize drying. Use of renewable energy carriers in hay aeration
  - less concentrate



# Case study pork



## Fully slatted floors



- ◆ No outdoor area
- ◆ Forced ventilation

## Multi-surface system



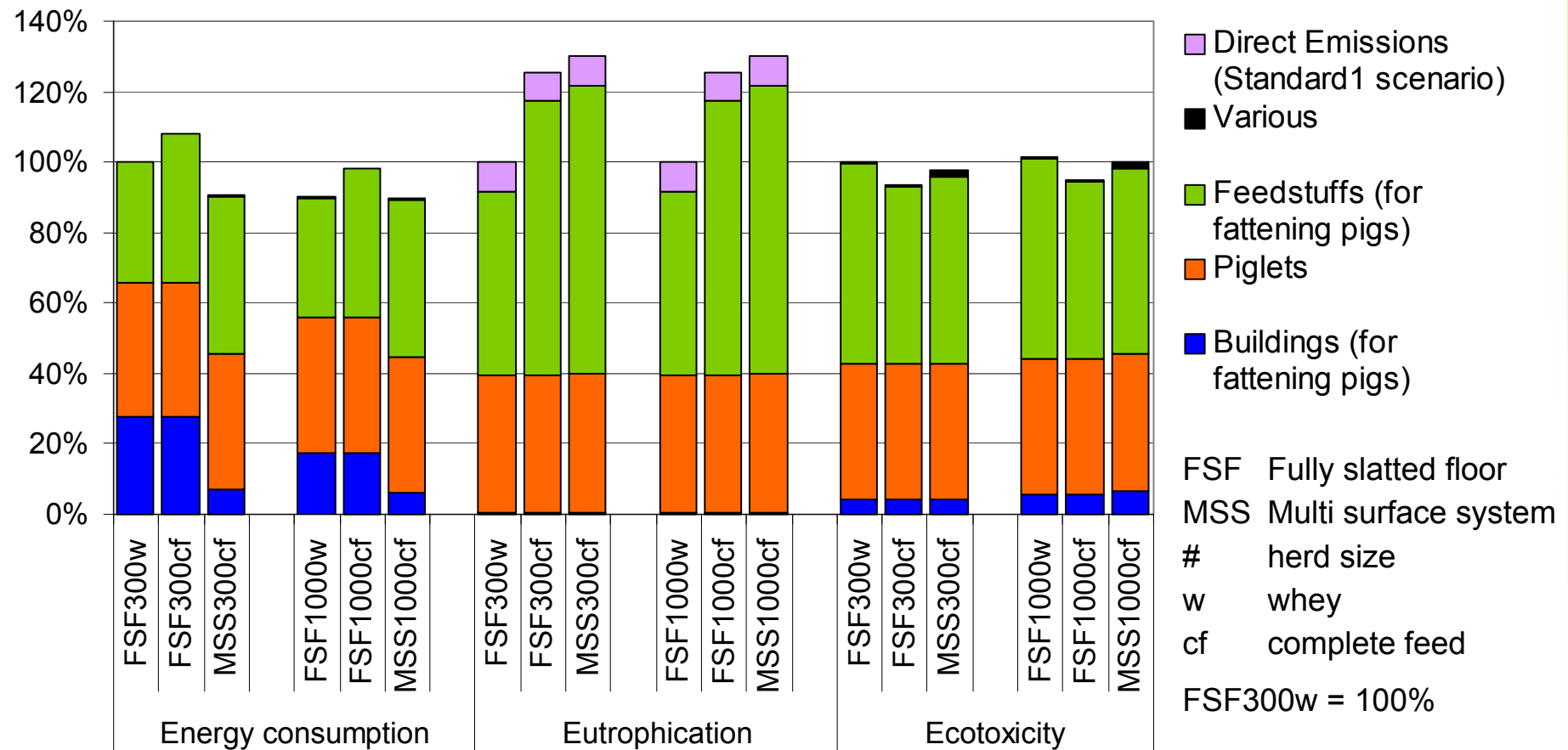
- ◆ Exercise yard
- ◆ Free ventilation

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- ◆ Herd size: 300 & 1000 fattening pigs
  - ◆ Feed:
    - Complete diet (concentrate) or
    - Whey & supplementary feed
  - ◆ FU: 1 kg pig (live weight at farm gate)

# Pork - Results



## Environmental impacts of different pig production systems



# Pork - Discussion



- ◆ **Buildings have a relevant influence on energy consumption (up to 30 %)**
- ◆ **Supply of feedstuffs is the most important factor affecting the environmental impact of pig fattening**
  - **agricultural production using low-emission fertiliser and efficient mechanisation**
  - **little transportation and drying**
  - **use of by-products from milk processing, milling, sugar and oil production or other industrial processes – provided that these products are not contaminated with pollutants or competing with other fields of application**

# Conclusions (1)

- ◆ **Impacts = combined result of feeding regime and housing system**
- ◆ **Infrastructure (buildings and installations) has a significant effect on the overall environmental impact of animal production**
- ◆ **Supply of feedstuffs is essential**
  - from an economic point of view
  - from an environmental point of view
  - biodiversity and landscape issues should be included in the assessment



# Conclusions (2)

## Linking environment and economy

