WIFO ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG
AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

BUNDESANSTALT für Agrarwirtschaft
FEDERAL INSTITUTE of Agricultural Economics

'Index-based costs of livestock production' (INCAP.I) in Austria – the 'suckler cow and beef calf production' activity

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Contents of presentation

- **Introduction to the Index-based Costs of Agricultural Production (INCAP)**
- **Example: 'Suckler cow and beef calf production' activity**
- **Summary and discussion**

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Introduction to INCAP
‚Index-based Costs of Agricultural Production'

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Introduction to INCAP (1): Motivation for developing INCAP

- **Understanding the impact of climate change:**
  - **on society** ✓
  - **at the farm level in specific regions and production systems** ?
- **Objectives:**
  - **Gain better insight into the costs of climate change arising to farmers**
  - **Develop a data set suitable for**
    - **modelling**
    - **communicating the effects of climate change at the micro-economic level**

Introduction to INCAP (2): Scope and tasks involved

- **Scope of INCAP:**

  a multi-purpose cost data set accounting for …

  - **all important plant and livestock production activities in Austria**
  - **specific attributes of each activity**
  - **an extended period (from the past into the future)**

- **Tasks involved:**

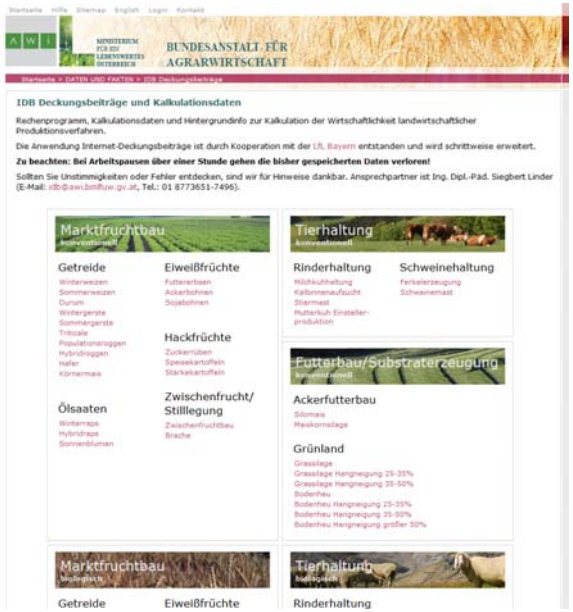
Define scope and structure* → **Review available data** → **Select data and develop INCAP** → **Replace explicit data by functions** (where possible) → **Testing and validation** → **Dissemination**

*** activities, gross margin components, attributes, time, area**

Introduction to INCAP (3): The concept of gross margins

- **Concept:**
  - **Revenue – variable costs = gross margin**
  - **Gross margin: amount available for covering fixed costs + income**
- **Advantages:**
  - **common usage**
  - **farm records**
  - **benchmarking possible**
  - **no/little distortion through fixed costs**
- **Disadvantages:**
  - **depending on the purpose (analyse the past, plan for the future …)**
  - **no uniform concept regarding the considered cost items**
  - **detailed data required**
  - **understanding of the underlying system required to allow benchmarking**

Introduction to INCAP (4): Primary data source used: 'Internet Gross Margins'



Livestock activities – available:
Dairy cow and milk production
Heifer rearing
Bull fattening
Suckler cow and beef calf production
Piglet production
Pig fattening

Livestock activities – under development:
Sheep
etc.

Livestock-related acitivities – available:
Maize silage
Grass silage
Hay

Link to Internet Gross Margins application (publicly accessible):
http://www.awi.bmlfuw.gv.at/idb/default.html

Introduction to INCAP (5): Scope and structure

INCAP

Plant production activities (INCAP.p)	**Livestock activities (INCAP.l)**
Cereals, oilseeds, protein crops, root crops, catch crops, fallow land, silage, hay	Dairy cow and milk prod., heifer rearing, bull fattening, suckler cow +beef calf prod., piglet production, pig fattening

INCAP consists of 2 activity groups.

← **Activity groups**

← **Activity types**

Introduction to INCAP (6): Scope and structure

Activity

Each activity has at least 3 dimensions.

Gross margin components	**Attributes**	**Time**	**Area**	← **Dimensions**
Revenue (e.g. milk, meat) Variable costs (e.g. replacement, reproduction, feed, health)	Attribute types (e.g. farming system, replacem. type, reproduction type, feed)	Past/Present Future	Austria Provinces Communities	← **Differentiation** within the dimensions
Capture heterogenous management systems	Capture heterogenous management systems	Capture development over time	Allow spatially-explicit analyses	← **Purpose**

Example: ‚Suckler cow and beef calf production' activity

Fleckvieh suckler cow and calf
(Source: Humer (2014): Diplomarbeit Kälbersterblichkeit, LFZ Raumberg-Gumpenstein)

Suckler cow activity (1): Gross margin calculation scheme

	Component	**Remarks**
Revenue	Calves Cow Dung and manure	Complementary products
Variable costs	Heifer replacement Concentrate, minerals Forage Health, hygiene Reproduction Litter Water, energy Machinery Other	excluding: ▪ CAP payments ▪ tax including: ▪ cow ▪ calves ▪ proportion of heifer, if applicable ▪ proportion of bull, if applicable ▪ losses (cow, calves, heifers)
Gross margin		**in EUR/cow/year**

Suckler cow activity (2): Activity-attribute-combinations

Activity	**'Suckler cow and beef calf production'**
Attribute groups: attribute types	Farming system: conventional, organic Heifer replacement: reared, bought-in Reproduction type: artificial insemination (AI), bull Calf type: fattening, slaughter Forage type: silage+pasture, hay+pasture, silage+hay+pasture Slope: 0-25%, 25-35%, 35-50%
→ large number of activity-attribute combinations	144 **unique combinations** in a single period (**and more** if further dimensions and/or attributes are added)

Suckler cow activity (3): Selected basic information

Reference period	national average of 5 years (Austria, 2010-2014)	
Calves produced	0.90 calves (393 days calving interval , 2.5% twin births, 5.0% losses)	
Weaning	at 7 months	
Calves sold	if heifers reared: 0.73 calves (0.45 male, 0.28 female)	if heifers bought in: 0.90 calv. (0.45 male, 0.45 female)
Calf weight, fattening	male: 290 kg, female: 270 kg live weight	
Calf weight, slaughter	male: 250 kg, female: 220 kg slaughter weight	
Cow weight, slaughter	319 kg slaughter weight	
Cow replacement rate	if calves sold for fatteining: 16.8% (≈ 5.9 years)	if calves sold for slaughter: 15.9% (≈ 6.3 years)

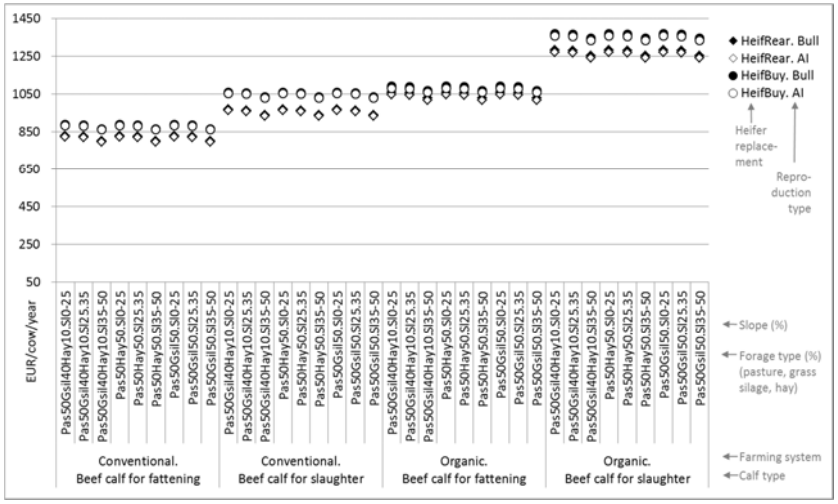
Suckler cow activity (4): Revenue

for 144 combinations in the reference period (avg. 2010-2014)

Revenues
- for 144 suckler cow activity-attribute combinations,
- in Austria,
- in a single period (avg. 2010-2014),
- **excl. tax and CAP payments,**
- EUR/cow/year

Source: Own figure, 2016

3 forage mixes:
- Pasture + Grass silage + Hay (50:40:10)
- Pasture+Hay (50:50)
- Pasture+Grass silage (50:50)



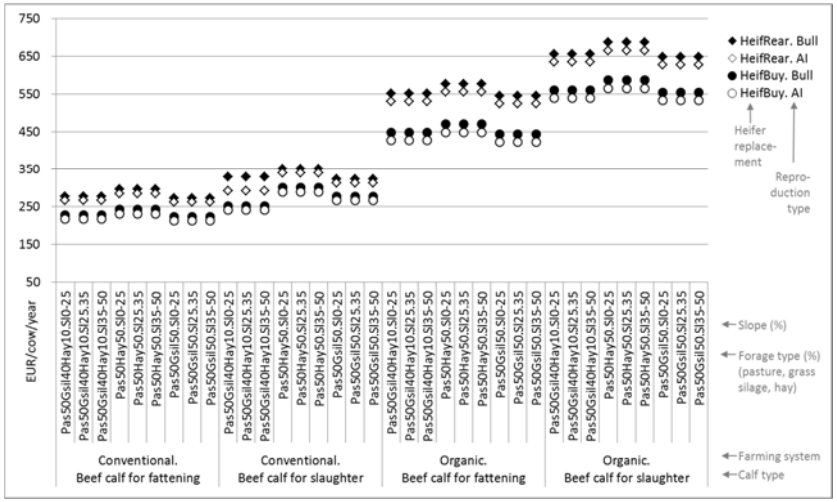
Suckler cow activity (5): Forage costs

for 144 combinations in the reference period (avg. 2010-2014)

Forage costs
- for 144 suckler cow activity-attribute combinations,
- in Austria,
- in a single period (avg. 2010-2014),
- excl. tax and CAP payments,
- EUR/cow/year

Source: Own figure, 2016

3 forage mixes:
- Pasture + Grass silage + Hay (50:40:10)
- Pasture+Hay (50:50)
- Pasture+Grass silage (50:50)



Suckler cow activity (6): Gross margins

for 144 combinations in reference period (avg. 2010-2014)

Gross margins
- for 144 suckler cow activity-attribute combinations,
- in Austria,
- in a single period (avg. 2010-2014),
- excl. tax and CAP payments,
- EUR/cow/year

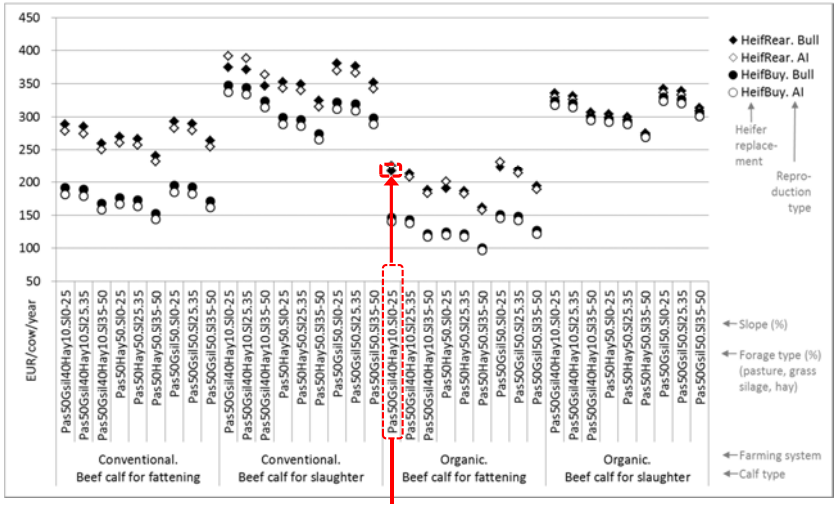
Source: Own figure, 2016

Payment for organic farming:

EUR 225/ha grassland

Source: AMA Merkblatt ÖPUL 2015, 25.03.2015

In this example: ca. 1ha/cow



See next slide: time series for 1 specific activity-attribute combination

Suckler cow activity (7): Changing parameters

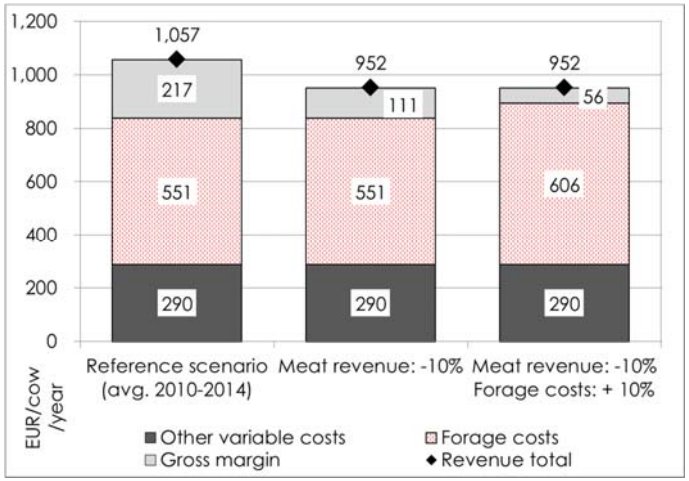
Activity:

Suckler cow and beef calf production

Attributes:

- farming system: organic
- calf type: for fattening
- heifer replacem.: heifer rearing
- reproduction: bull
- forage type: pasture+grass silage+hay (50:40:10)
- slope: 0-25%
- excluded: CAP payments, tax
- Euro/cow/year

Source: Own figure, 2016



Suckler cow activity (8): Time series

for 1 combination in the reference period (avg. 2010-2014)

Summary and discussion

Summary and discussion (1)

- **INCAP provides a high degree of differentiation, i.e.**
  - **numerous activities accounting for multiple**
  - **production conditions, management systems and periods.**
- **INCAP is a data set suitable for a series of agro-economic analyses and modelling tasks, e.g.**
  - **optimisation problems**
  - **spatially-explicit economic modelling**
  - **explicit economic modelling of the impact of climate change, of adaptation and mitigation measures**
  - **(future periods)**
  - **(future topics)**

Summary and discussion (2)

- **INCAP uses a simple and widespread approach, i.e. gross margins.**
- **Only a small number of sources is available for validation, covering only part of the activities, the activity-attribute-combinations or periods of time.**
- **When available/possible, observed data will be used for validation.**
  - **At the ÖGA Annual Conference 2016: presentation regarding validation of INCAP**
- **INCAP will – hopefully – be made available to the public.**

ÖGA

26th Annual Conference of the
Austrian Society of Agricultural Economics

Co-operation between Research and Practice
A key to competitiveness and innovation in agriculture?

15th-16th September 2016

at the University College for Agrarian and Environmental Pedagogy, Vienna, Austria

HOCHSCHULE FÜR Agrar- und Umweltpädagogik

Thank you

Dissemination

How to work with INCAP?

Source: Own figure, 2016

Step 1: Spread-sheet
- Compile and update data
- Specify scenarios and assumptions
- Define model
- Check model file for accuracy and completeness (automated)
- Export model input file as a text file (automated)

Step 2: GAMS
- Import model input file
- Run model
- Generate results file as a text file (automated)

Step 3: Spread-sheet
- Import results
- Check imported file for accuracy and completeness (automated)
- Analyse results
- Revise data, scenarios and assumptions
- …

How to make INCAP available to the public?

- **User interface**
- **Data protection/ anonymity**
- **etc.**