

**growing Miscanthus in Europe**

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**Practical experience**

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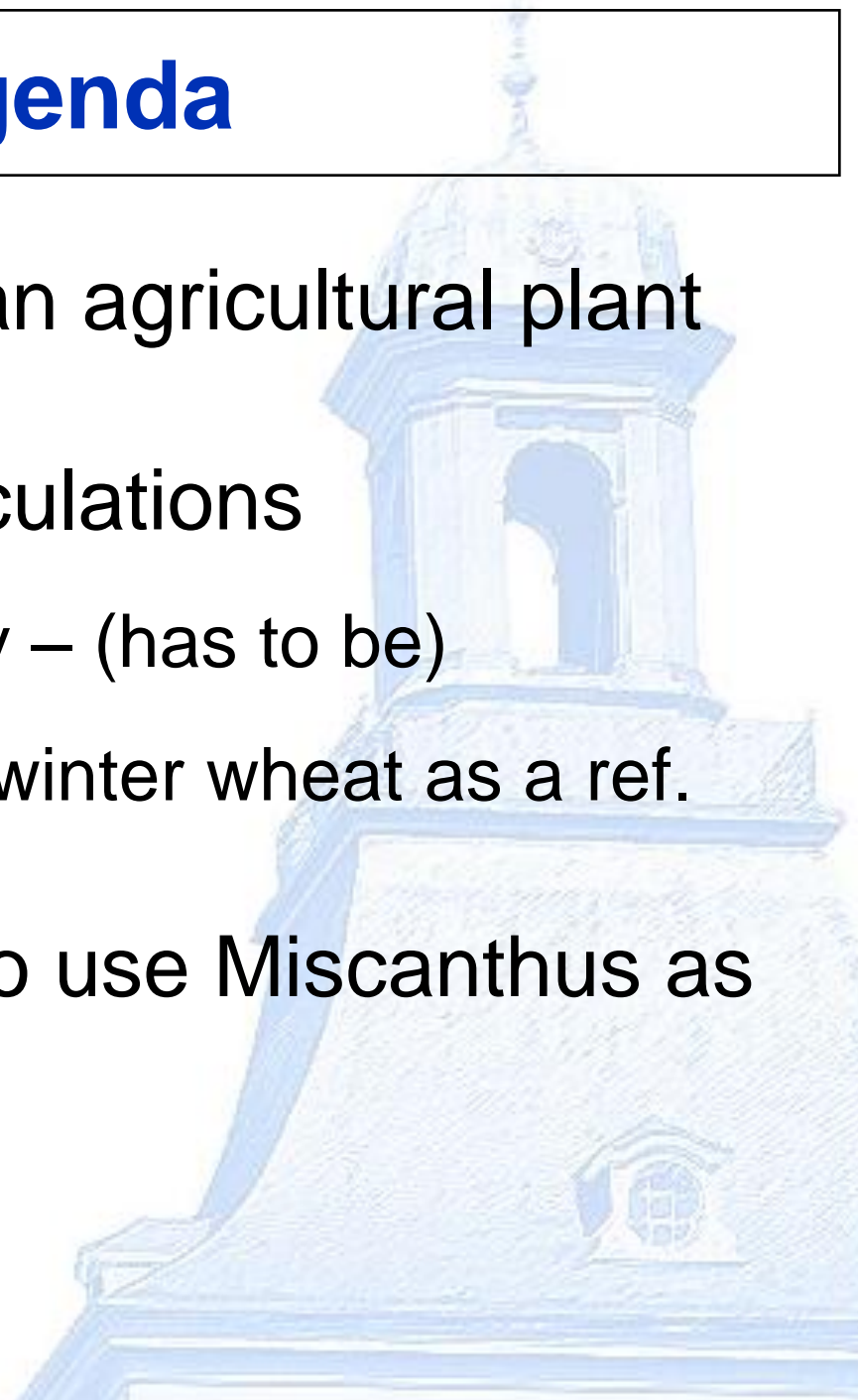
**an economical look at some  
different ways to use it as a  
Product.**

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Prof. Dr. Gerhard Schiefer

# Agenda

- Miscanthus as an agricultural plant
  - Economical calculations
    - A little bit theory – (has to be)
    - Comparison to winter wheat as a ref.
  - Different ways to use Miscanthus as a Product
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# Schedule

The Plant

Physiology

Grow,Harvest

Calculation

Theory

Wheat

Miscanthus

Usage

energy

raw mat.

environmental

End

1. The Plant *Miscanthus giganteus*
  - a. general Characteristics and Physiology
  - b. Agronomic aspects – plant, harvest, etc.
2. eco. Calculation
  - a. Short theory introduction
  - b. Cost / Revenue winter wheat
  - c. Cost / Revenue *Miscanthus*
3. Different kinds of usage
  - a. use for energy purpose
  - b. use as a industrial input / raw material
  - c. environmental aspects

# Overview:

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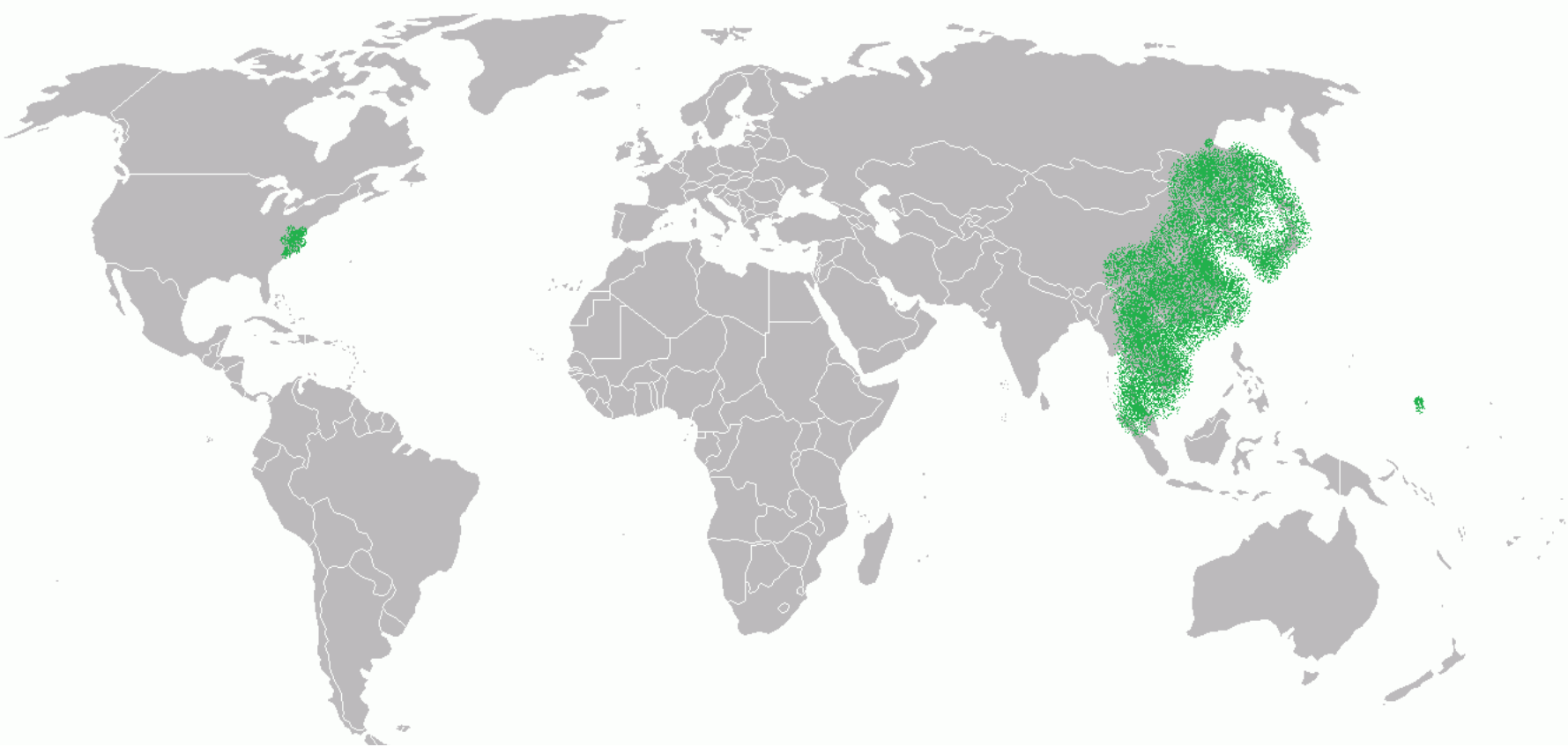
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•Primary (naturel) area of growth.

Quelle: Eigene Darstellung nach (Loefel & Nentwig, 1997)

„Chinaschilff“

„Elefantengras“ or „Miscanthus sinensis Giganteus“

Miscanthus x giganteus

In the early 1990s commercial use under the influence of:

- overproduction
- land retirement
- “Meat Mountains” and “Milk Seas”

Today as a renewable Energy crop:

- Leg of raw materials
- Energy crisis
- Sustainability

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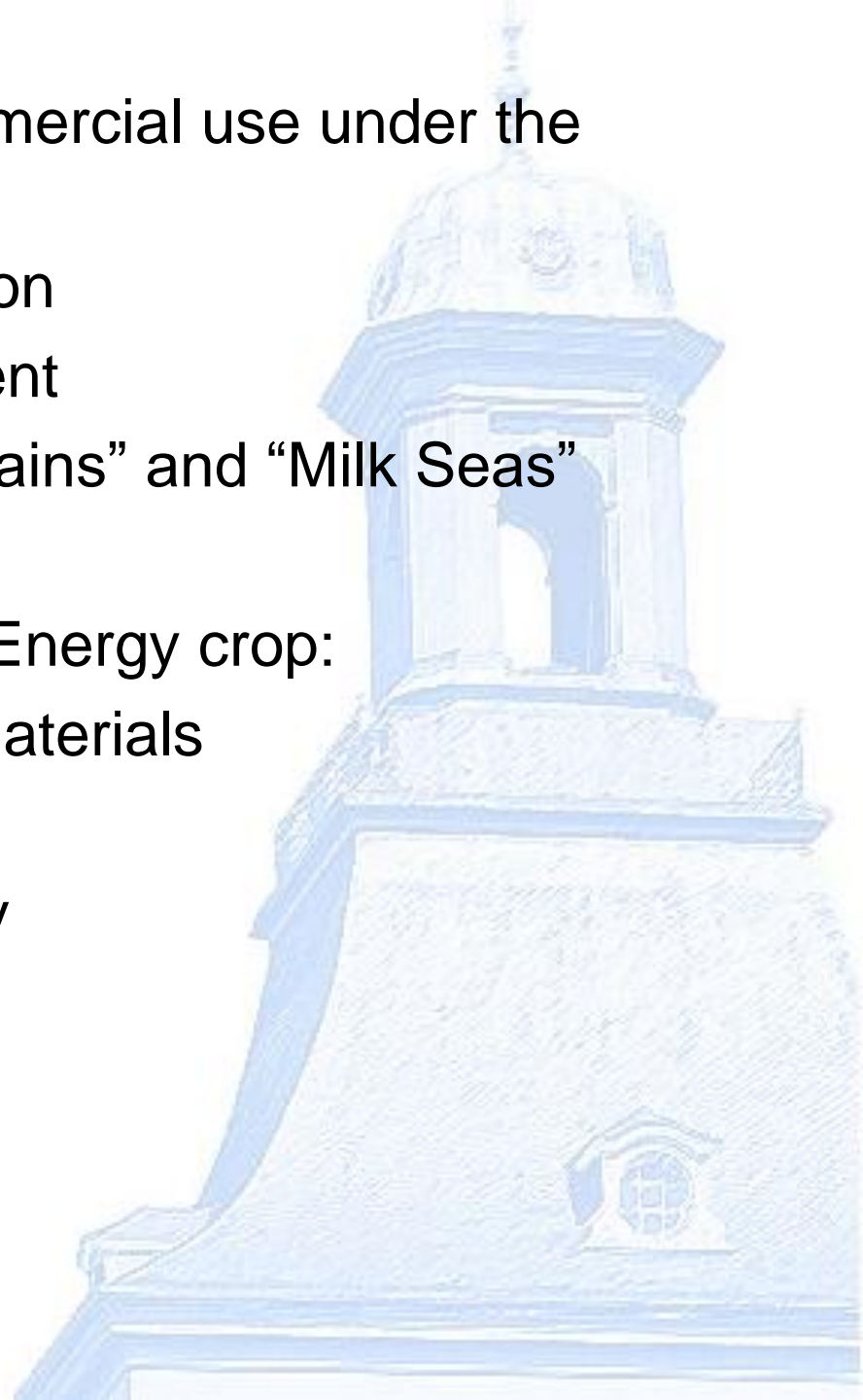
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- sprout system extends to about  $1\text{m}^2$
- Miscanthus roots are reaching about 30cm in the ground
- efficient use of sunlight and water
- essential nutrients are used several times
- high light saturation point and high temperature optimum

## Growing Miscanthus (agronomical aspects)

- „good Maize/ Corn land = good Miscanthus land“
  - optimal:
  - “tiefgründige, gut durchwurzelbare, humose Lehmböden mit guter Wasserführung, gutem Nährstoffspeichervermögen”
  - annual rainfall between 500 and 600mm during the vegetation time
  - “sandige bis lehmsandige Böden”
  - water can be the limiting factor between june and september
  - total loss is not a threat because of the underground root system

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ST  
635d  
635d

635d

635d

635d

# Cultivation

- fighting weeds
  - mechanical
  - chemical with spraying
    - in Germany §18b PflSchG
    - Pre- Growing – Glyphosate
    - After Growing – usual Maize Spraying
      - S-Metolachlor („Dual – Gold“)
      - Bromoxynil („Certrol B“)
      - no Sulforon („Motivell“, „Cato“)
  - Amount has to be adjusted to the weed problematic

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# Fertilizing

- no fertilizer needed in the first years on former “normal” used fields
- after that – fertilizing in relation to the harvest and field probes

## Nitrogen

2,2kg / t dry material      39kg at 17,5t

## Phosphate

1,2kg / t dry material      21kg at 17,5t

## Kali

4,8kg / t dry material      48kg at 17,5t

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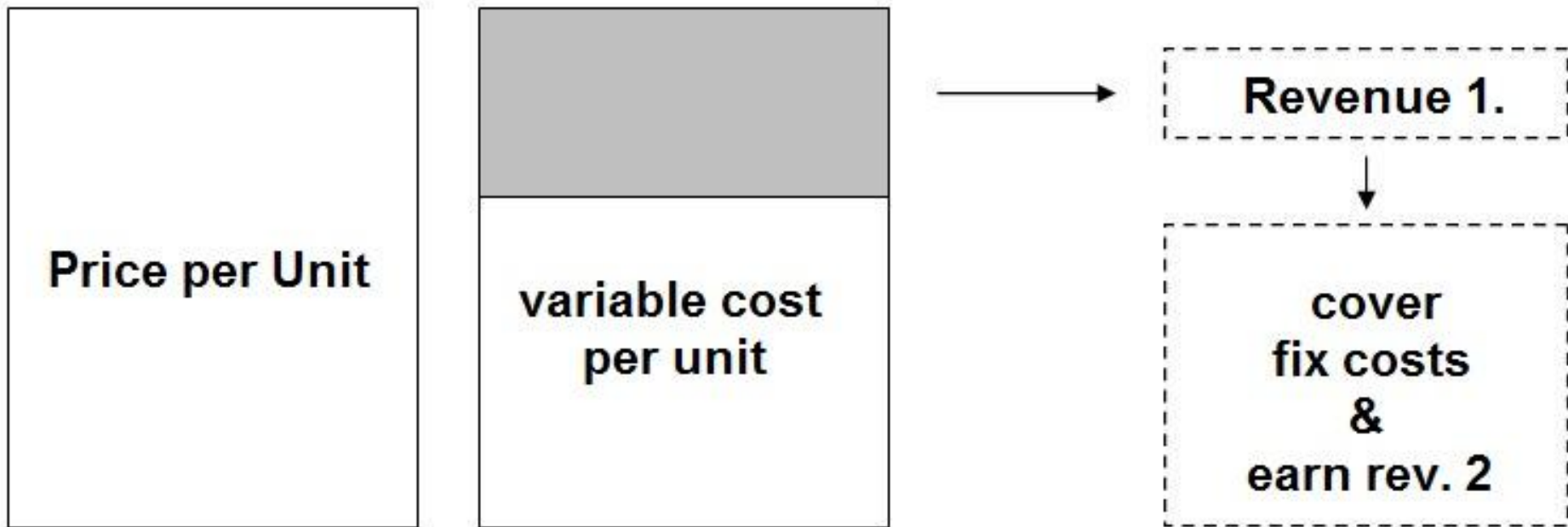


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## economical calculation:

- Revenue 1 (Deckungsbeitrag) is the standard number to measure success of agricultural crops





## economical calculation:

- Revenue 1 (Deckungsbeitrag) is the standard number to measure success of agricultural crops
- Further important for the calculation
  - estimation of the costs
    - company specific values
    - diverse laws and taxation
      - special VAT scheming for many EU-Farmers?
      - EU – subsidies

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# Deckungsbeitrag Winterweizen pro Hektar

Deckungsbeitrag Winterweizen
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## Mechanisierungskosten bei Winterweizen (inkl. Lohnkosten)

Pflügen	75 €/ha
Dünger streuen (3 mal)	21 €/ha
Säen mit Kombination	71 €/ha
Spritzen (3mal)	60 €/ ha
Getreidetransport	35 €/ha
Dreschen	145 €/ha
Stoppel Bearbeitung	36 €/ha
	<hr/> <hr/>
	<b>443 €/ha</b>

	<b>1.106,57 €</b>	<b>937,96 €</b>
<b>Deckungsbeitrag</b>	<b>593,78 €</b>	<b>502,04 €</b>

# Deckungsbeitrag Winterweizen pro Hektar

## Deckungsbeitrag Winterweizen

Weizenertrag:	80,00	dt / ha	exkl. 10,7%
Weizenpreis:	19,93	€ / dt	18,00 €

		inkl. MwSt	exklusive
<u>Erlös</u>		<b>1.700,35 €</b>	<b>1.440,00 €</b>
<u>Kosten:</u>	Saatgut:	85,60 €	80,00 €
	Pflanzenschutzmittel	142,80 €	120,00 €
	Dünger	267,70 €	224,96 €
	Mechanisierung	527,17 €	443,00 €
	Hagelversicherung	23,80 €	20,00 €
	Trocknung	59,50 €	50,00 €
		<b>1.106,57 €</b>	<b>937,96 €</b>
<b>Deckungsbeitrag</b>		<b>593,78 €</b>	<b>502,04 €</b>

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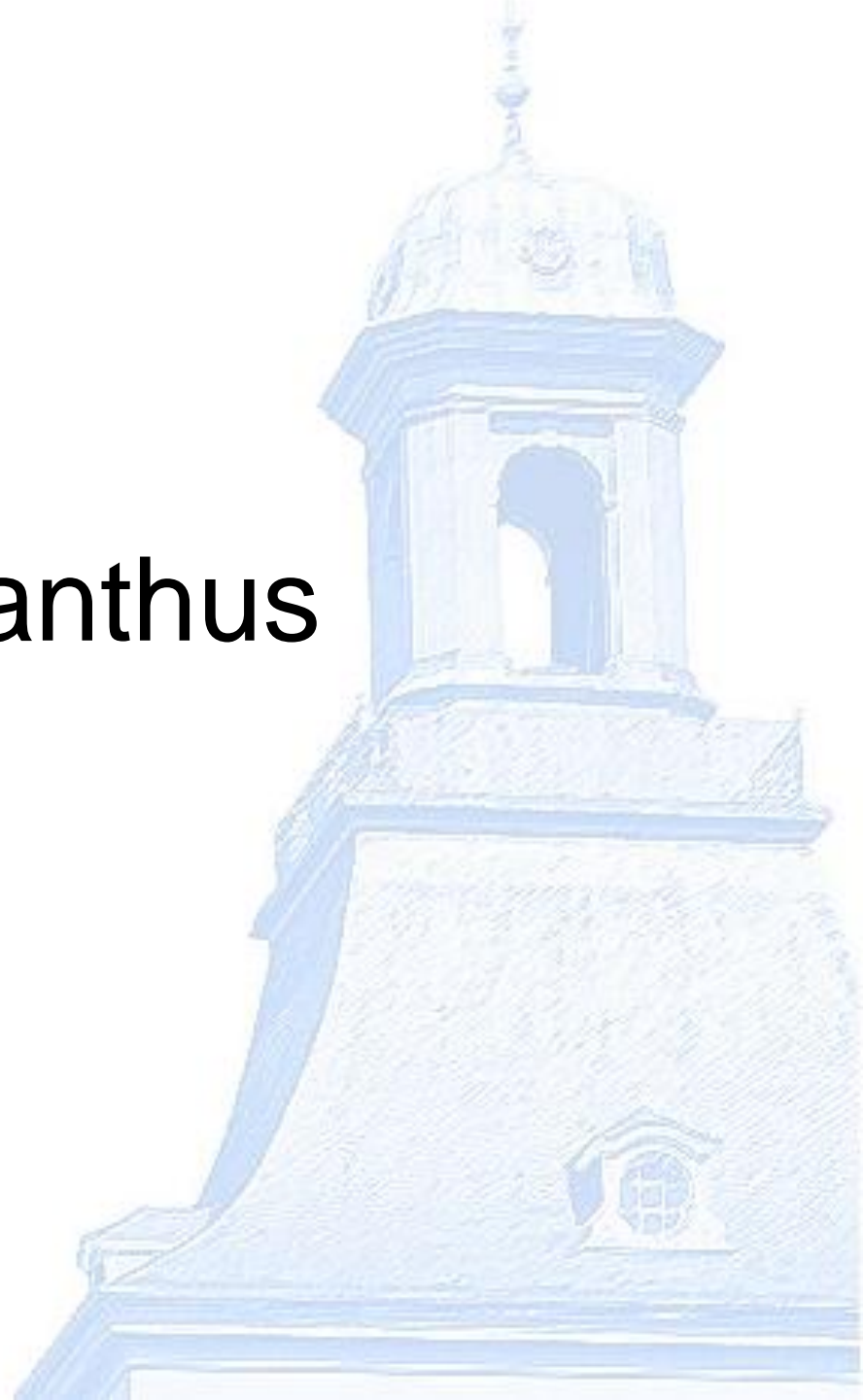
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# Miscanthus



## Deckungsbeitrag Miscanthus pro Hektar

Deckungsbeitrag Miscanthus (n = 10 Jahre, Zinssatz 4%)			
FM Ertrag mit 12,5% Restfeuchte	200,00	dt/ha	inkl 10,7%
Preis:	6,78	€/ dt	7,50 €
		inkl. MwSt	exklusive
<u>Erlös</u>		<b>1.500,00 €</b>	<b>1.355,01 €</b>
<u>Kosten:</u>	<b>Saat:</b>	307,05 €	277,37 €
	Pflanzenschutzmittel	12,45 €	10,46 €
	Dünger	134,82 €	113,29 €
	Mechanisierung	400,60 €	336,64 €
		<b>854,92 €</b>	<b>737,77 €</b>
<b>Deckungsbeitrag</b>		<b>645,08 €</b>	<b>617,25 €</b>

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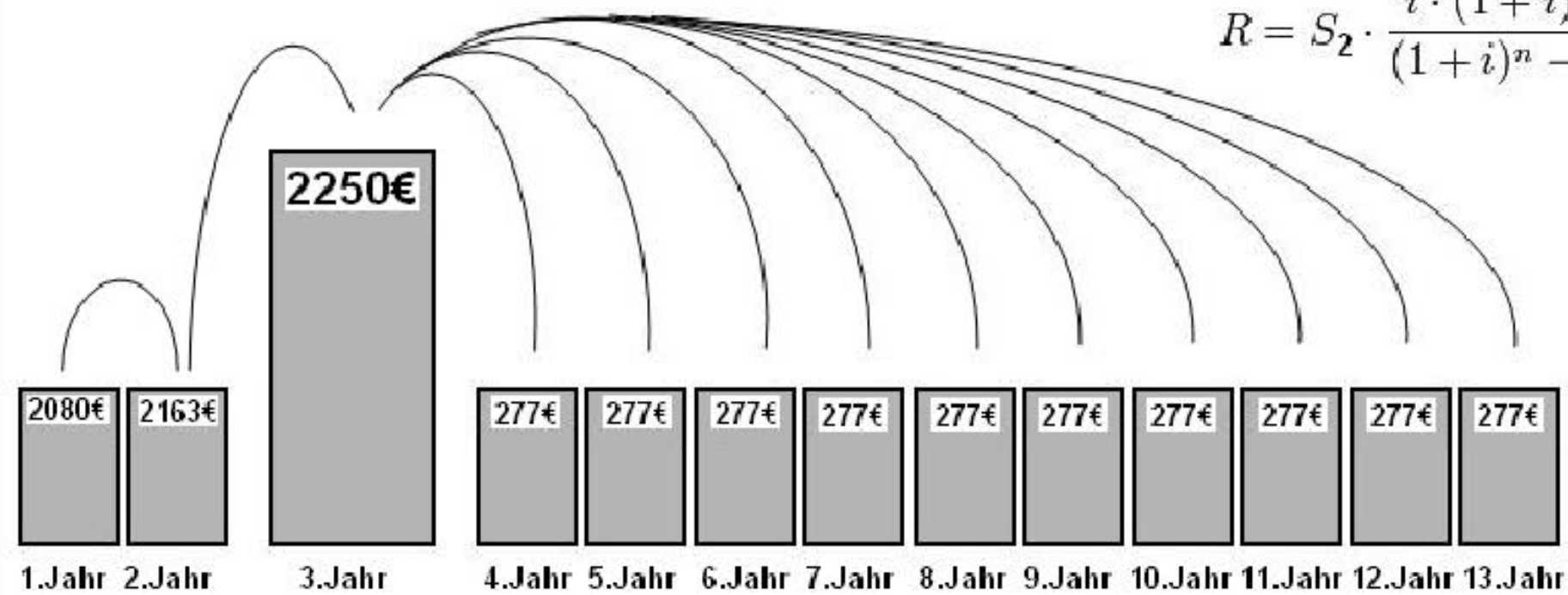
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Jahre (n):	10 Jahre						
Zinssatz (i):	4,00%				1.Jahr	3.Jahr	
					Barwert (S <sub>0</sub> )	Barwert (S <sub>2</sub> )	Annuität (R)
Kosten Pflanzgut:	13.000 Rhizome x 0,16 € =				2.080,00 €	2.249,73 €	277,37 €
Kosten Pflanzenschutz							
1. Jahr - 1 Maßnahme	40,00 €				40,00 €		
2. Jahr - 1 Maßnahme	40,00 €				38,46 €		
					78,46 €	84,86 €	10,46 €

$$R = S_2 \cdot \frac{i \cdot (1+i)^n}{(1+i)^n - 1}$$



Beispiel: Pflanzung April 2010

1. Jahr = April 2010 bis März 2011

2. Jahr = April 2011 bis März 2012

3. Jahr = April 2012 bis März 2013



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## Nährstoffkosten bei Miscanthus

Nährstoff	Entzug je kg TM	Entzug bei 17,5t	Preis je kg Nährstoff
N - Stickstoff	2,2	39	0,70 €
P - Phosphat	1,2	21	0,51 €
K - Kalium	4,8	84	0,63 €
Ausbringungsmenge kg je Hektar		Kosten je Hektar	
N - Stickstoff	39kg	27,44 €	
P - Phosphat	21kg	10,65 €	
K - Kalium	84kg	52,50 €	
Summe:		90,60 €	

raw mat.

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## Mechanisierungskosten bei Miscanthus (inkl. Lohnkosten)

<u>Einmalige Arbeiten:</u>		Barwert 3.Jahr
Pflügen	75,00 €/ha	81,12 €/ha
<i>Erläuterung Pflanzen:</i>		
Ein Traktor (67kW) + Kreiselegge (3m) + Miscanthuspflanzmaschine (3-reihig)		50,00 €/Std
+ 3 Pflanzler (12€/Std)		36,00 €/Std
		<u>86,00 €/Std</u>
<i>Leistung:</i>	3 Std/ha	258,00 €/ha
<i>Erläuterung Transport:</i>		
Zwei Traktoren (67kW) + Transportwagen (20m <sup>3</sup> )		120 €/Std
<i>Leistung:</i>	0,5 Std/ha	<u>60 €/ha</u>
		<u>287,00 €/ha</u>
<b>jährliche Gesamtkosten:</b>	<b>49,64 € + 287,00€ =</b>	<b>336,64 €/ha</b>

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## ➤ Economical View

- Miscanthus is almost always a substitute for other products and raw materials
- The price of these other products dictate the price that can be charged for the Miscanthus
- extra payments or reductions go along with the qualification of Miscanthus as a substitute

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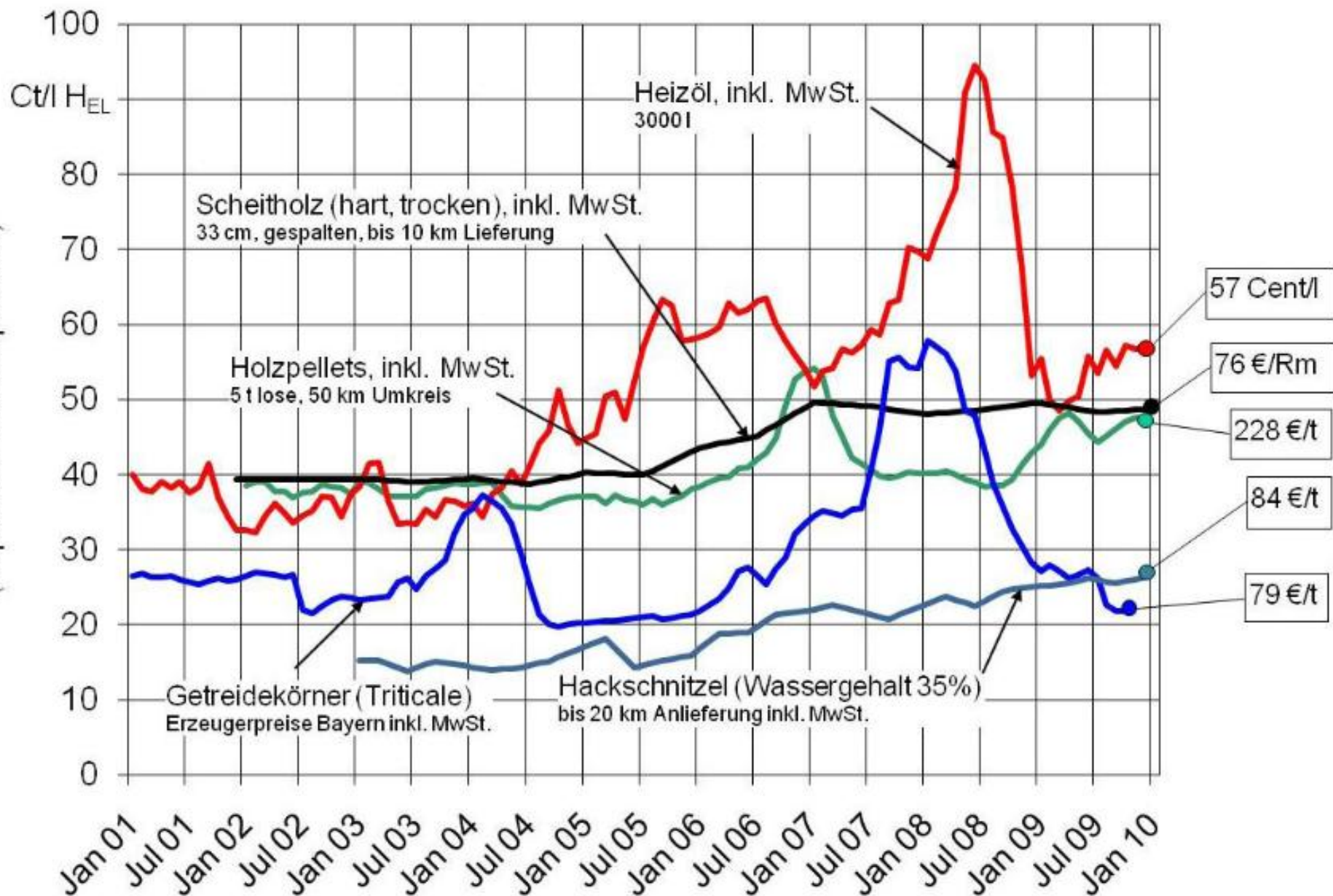
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ADARE, CO. LIMERICK  
061 395336

Brennstoffpreis  
(Ct pro Liter Heizöläquivalent)



Entwicklung der Brennstoffpreise (inkl. Anlieferung und MwSt.)









End

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Thank you for your  
intention!

