



The „EVA“-Project is financially supported by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) via the Agency of Renewable Resources (FNR)

# Optimised growth and preservation of energy crops

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# energy farming



increasing  
number of  
biogas plants

nature  
conservation

increasing land  
requirement

plant health

cultivation of  
approved, biomass  
rich plants

soil fertility

cultivation of high  
yielding plants  
(methane/hectare)

secure  
yield



# potential cultivation systems for energy farming



**conventional**  
(one main crop/year)



**double cropping system**  
(one summer main crop follows one winter crop = two harvests per year)



**mixed cropping**  
(species mixtures → lowering the input by improving synergy effects)



**forage mixtures**  
(perennial utilisation of one plant species or variety mixture)

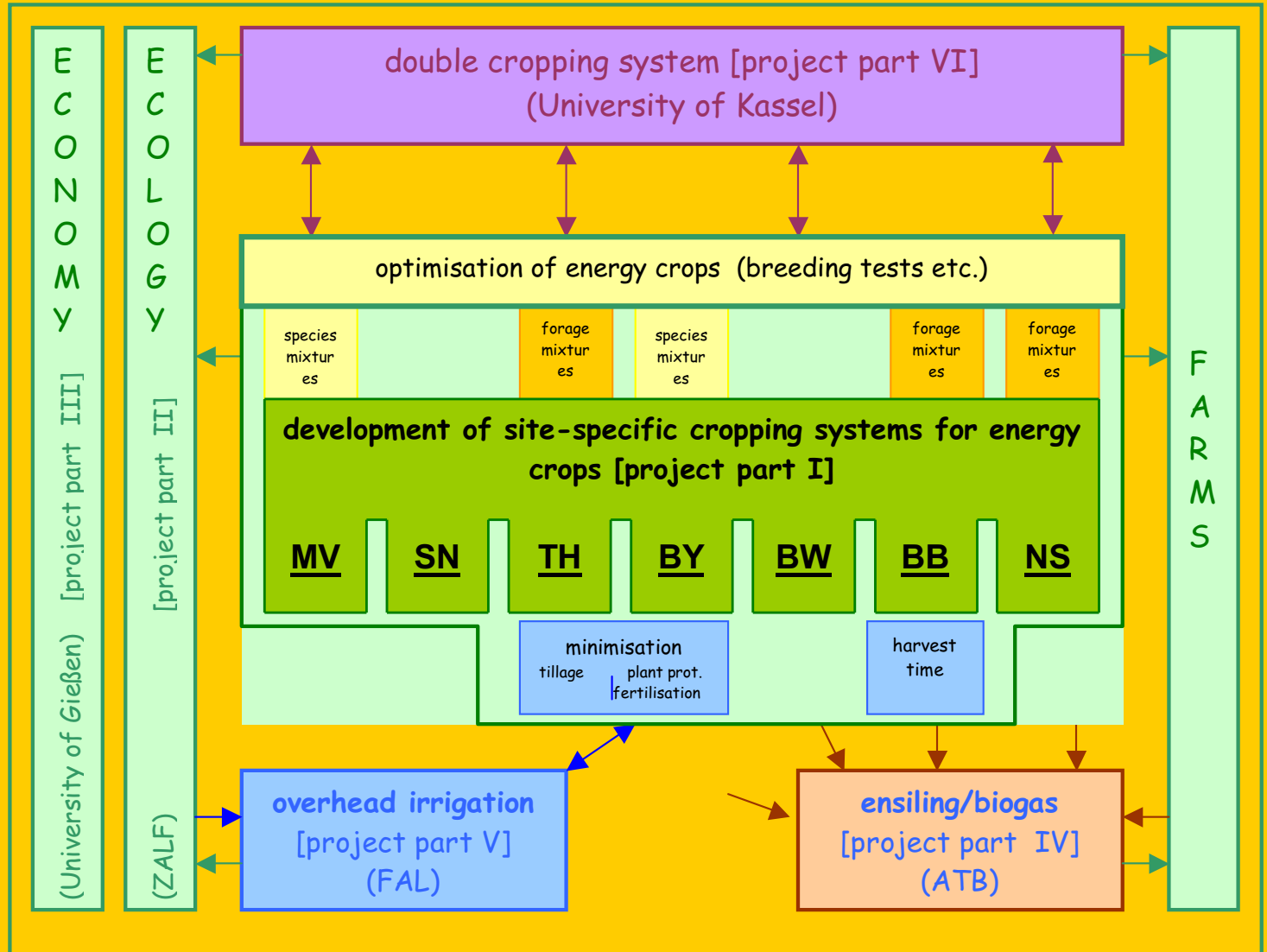


# specific questions in energy farming

- x **overhead irrigation?**  
(secure yields !)
- x **minimised tillage operations?**  
(lowering the input !)
- x **reduced fertilisation and plant protection measures?**  
(lowering the input !)
- x **optimal harvest time?**  
(optimal animal feedstock=optimal substrate for anaerobic digestion ?)

# concept of the network „EVA“ (2005 - 2008)

Dr. Katja Gödeke, TLL 2007



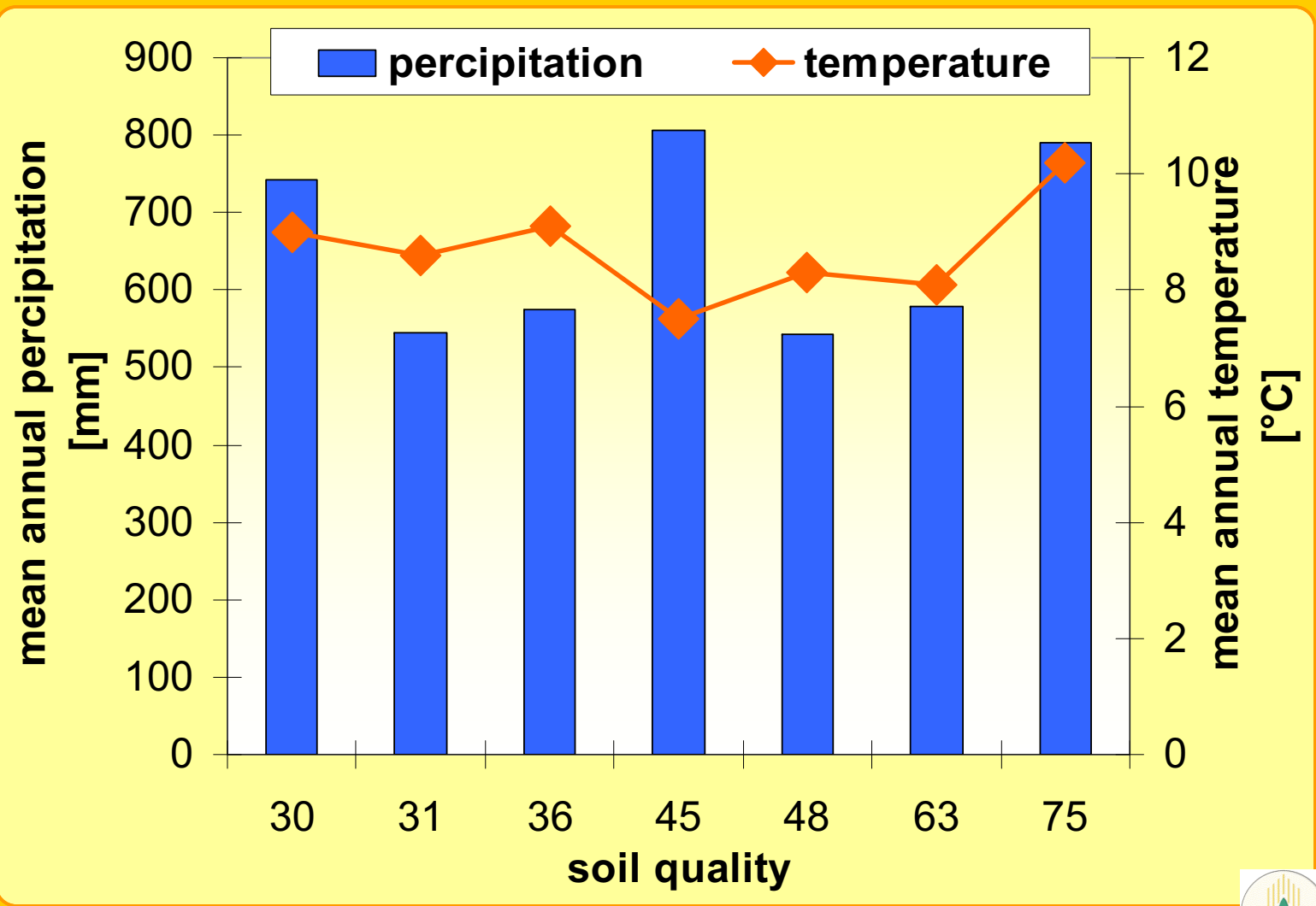
# crop rotations in test

	1	2	3	4	5
2005	sp-barley (whole pl.) fodder radish (intercrop)	forage sorghum	maize	sp-barley (whole pl.) + underseed alfalfa or clover grass	oat (whole pl.)
2006	maize	forage rye (intercrop) maize (catch crop)	forage rye (intercrop) forage sorghum (catch crop)	alfalfa or clover grass	winter triticale (whole pl.)
2007	wi-triticale (whole pl.) sweet sorghum (intercrop)	winter triticale	wi-triticale (whole pl.) annual ryegrass (intercrop)	alfalfa or clover grass	winter rape
2008	winter wheat	winter wheat	winter wheat	winter wheat	winter wheat



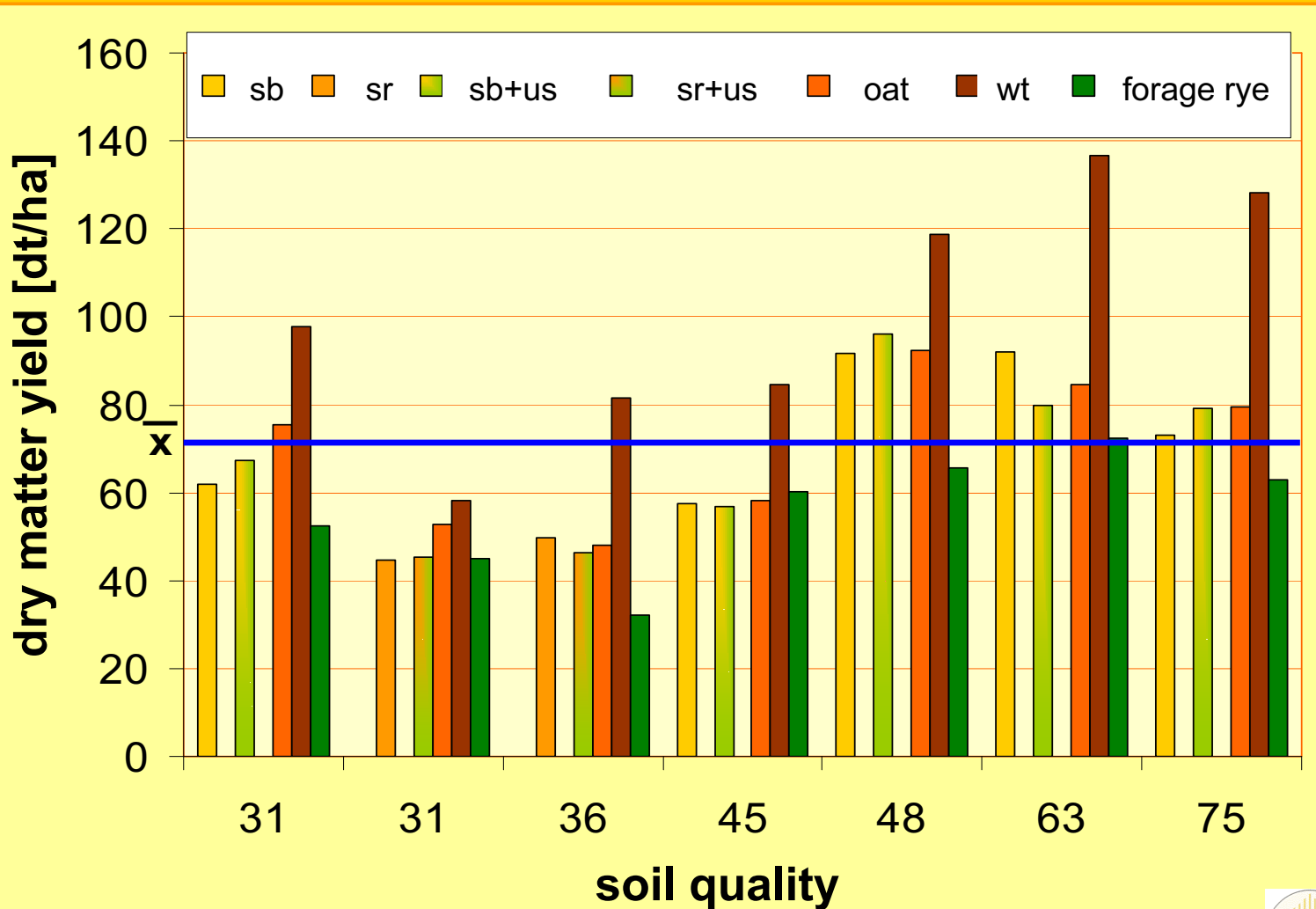


# sites



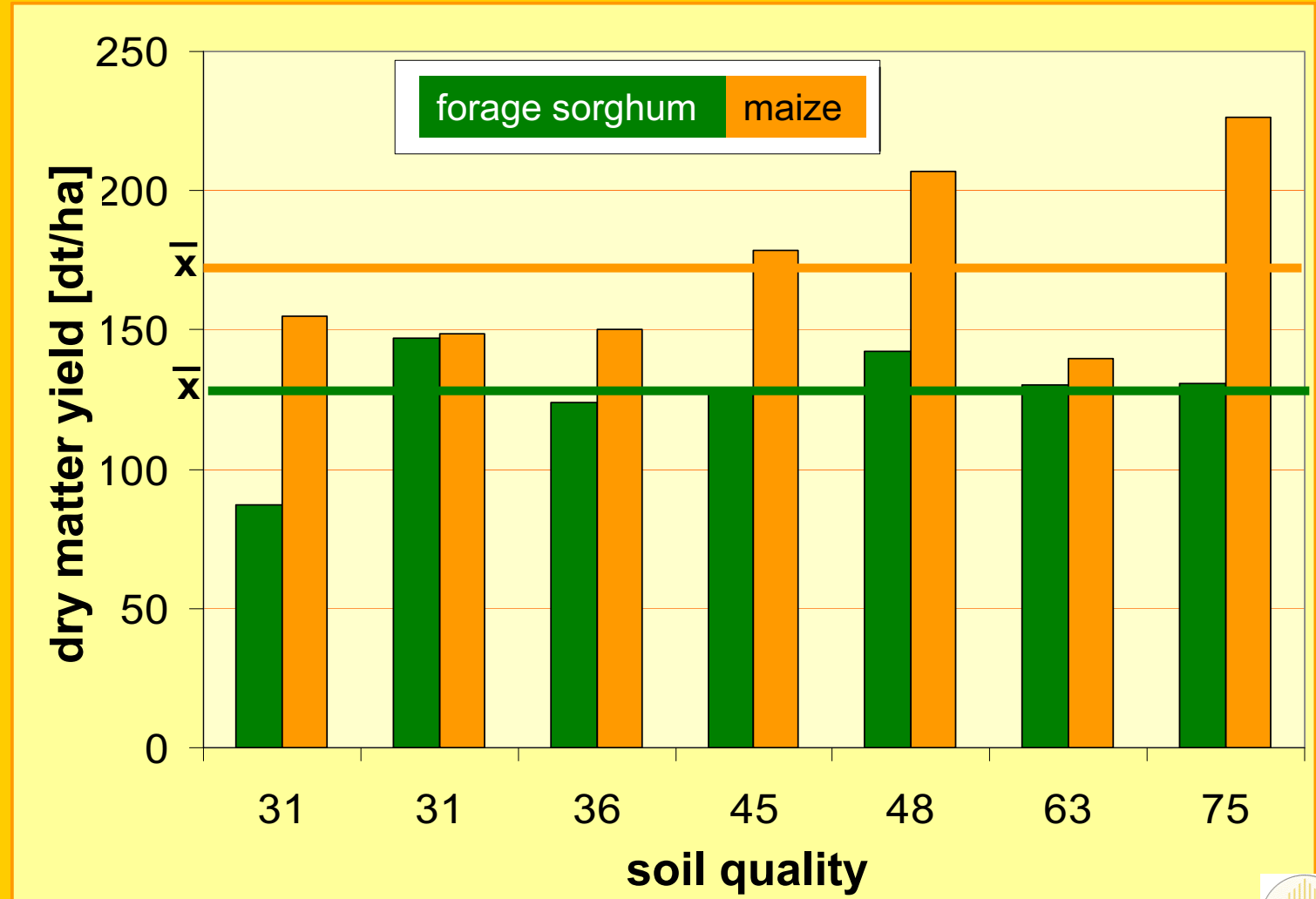
# yields of whole plant cereals

(dm-yield 2005/2006, based on dm-content and crop per year)



# yields of maize and forage sorghum

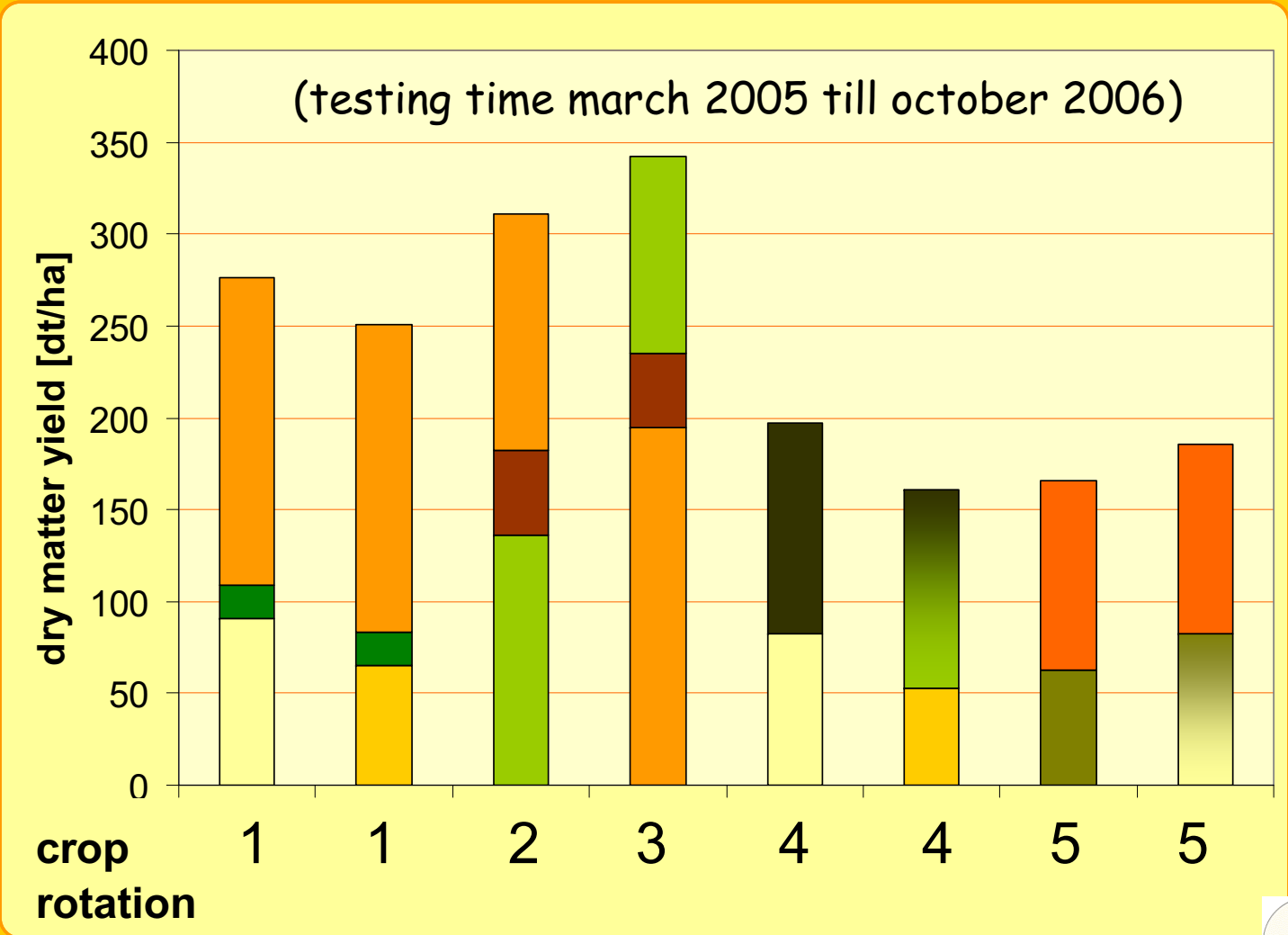
(dm-yield 2005/2006, based on dm-content and crop per year)





# crop rotation yields

- sp-barley
- sp-rye
- fodder radish
- maize
- forage sorgh.
- forage rye (intercrop)
- alfalfa
- clover grass
- oat
- oat (mixed varieties)
- winter-triticale



# economy

(temporary calculations, source: T. Toews, University of Gießen)

values in €/t dm

crops sites	sb	fr	m	m (cc)	fr	fs	fs (cc)	oat	cg	wt
	sr								alf	
Ascha	114	158	72	82	126	89	77	114	86	97
Dornburg	77	172	74	79	89	70	89	83	111	59
Ettlingen	93	163	59	65	99	88	84	88	192	71
Gülzow	80	182	60	68	118	74	70	73	219	69
Güterfelde	97	241	77	83	151	71	132	96	215	83
Trossin	98	219	70	75	218	73	69	107	-	68
Werlte	98	188	86	79	88	102	96	88	104	72

sb/sr - spring barley/rye

fr - fodder radish

m - maize

m(cc) - maize (catch crop)

fr - forage rye

fs - forage sorghum

fs (cc) - forage sorghum (catch crop)

oat - oat (mixed varieties)

cg/alf - clover/alfalfa grass

wt - winter triticale

the most favourable crop at site



# temporary conclusions



**Site specific crop rotations optimise the plant production on a ecologic and economic sustainable way.**



**Crop rotations including maize and whole plant cereals are recommended as well as the integration of further C<sub>3</sub>- and C<sub>4</sub> -plant species.**



**Considering the specific sites, the crop rotations has to be added with:**

- more maize at forage production sites
- more whole plant cereals at sites with good soil or less good soil with high precipitation and temperatures.





# Network „Site specific crop rotations for energy farming“

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# Thank you!

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INFO: [www.tll.de/vbp](http://www.tll.de/vbp)