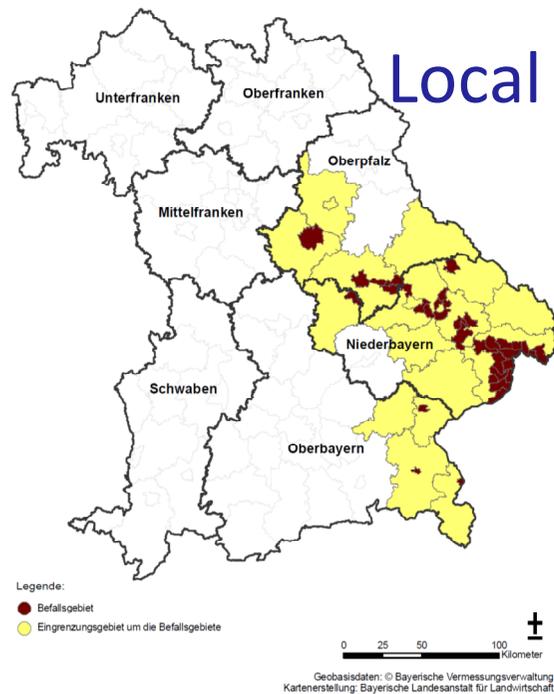


The corn rootworm in Bavaria

Local relevance and economic impact on single farms



24th IWGO Conference
24 to 26 October 2011
Freiburg, Germany

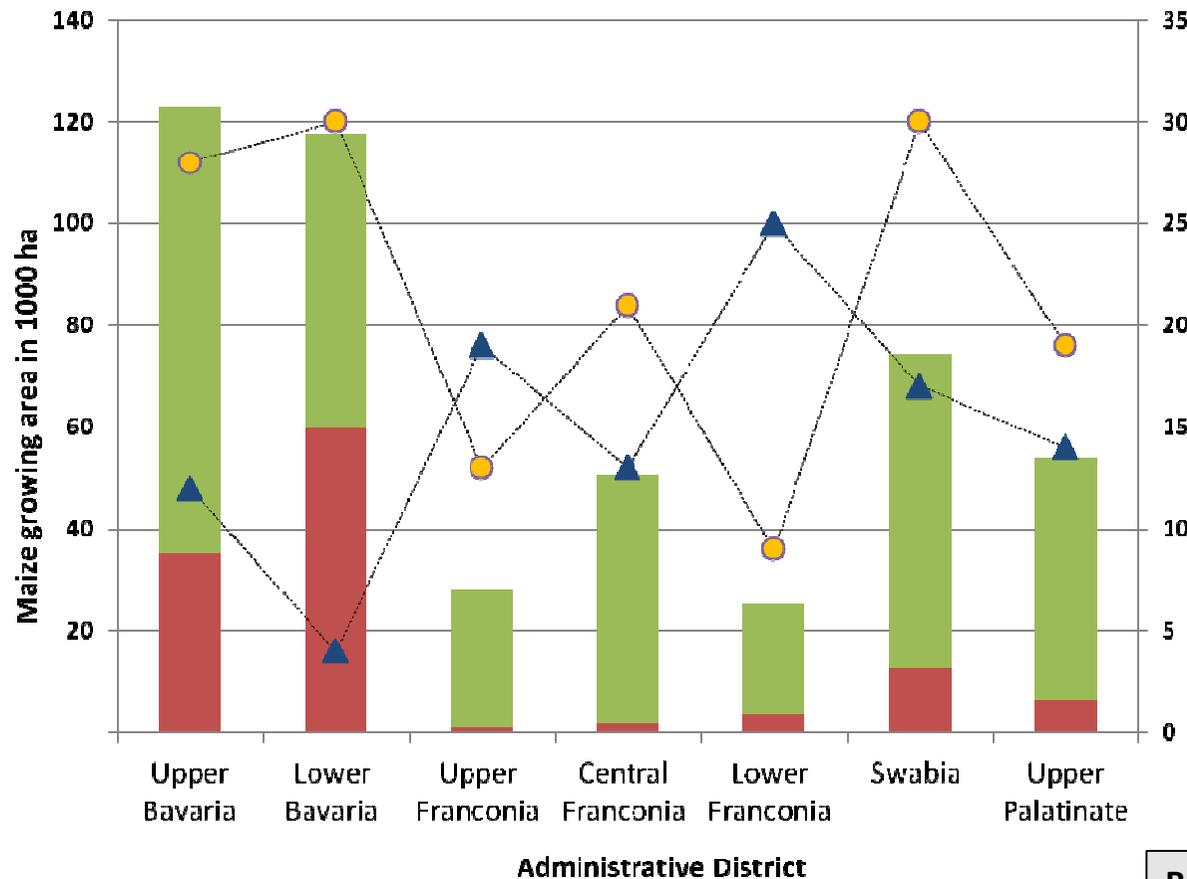


Project aim:

- Assessment of the possible regional significance of the Western corn rootworm (WCR)
- Determination of the economic impact of different eradication and containment measures at farm level

Cultivation of maize in Bavaria:

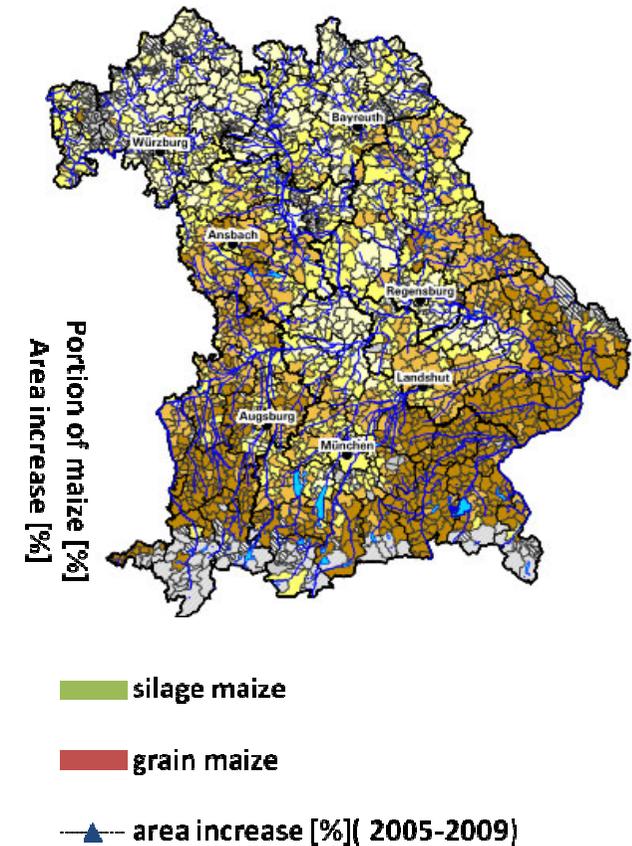
Maize growing area 2009



Source: InVeKoS-Data 2005-2009, own calculations

Bavaria: maize 2010

Source: Halama, Lfl. Bayern



Bavaria:

Maize growing area: **464.688 ha**

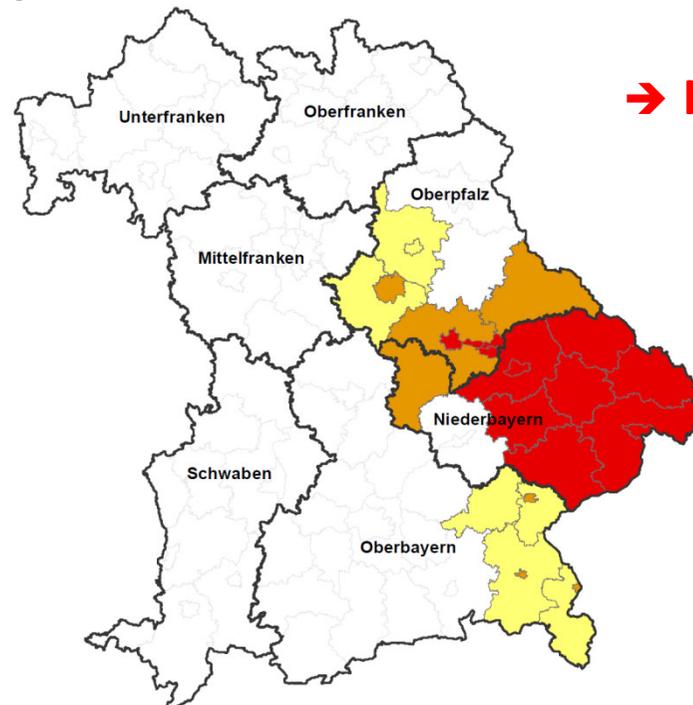
Portion of maize in crop rotation: **22 %**

Area increase: **11 %**

Regions under containment measures :

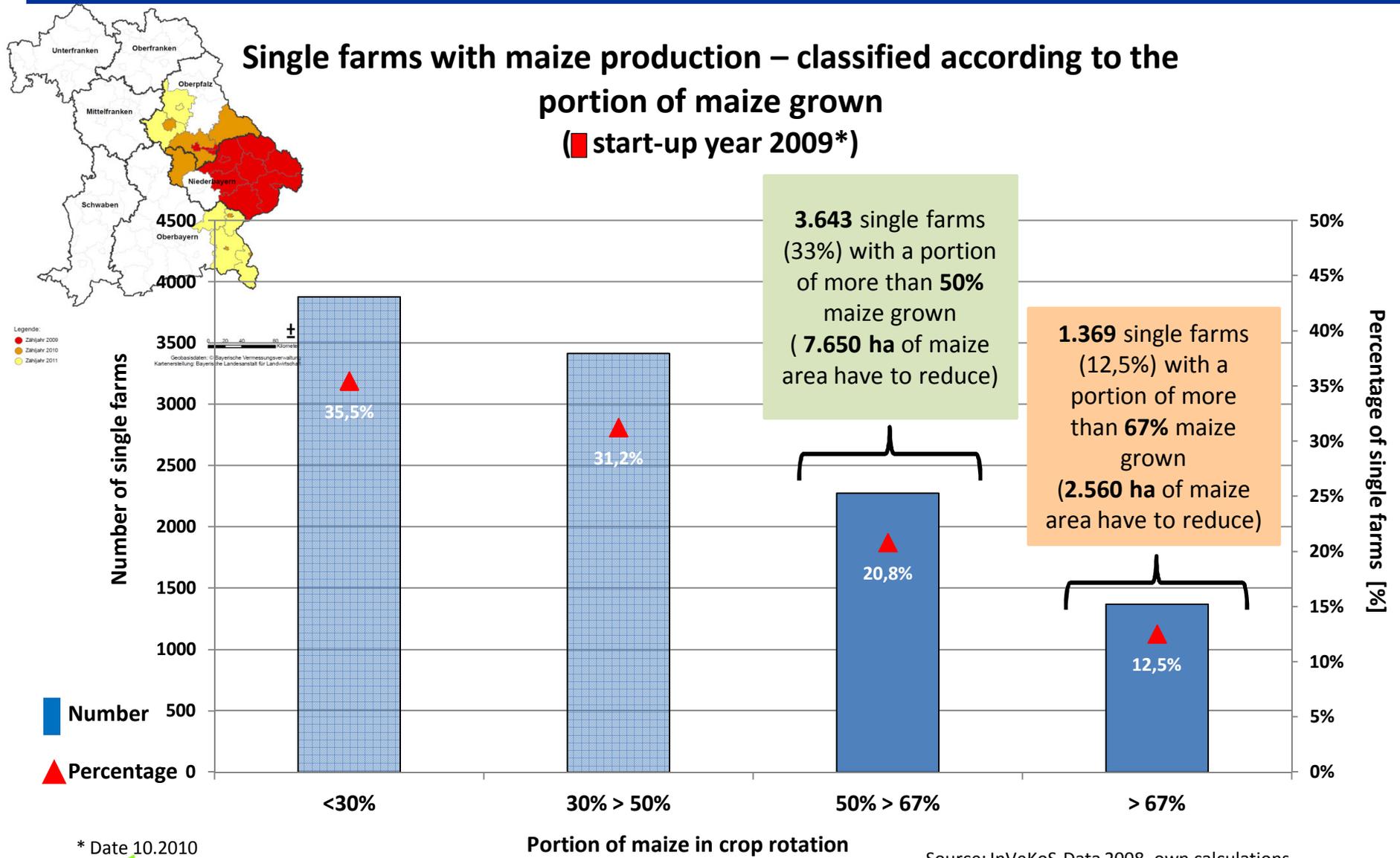
Restriction on crop rotation = max. 2/3 maize

- **start-up year 2009:** reduction of maize cultivation at the latest **2011**
- **start-up year 2010:** reduction of maize cultivation at the latest **2012**
- **start-up year 2011:** reduction of maize cultivation at the latest **2013**



→ Imposition of a fine in case of non – compliance

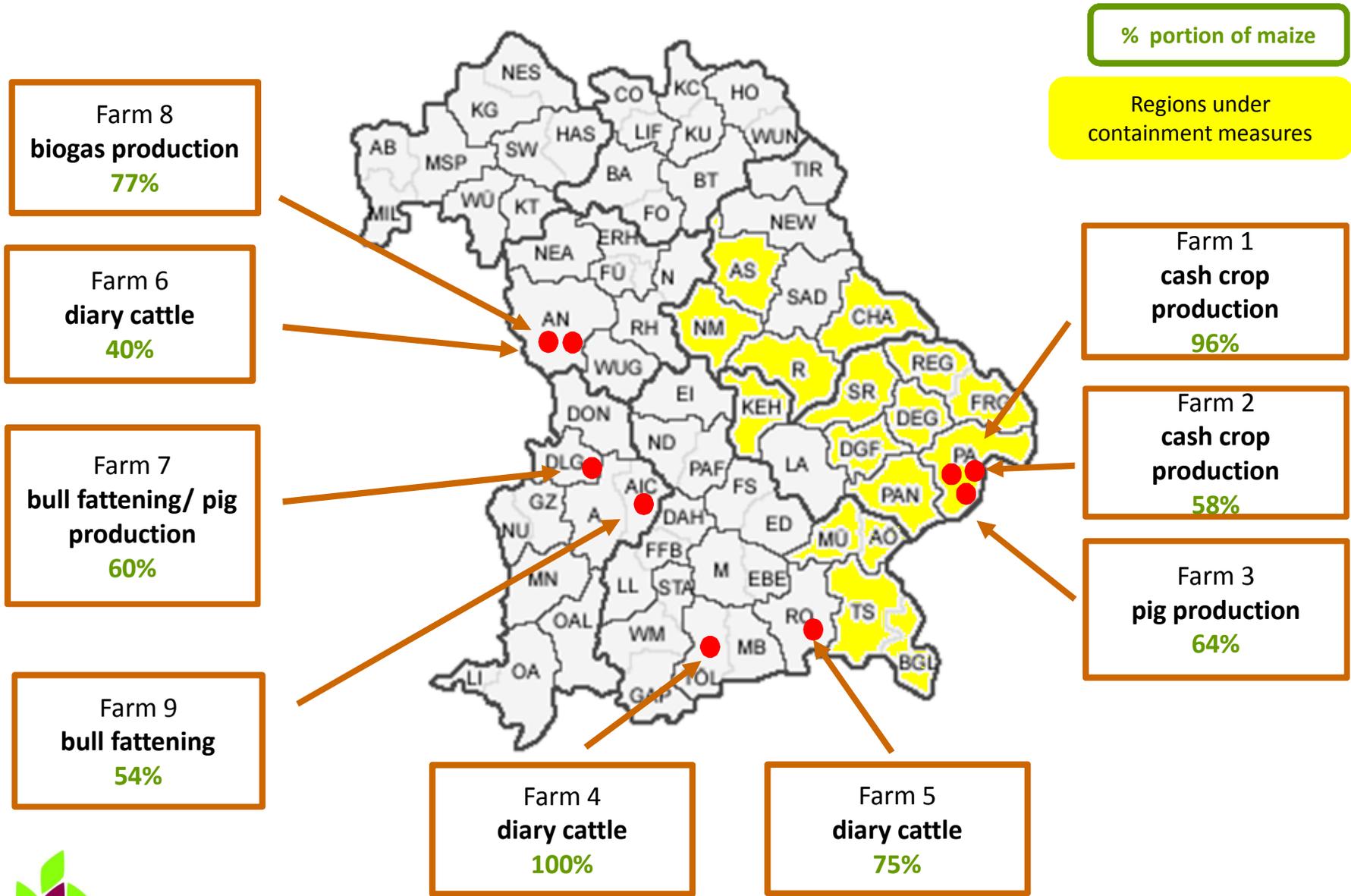
Affectedness of single farms:



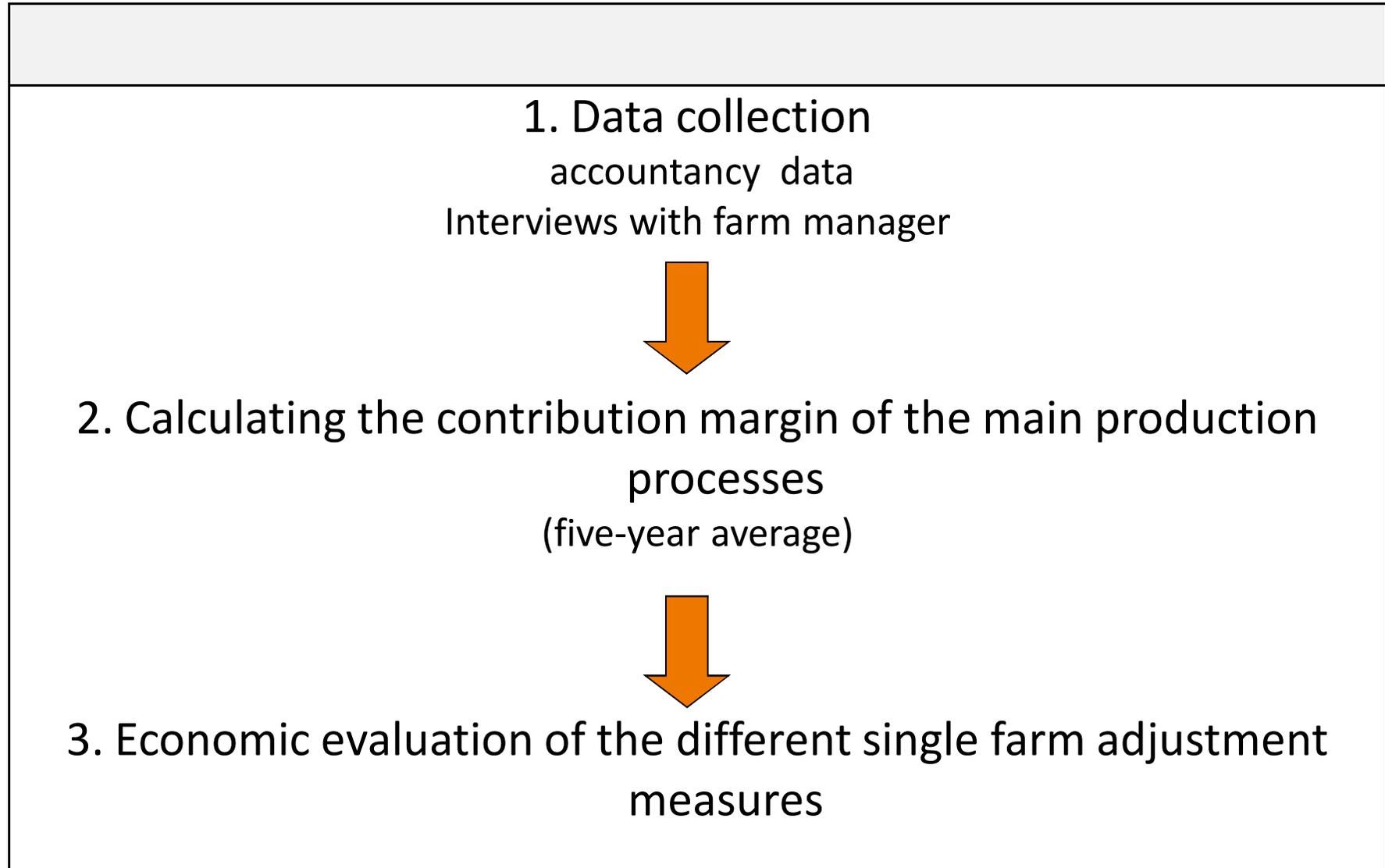
Selection of case study farms:

Selection of specific regions	Selection of typical single farms
<p>➔ <i>Assuming that the economic importance of the beetle depends on the regional maize density</i></p> <ul style="list-style-type: none">• Identification of regions in Bavaria with a high maize density• Analysis of the InVeKoS-Database<ul style="list-style-type: none">- Regional portion of maize in crop rotation (> 50%)- Area related development of maize production (2005-09)• Expert interview	<ul style="list-style-type: none">• Analysis of the InVeKoS-Database<ul style="list-style-type: none">- Regional portion of maize in crop rotation (> 50%)- Portion of maize grown on single farm (> 66%)• Different farm types (diary cattle, cash crop production, bull fattening, pig production, etc.)• Expert interviews• Willingness of manager to participate

Regional location and farm type :



Methode:



Determination of adjustment costs:

$$AC = \{(CM + VC) + WR + PF\} + C_A$$

$$C_A = T_C + YL + PP$$

AC: *Adjustment costs*
CM: *Change of contribution margin*
VC: *Change of variable costs*
WR: *Wage rate for additional work*
PF: *Purchase of fodder / substrate*

C_A : *Farm specific additional costs*
 T_C : *Transport costs*
YL: *Yield loss*
PP: *Additional plant protection*

Adjustment measures :

farm type	no.	grain maize/silage maize is replaced by:
cash crop production	1	winter wheat cultivation
	2	
pig production	3	purchase of wet maize, winter wheat cultivation (cash crop)
dairy cattle	4	purchase of feed wheat, grass-clover cultivation, ryegrass cultivation
	5	
	6	
biogas production	7	purchase of substrate (silage maize), grass-clover cultivation
	8	
bull fattening	8	purchase of fodder (silage maize, feed wheat, potato pieces), winter wheat cultivation (cash crop), grass-clover cultivation
	9	

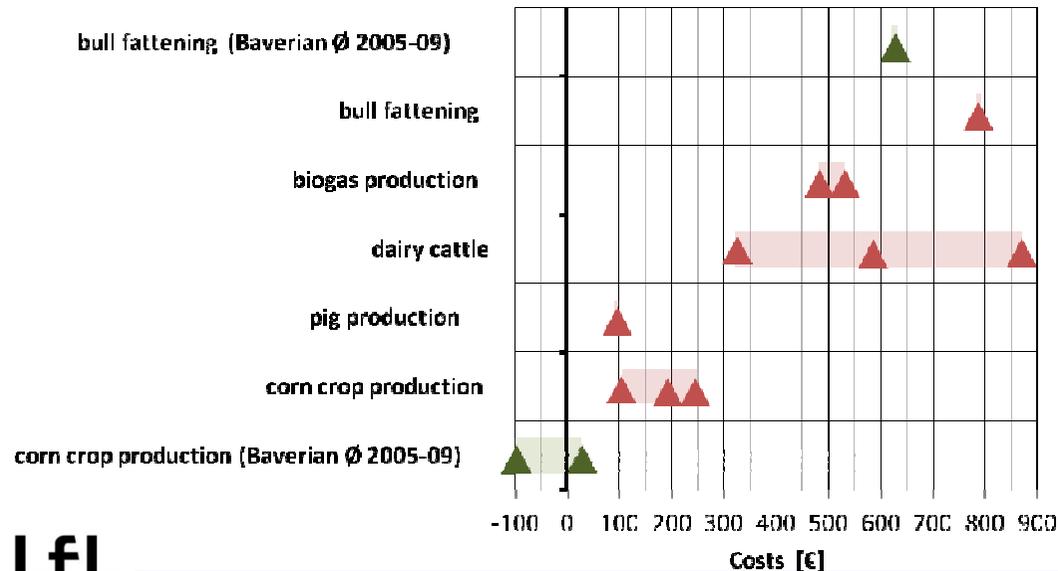
Adjustment costs :

Adjustment costs per 1 ha replaced maize area (at single farm level) *

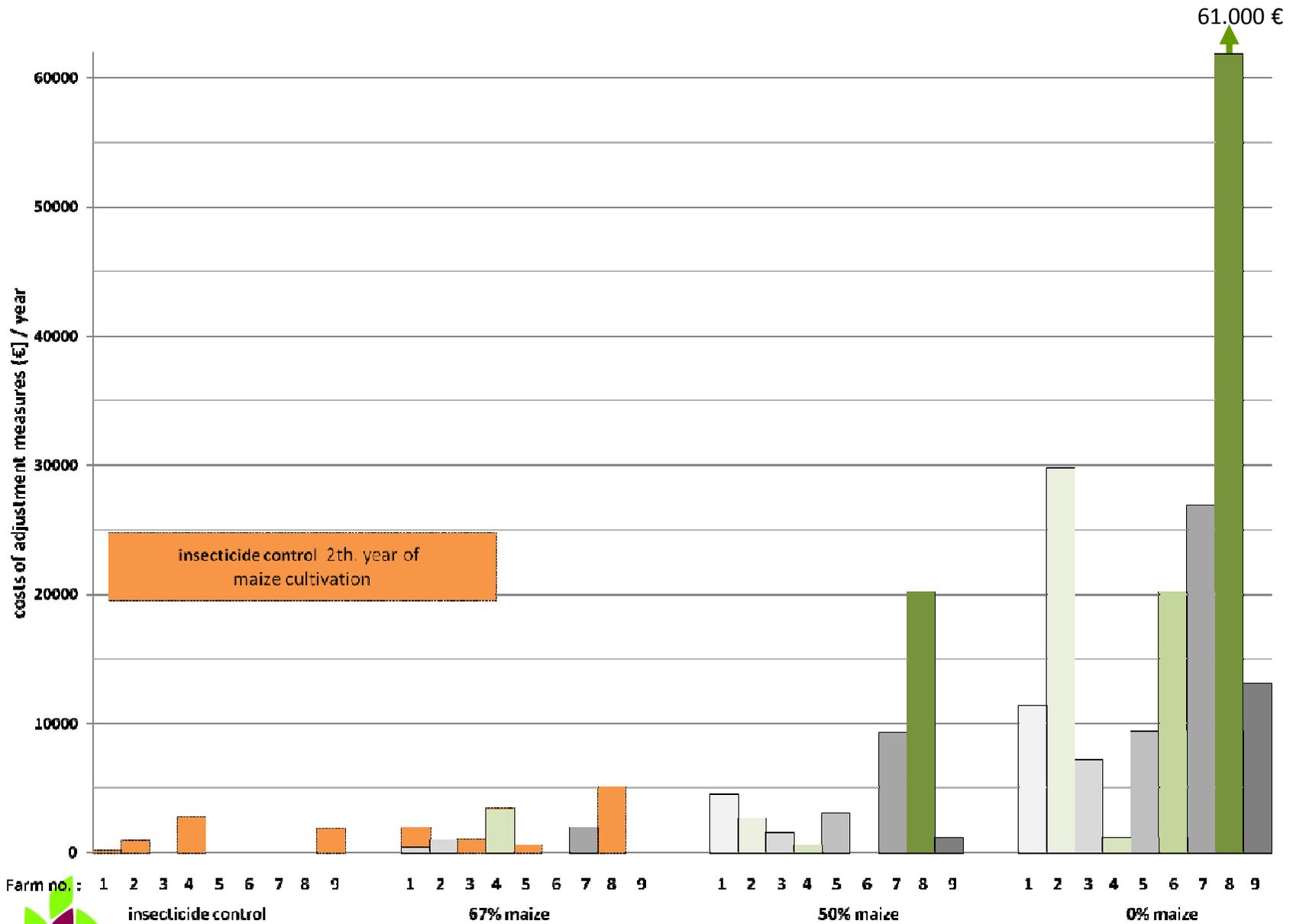
farm type	no.	current situation [€ /ha]	67% maize [€ /ha]	50% maize [€ /ha]	0% maize [€ /ha]
cash crop production	1	-	107	168	249
	2	-	-	146	217
pig production	3	-	-	91	91
dairy cattle	4	-	316	316	316
	5	-	544	544	544
	6	-	-	-	872
biogas production	7	-	483	483	483
	8			532	532
bull fattening	8				
	9			782	782

reference : Ø harvest year 2005 - 2009
* incl. preceding crop effect 100€

Adjustment costs per 1 ha replaced maize area (incl. preceding crop effect)



Economic impact per year :



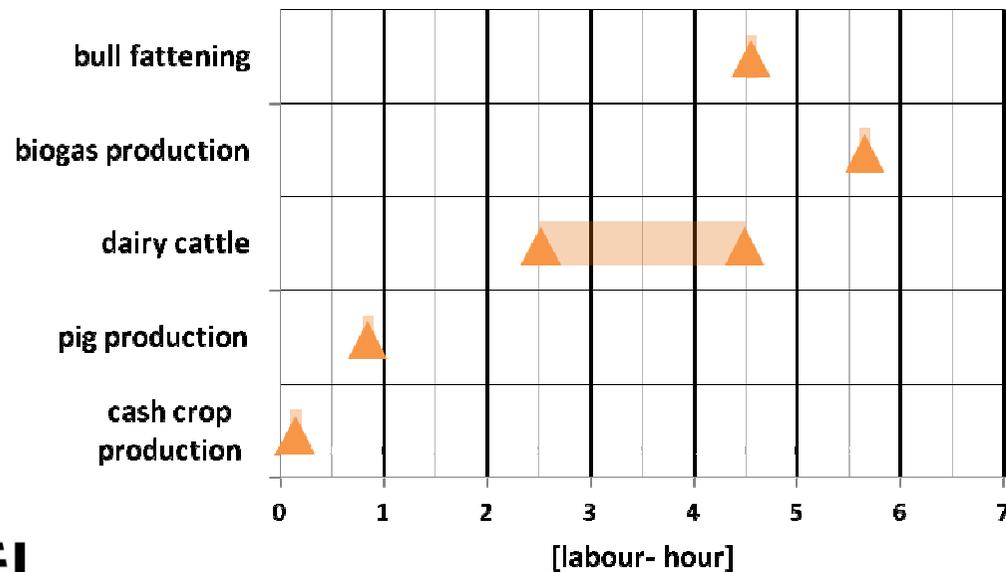
Additional work :

Additional work per 1 ha replaced maize area (at single farm level) *

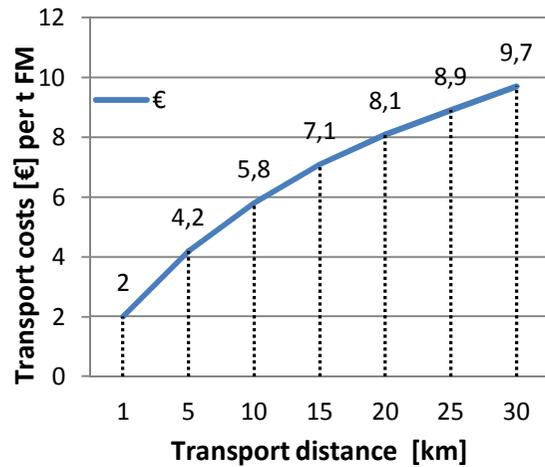
farm type	no.	current situation [LH/ha]	67% maize [LH /ha]	50% maize [LH/ha]	0% maize [LH/ha]
cash crop production	1	-	0,1	0,2	0,1
	2	-	-	0,1	0,2
pig production	3	-	-	0,9	0,9
dairy cattle	4	-	2,5	2,5	2,5
	5	-	4,5	4,5	4,5
	6	-	-	-	4,5
biogas production	7	-	5,6	5,6	5,6
	8			5,7	5,7
bull fattening	9			4,5	4,5

Source: LfL, own calculation

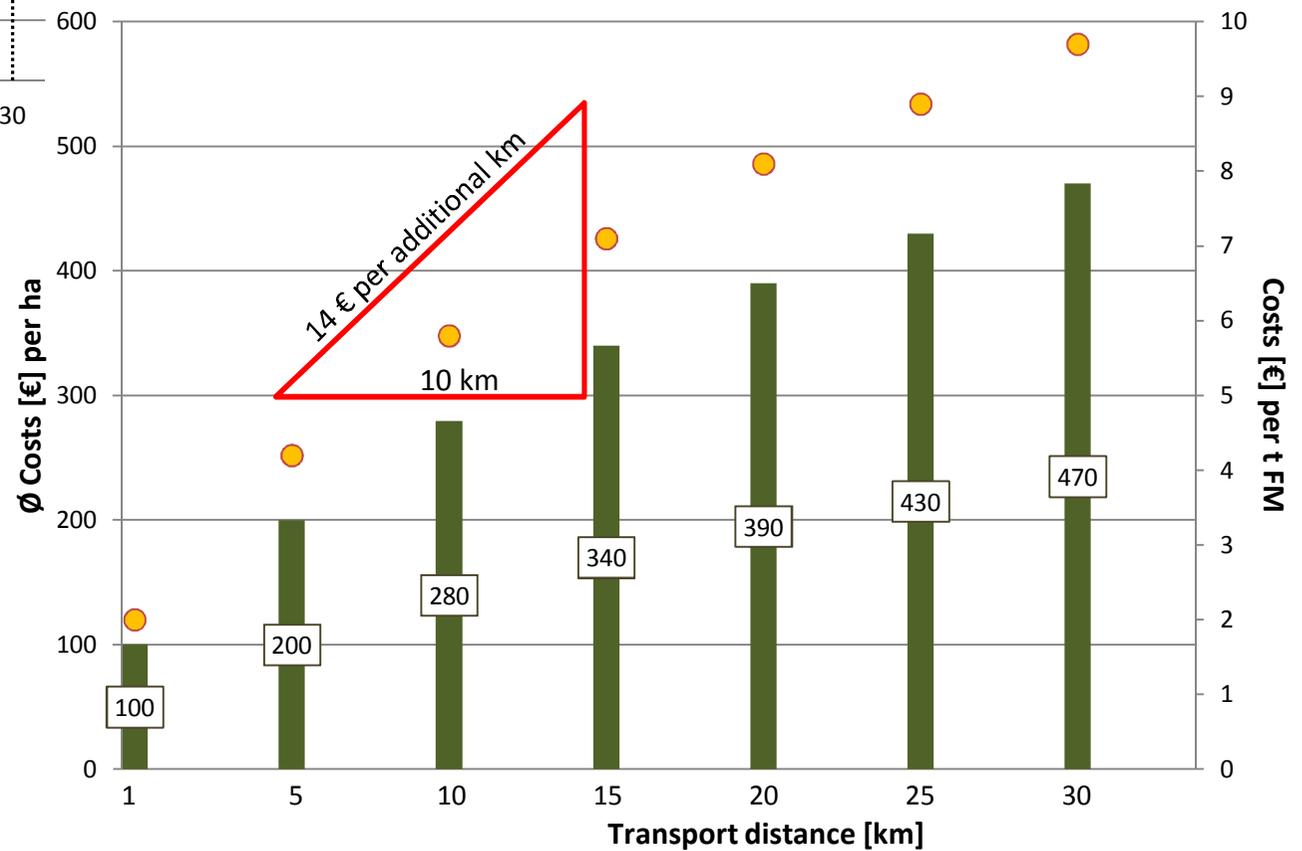
Additional work per 1 ha replaced maize area



Transport costs:



Transport costs of silage maize depending on distance and yield



Source: Strobl 2011, own calculations

Conclusion:

- **Definition of 5 specific regions with a high risk of damage caused by WCR**
- **Regional problem**
- **Currently only the containment measure “2/3 crop rotation” is of importance for Bavaria**
- **Most farmers assessed the adaptation measure 2/3 crop rotation to be of a minor problem**
- **Comparatively low consequences for cash crop production**
- **Results show the economic impact of the containment measures seem to be small at farm level**
- **„special status“ region of Rottal-Inn → substantial compliance costs**
- **transport cost for silage maize: 14 € per additional km (important for the farm types: dairy cattle, bull fattening and biogas production)**