



The precautionary principle in coexistence management

**Conference "Co-existence of genetically modified,
conventional and organic crops – Freedom of choice"
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The precautionary principle in coexistence management

coexistence management, takes care of.....

Criteria		Requirements/Measures		Decisions
Data from past growing periods - Crop specific share - Distribution of field sizes - Etc.	→	- Isolation distances - Availability of closed production processes - Crop rotation requirements - Etc.	→	Is coexistence even possible? Are all requirements fulfilled ?

... criteria to be analysed based on the geographic defined region

... requirements to be identified, measures to be implemented

... decisions to be taken

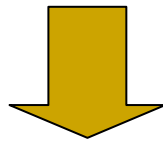
...before cultivation!

The precautionary principle in coexistence management

coexistence management means:

Requirements for GMO-growers:

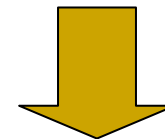
- isolation distances
- declaration of the product
- Segregation in the whole process
- etc.



HORIZONTAL COEXISTENCE

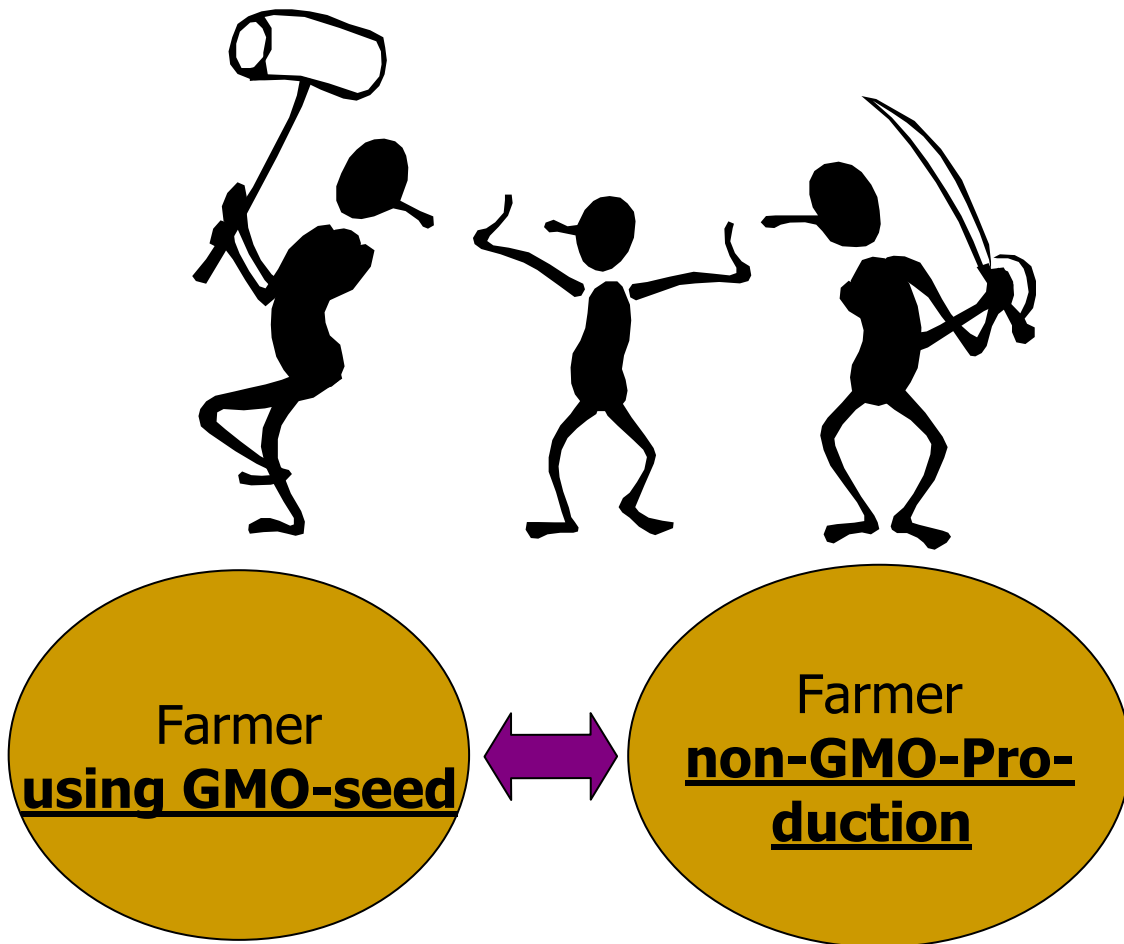
Requirements for conventional and organic growers:

- seed and field should be as less contaminated as possible to left the highest margin (Δ) for subsequent adventitious presence in the harvest product
- Segregation in the whole process
- etc.



VERTICAL COEXISTENCE

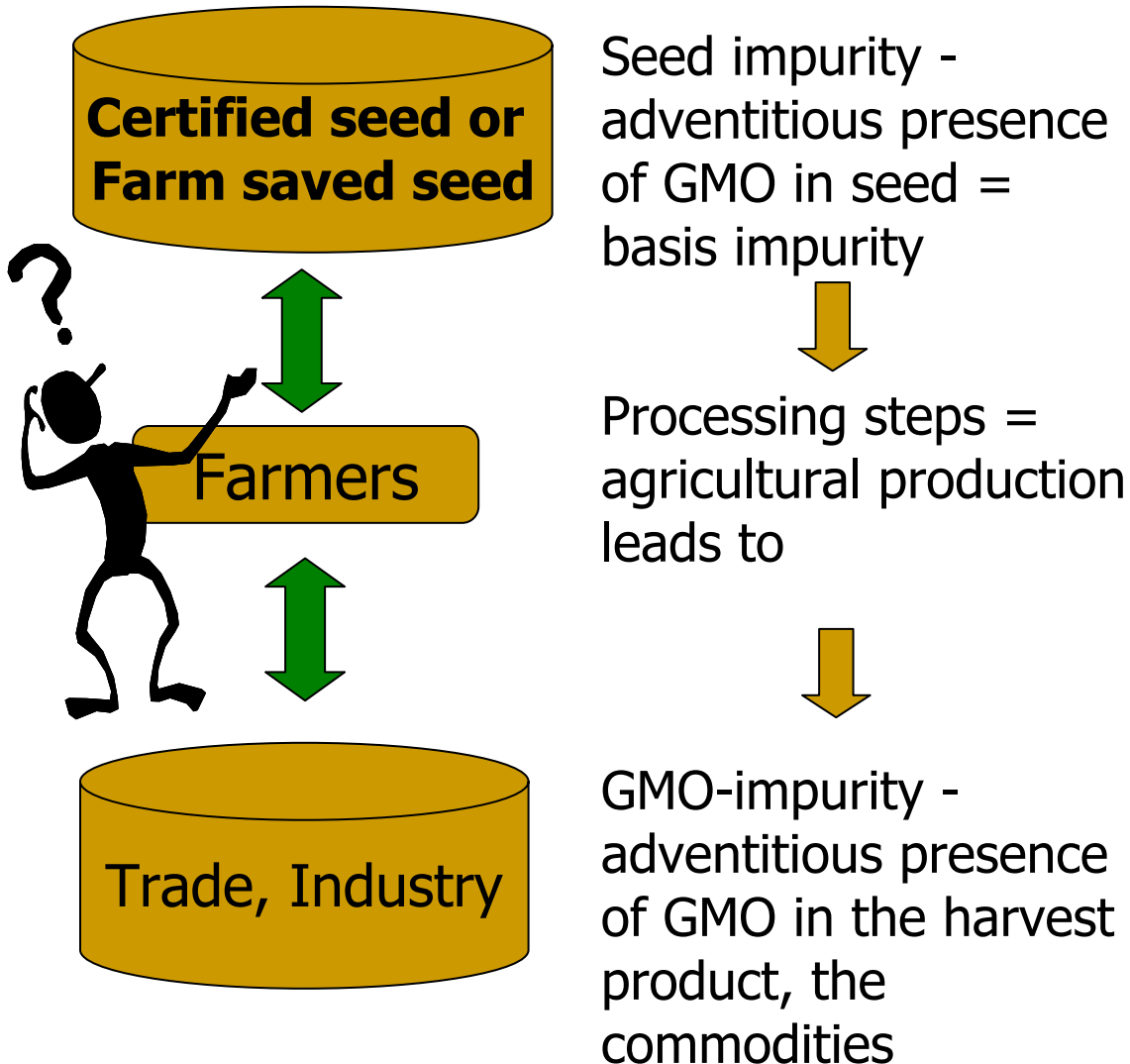
The precautionary principle in coexistence management



Horizontal Coexistence

is concerned with the conditions, requirements and interactions **between** the farmers **using GMO-seed** and the farmers of **non-GMO** - conventional and organic production

The precautionary principle in coexistence management



Vertical Coexistence

is concerned with the conditions, requirements and interactions for the production basics (seeds) and for the commodities along the whole production process on the farm

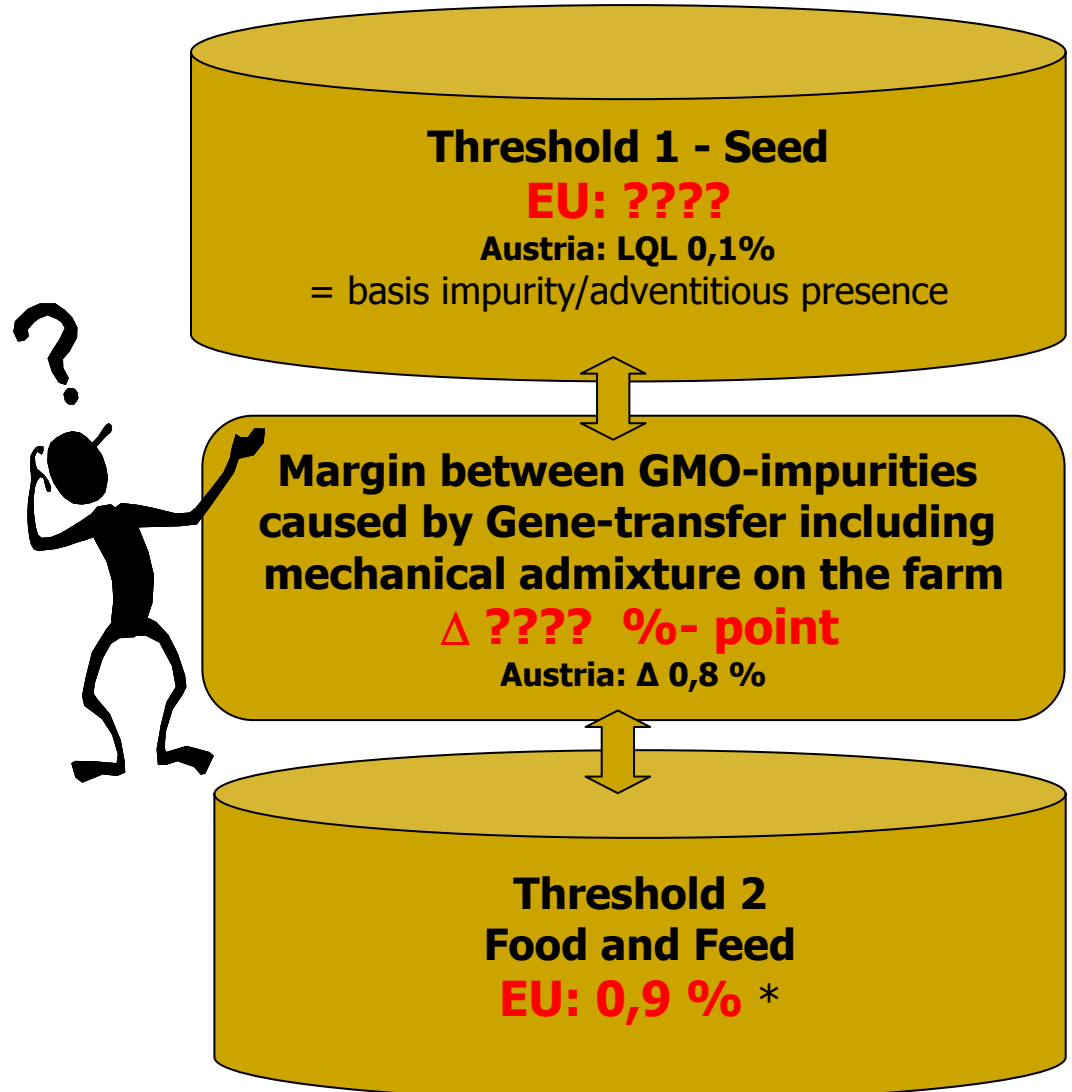
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**The difference in vertical
Coexistence give the
MARGIN in horizontal
coexistence =**

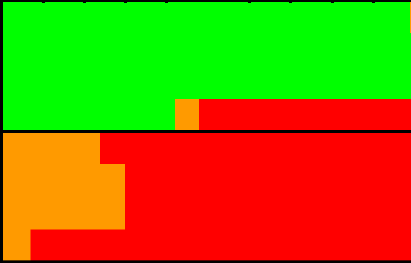
- Threshold 2 (adventitious presence of GMO in the harvest product/commodity for food and feed)
minus

- Threshold 1 (adventitious presence of GMO in seed)

Vertical Coexistence: the basis of precaution in coexistence-management - means appropriate risk sharing along the production chain





The Coexistence Index for Soybean seed: an example for a model to calculate possible coexistence in a defined geographic region

Threshold Certified Seed (%)	Threshold Basic Seed (%)	Isolation distance (m)	Change of seeds (%)	Volunteers (year)	Cross pollination potential with relatives, farmed or wild plants (ves/no)	Farm size (ha)	Field size (ha)	Crop specific share (%)	Yield (dt/ha)	up to %GMO										
SW2	SW1	ME	SGW	DW	WR	BG	SG	KAA	E	10	20	30	40	50	60	70	80	90	100	
I N P U T																				
0,7	0,1	0,4	100	0	0	Area 1	18	1,1	1,4	27										
0,7	0,1	0,4	100	0	0	Area 2	40	1,3	0,2	21										
0,7	0,1	0,4	100	0	0	Area 3	21	1,5	0,4	16										
0,7	0,1	0,4	100	0	0	Area 4	11	0,5	7,6	28										
0,7	0,7	0,4	100	0	0	Area 1	18	1,1	1,4	27										
0,7	0,7	0,4	100	0	0	Area 2	40	1,3	0,2	21										
0,7	0,7	0,4	100	0	0	Area 3	21	1,5	0,4	16										
0,7	0,7	0,4	100	0	0	Area 4	11	0,5	7,6	28										

Input criterias

Illustration of the Index

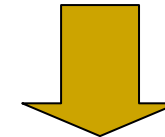
The Coexistence Index is a model and a tool to support the decision whether coexistence is possible  or not  by evaluation of the real natural and agricultural scenarios based on data of the previous planting season to forecast the coexistence in the current planting season.

The proportionality principle in „VERTICAL“ coexistence for “HORIZONTAL“ coexistence management

Crop, Species	Multiplication factor * through seed production
Potato	7-12
Soybean	10-25
Maize	80-200
Sugarbeet	450-600
Rapeseed	400-800

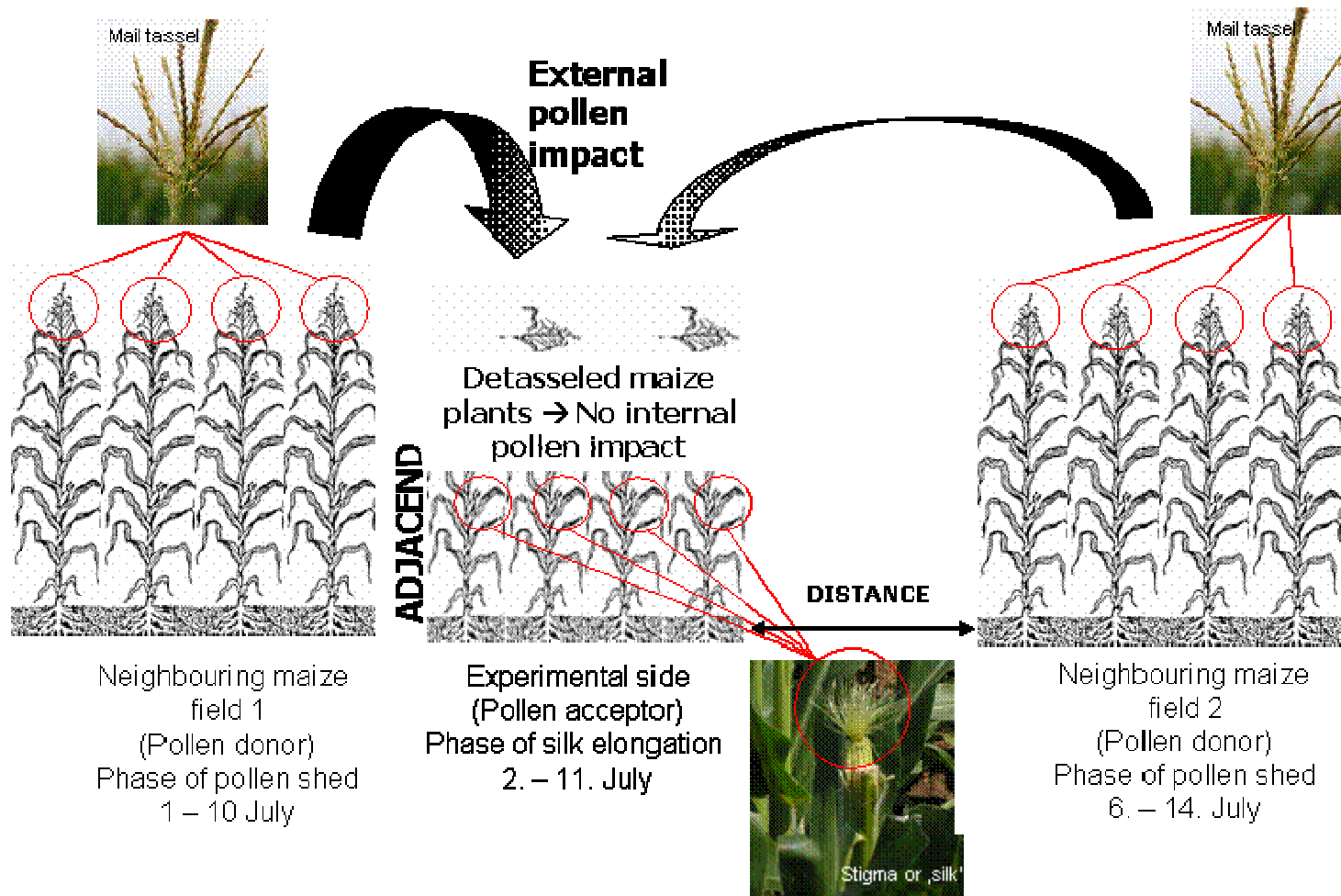
* x ha obtained for commodity production based on 1 ha seed production

Seed production:
segregation for
avoidance of gene transfer =
common practice

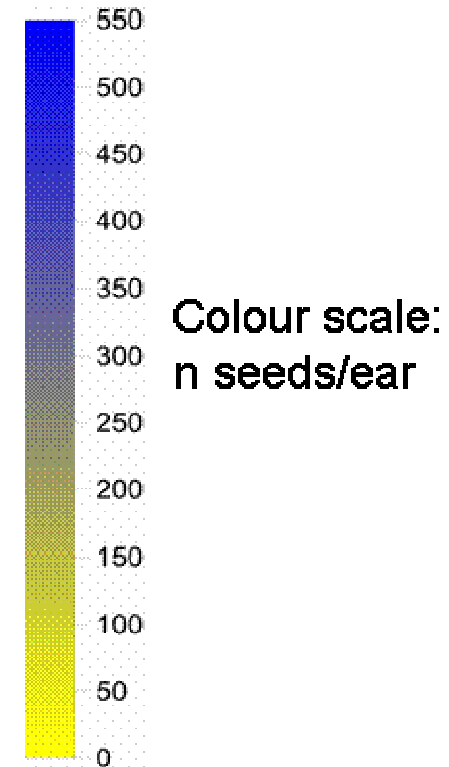
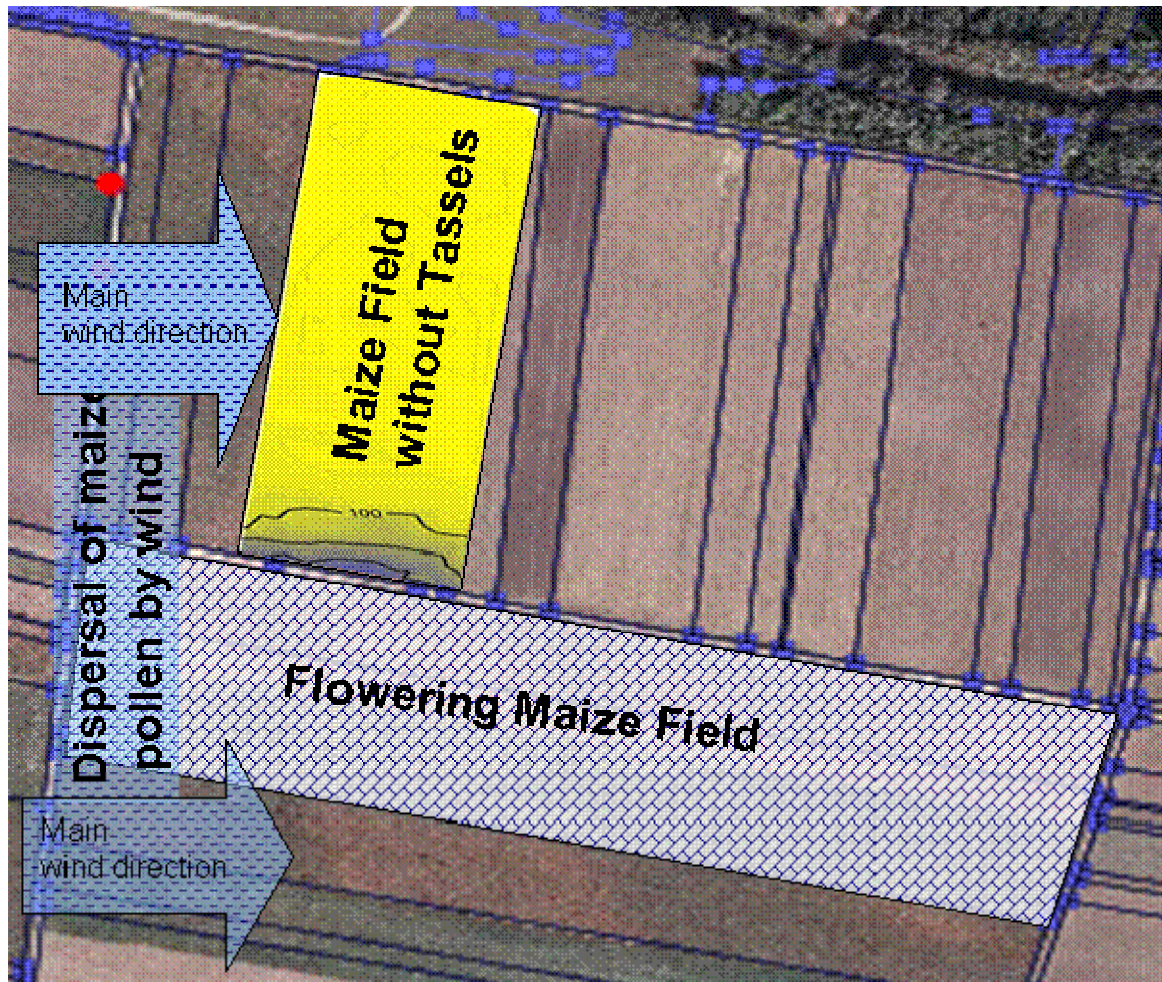


Commodity
production:
segregation for
avoidance of gene transfer =
new system has to
be introduced

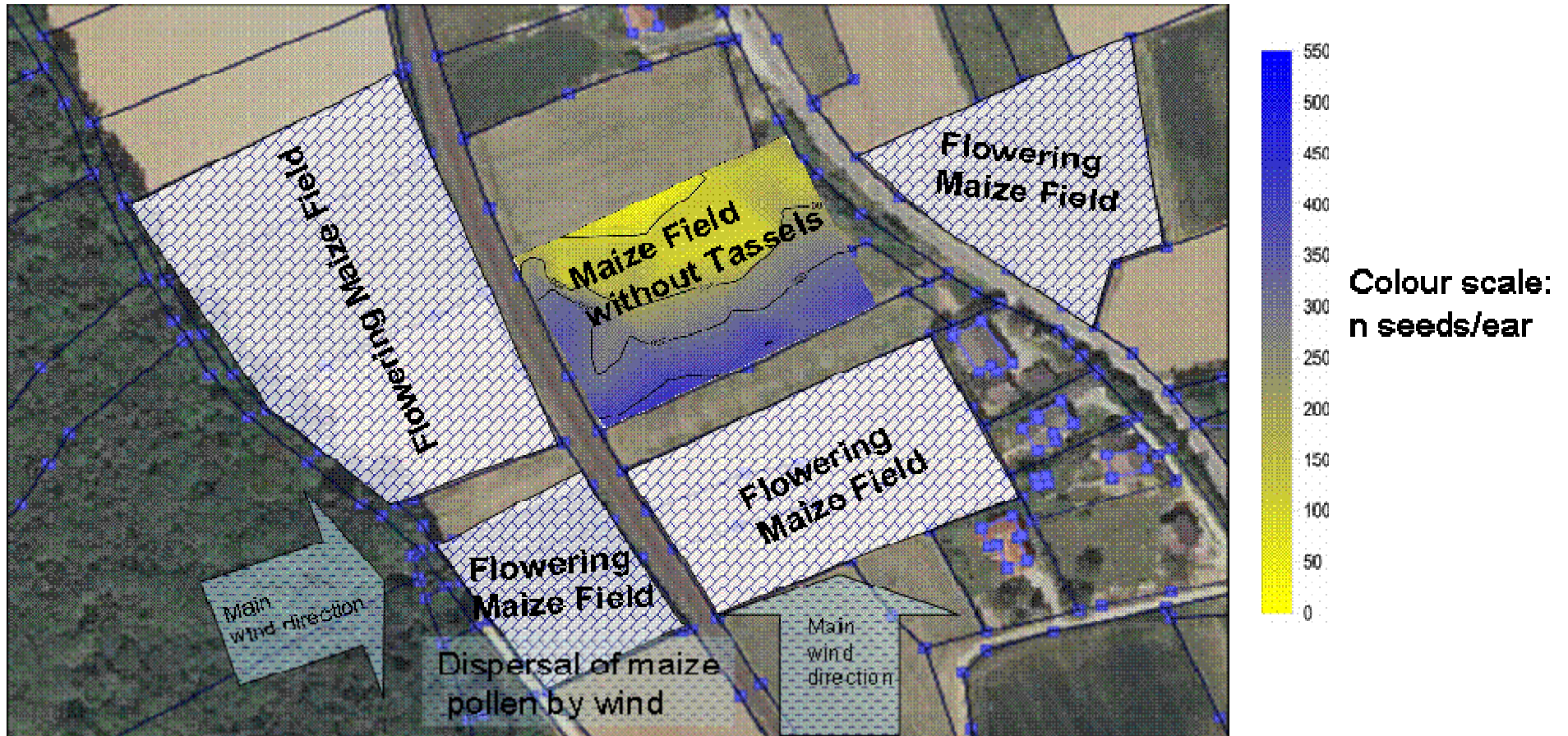
Research project part I: determination of the potential / of the maximum cross-fertilization in Maize (*Zea mays*)



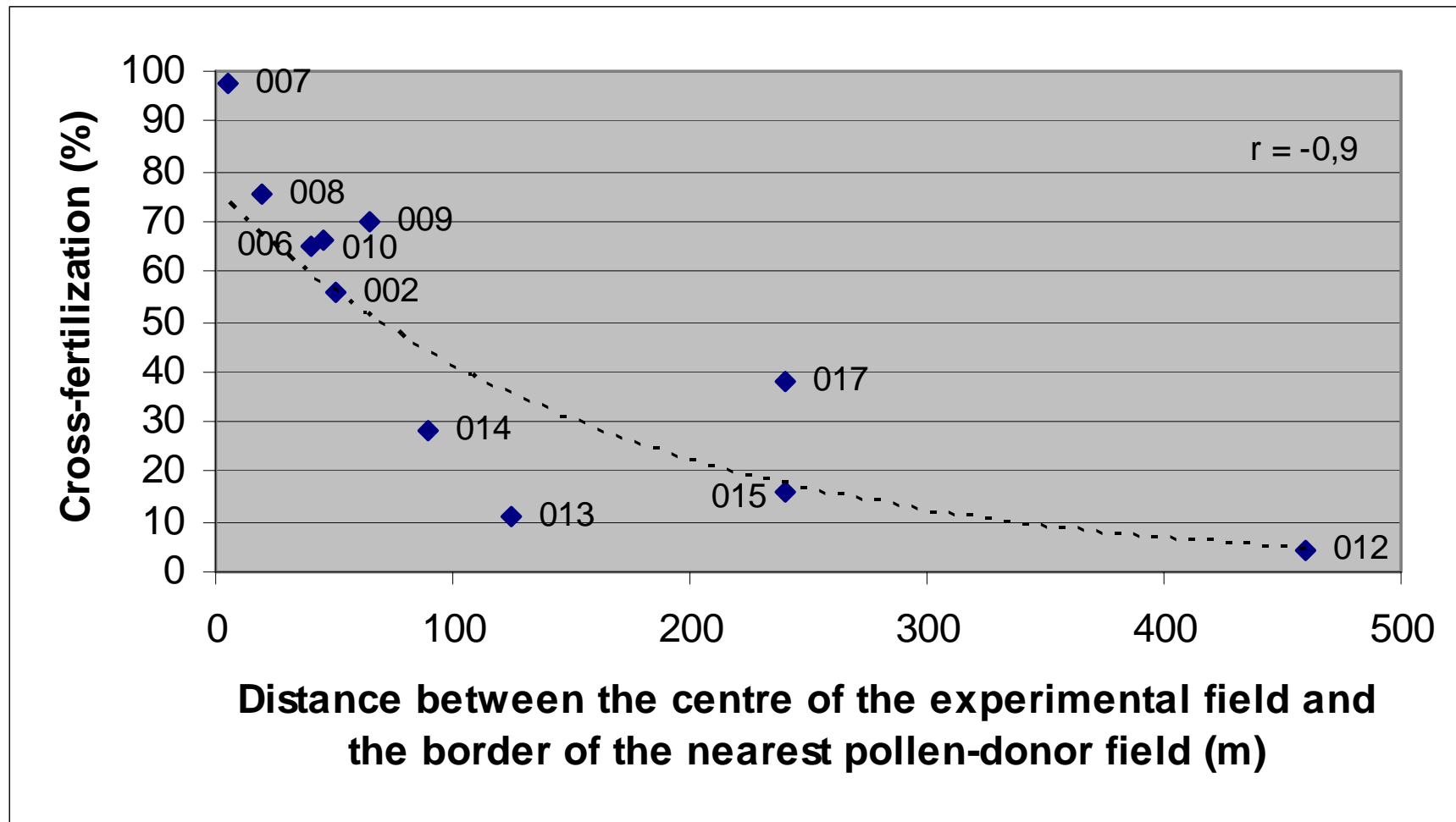
Research project part I: determination of the maximum/potential cross-fertilization in Maize (*Zea mays*)



Research project part I: determination of the maximum/potential cross-fertilization in Maize (*Zea mays*)

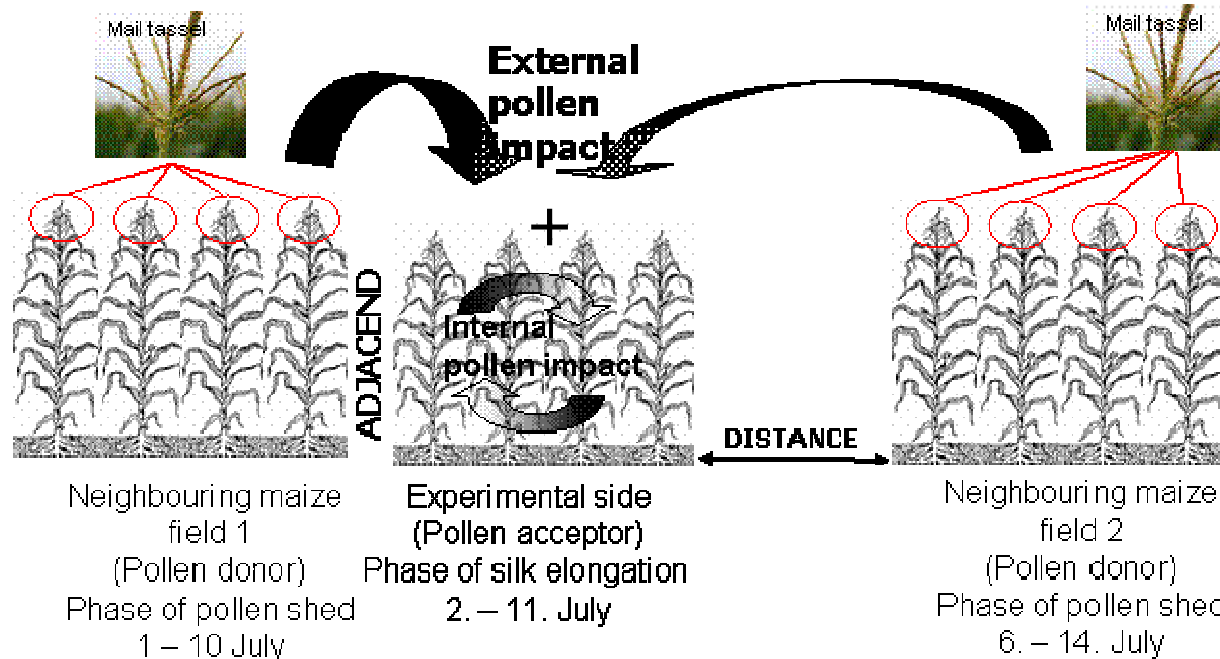


Research project part I: Cross-fertilization (%) related to distances to pollen donor fields*



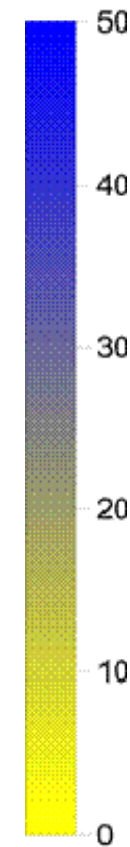
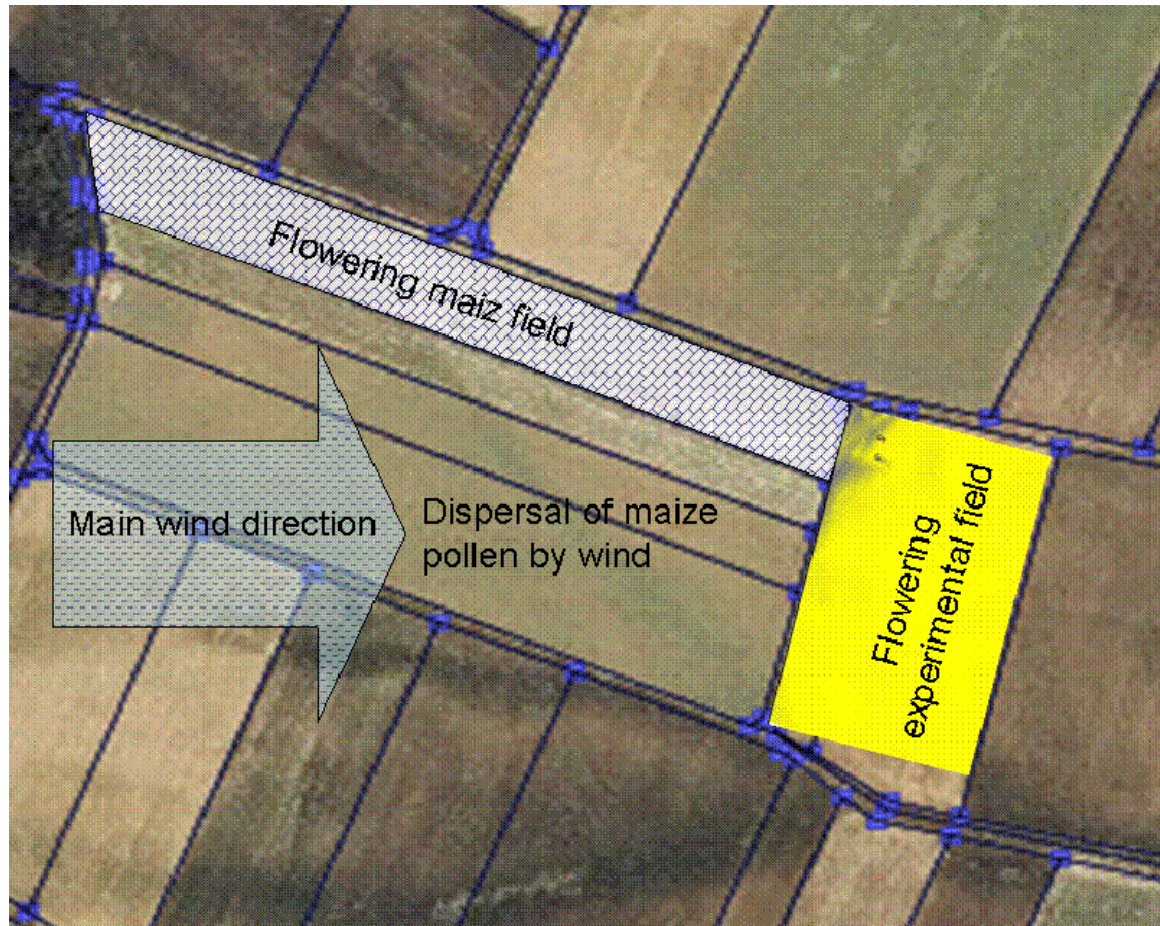
* Cross-fertilization (%) related to the total area of the experimental field

Research project part II: determination of cross-fertilization in consideration of impurities of certified seed in waxy maize fields



**Applying of iodine:
Purple discoloration (amylose) of maize kernels marks a cross-fertilization and non-waxy maize**

Research project part II: determination of cross-fertilization in consideration of impurities of certified seed in waxy maize fields



Colour scale:
n seeds/ear

Conclusion

Precautionary principles are implemented by:

- **Coexistence management in the way of**
 - Horizontal Coexistence → between farmers - in consideration the criteria in the region based on data of the last planting season (Coexistence Index, CI)
 - Vertical Coexistence → conditions, requirements, interactions along the whole production process, conditions that can not be influenced by the farmer (CI)
- **Proportionality of coexistence measures by an appropriate including of “vertical” coexistence criteria in concern to technical and economical aspects**
- **Applied research in consideration of coexistence criteria and requirements/measures on Member States and on the EU-level**
 - Use of available resources and results in all EU-Member States