Structure of organic vegetable farming, share of greenhouse area and fertilizer use – results of a survey in Germany

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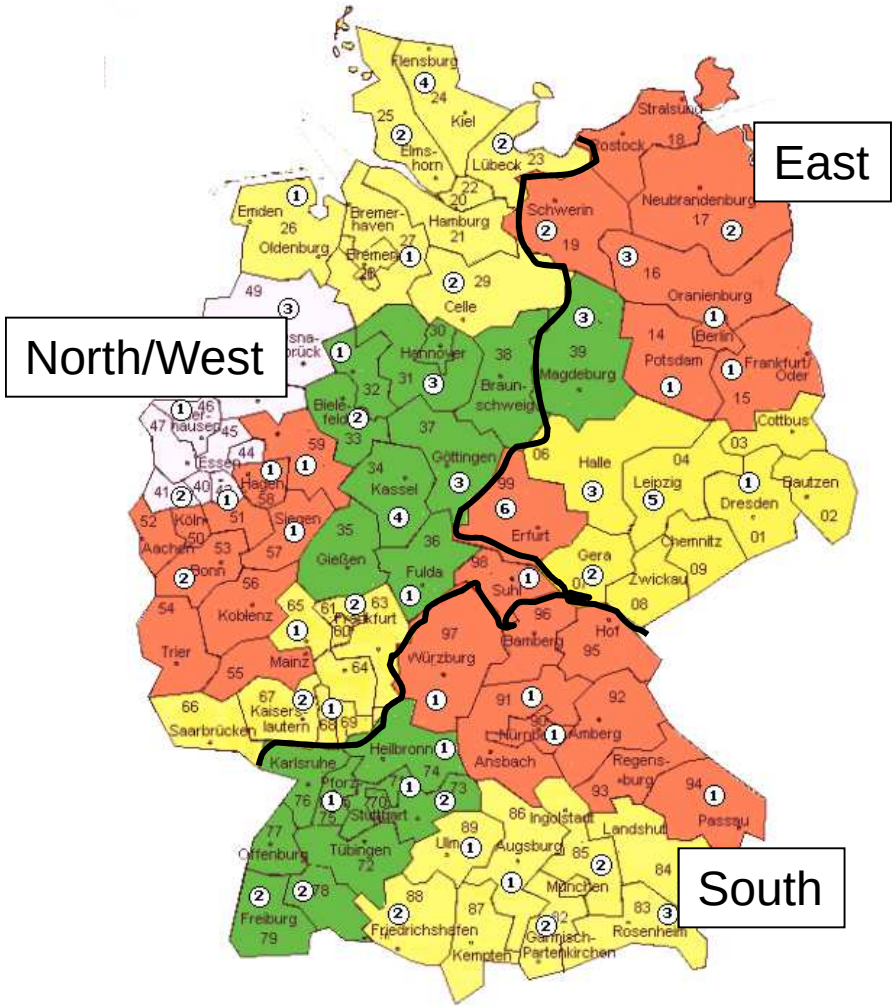
COST is supported by the EU Framework Programme Horizon 2020

- Survey of 100 organic vegetable farms in Germany
- Standard Questionaire, oral interviews
- Topics
  - farm structure
  - share of protected cultivation
  - Crop rotation
  - use of fertilizers

Survey



- Distribution of the farms surveyed

Region	Farms
	N
South	25
North/West	40
East	35
Total	**100**

Vegetable production

			organic		conv	% org
crops	Unit	2004	2012	2013	2013	2013
Vegetables	t	206,000	287,700	271,811	3,418,211	8.0
open land vegt.	ha	8,400	10,470	10,785	113,520	9.5
greenhouse	ha	100	230	263	1,291	20.4
Survey		*2001*				
open land vegt		*1,560*				
greenhouse		*11.9*				

- Organic vegetable production 8-10% of total production
- Share of organic greenhouse aera up to 20%
- Organic greenhouse 2,4% of organic vegt. area
- <u>Our Survey</u> in 2001 >10% of org. greenhouse and ca. 20% of organic open land vegetable area

Survey – farm structure

Region	Farms	Vegetable area [ha]				Part of Farm area
	N	Mean	Median	Min.	Max.	%
South	25	12.3	5.0	0.6	75	60.1
North/West	40	20.8	3.5	0.7	177	52.5
East	35	12.0	3.0	0.3	130	35.8
Total /Mean	**100**	**15.6**	**4.1**	**0.3**	**177**	**49.0**

- Bigger farms are located in North and East – Crops for processing, for ex. Carrots, red beets, spinach, cabbage
- In mean the farms are not totally specialised, vegetable area <60%

Survey – farm structure

Vegetable area	Farms	Vegetable area [ha]		Farm size [ha]		Area of vegtables [%]	
Category	[N]	Ave	Med	Ave	Med	Ave	Med
>0-1 ha	17	0.7	0.7	5.0	3.1	38.0	29.6
>1-2.5 ha	22	1.8	1.8	26.3	6.9	38.8	27.0
>2.5-5 ha	17	3.8	3.5	29.2	6.2	51.8	58.4
>5-10 ha	18	7.4	7.2	35.9	16.1	45.7	46.8
>10-20 ha	11	13.8	12.5	130.9	38.5	53.9	34.9
>20-50 ha	5	40.8	41.0	79.0	50.0	83.1	100.0
>50-100 ha	7	75.7	75.0	183.8	107.0	62.8	70.1
>100 ha	3	140.5	130.0	390.0	205.0	67.1	86.1
Total	**100**	**15.6**	**4.1**	**61.0**	**12.5**	**48.5**	**47.6**

- More farms in the category <10ha
- The bigger farms are more specialized on vegetable production

- Examples of carrots and salad production

Survey – protected area

Region	Farms	protected area	Size of protected area [m²]			
	N	N	Mean	Median	Min.	Max.
South	25	9	1846	800	400	6000
North/West	40	23	1318	800	2	4800
East	35	22	1096	620	10	4300
Total/Mean	**100**	**54**	**1315**	**785**	**2**	**6000**
Total in survey			116848			

- The mean of protected area 1000-2000m² but wide range among the farms

Survey – protected area

Region	Farms [N]			Area per farm [m²]			Share
	G*	P*	G & P	G	P	G & P	%
South	5	2	2	1848	700	2985	5.0
North/West	2	9	12	750	709	1870	3.9
East	6	9	7	1893	478	1206	6.2
Total	**13**	**20**	**21**	**1700**	**604**	**1755**	**5.0**

* G = under glass, P = under plastic

- The share of protected area is proportionally low
- Beside glashouses, plastics can play a considerable role

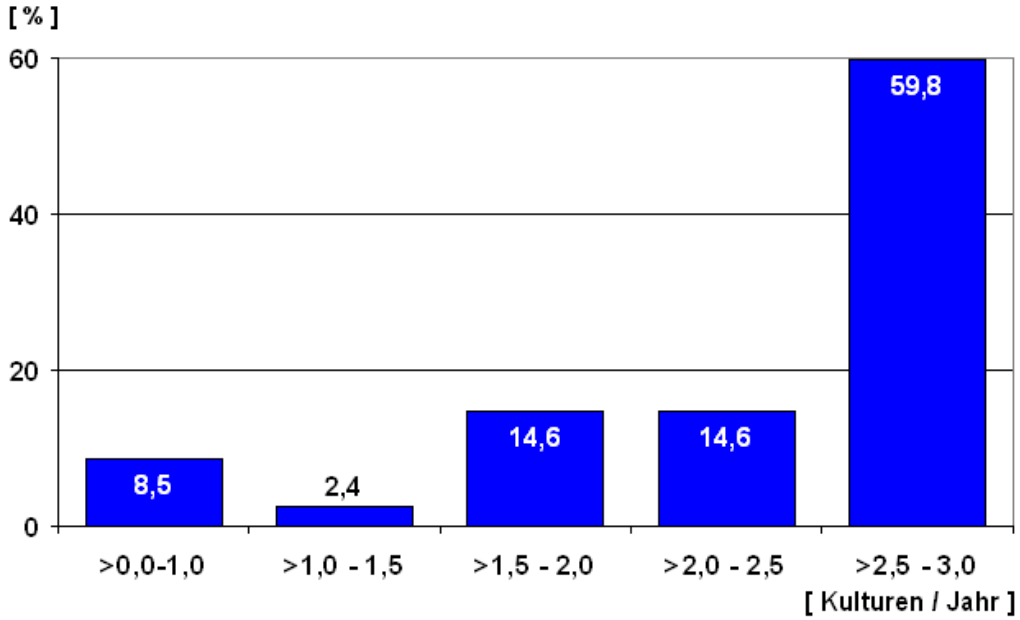
Survey – protected area

Farm size	Farms [N]			Area per farm [m²]			Share
	G*	P*	G & P	G	P	G & P	
< 1 ha	6	6		2300	539		11.2
1-3 ha	1	6	10	440	418	1116	4.5
3-5 ha	1	4	4	800	940	2248	3.8
5-10 ha	3	4	6	1486	645	2117	2.4
10-20 ha	2		1	1300		4000	1.7
Total...	**13**	**20**	**21**	**1700**	**604**	**1755**	**5.0**

- Smaller farms - higher % of covered aera are more intensive

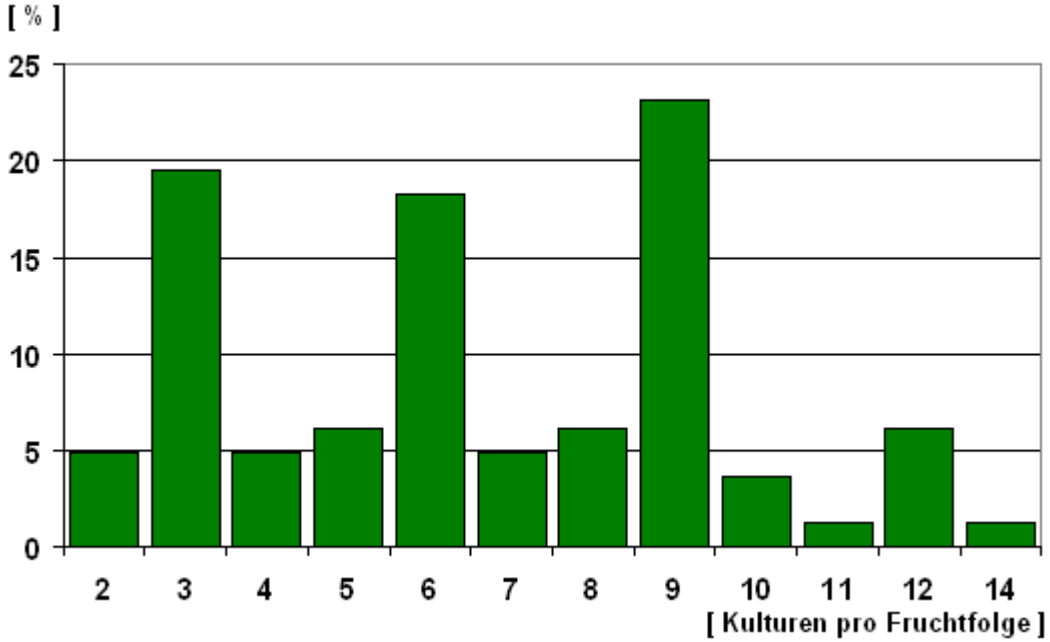
- glashouse and plastic tunnels in different use

Crop rotations in greenhouse



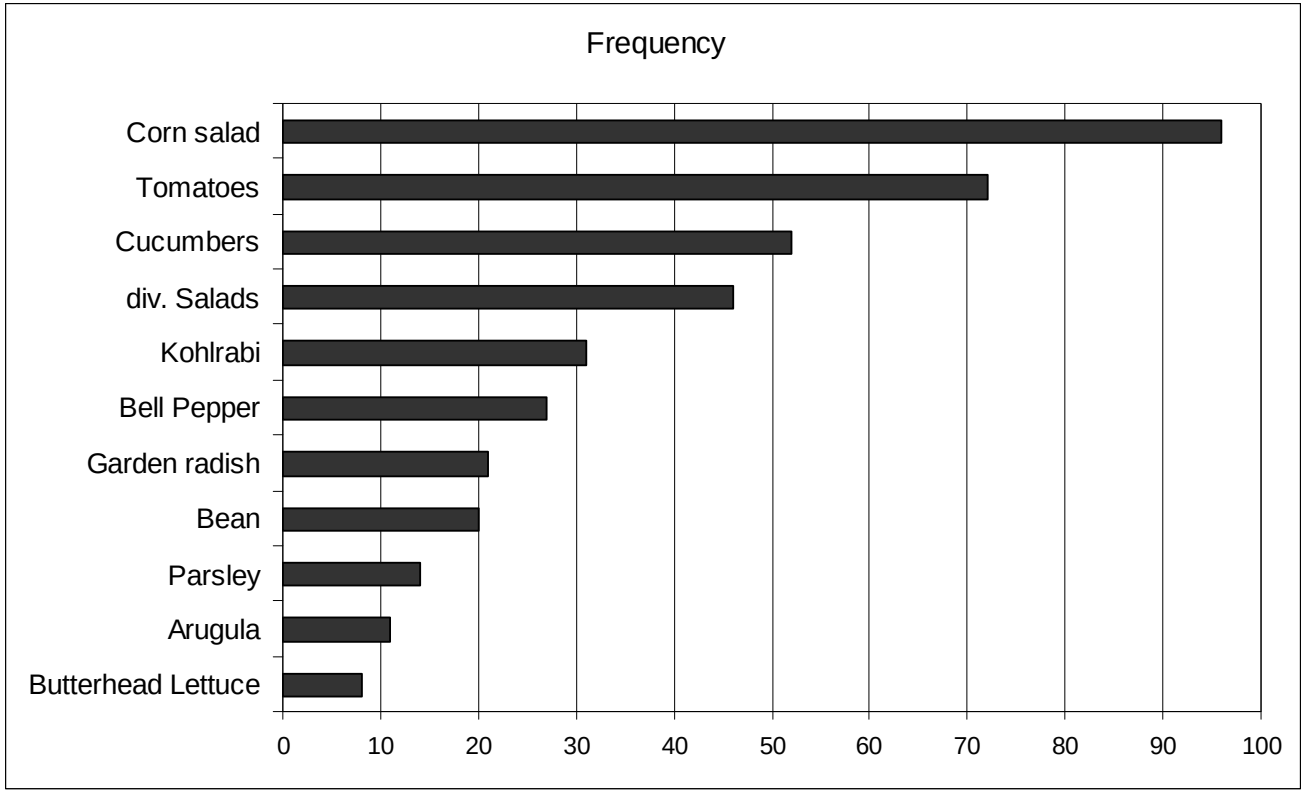
- most of the farms (60%) grow 3 crops per year

Crop rotations in greenhouse



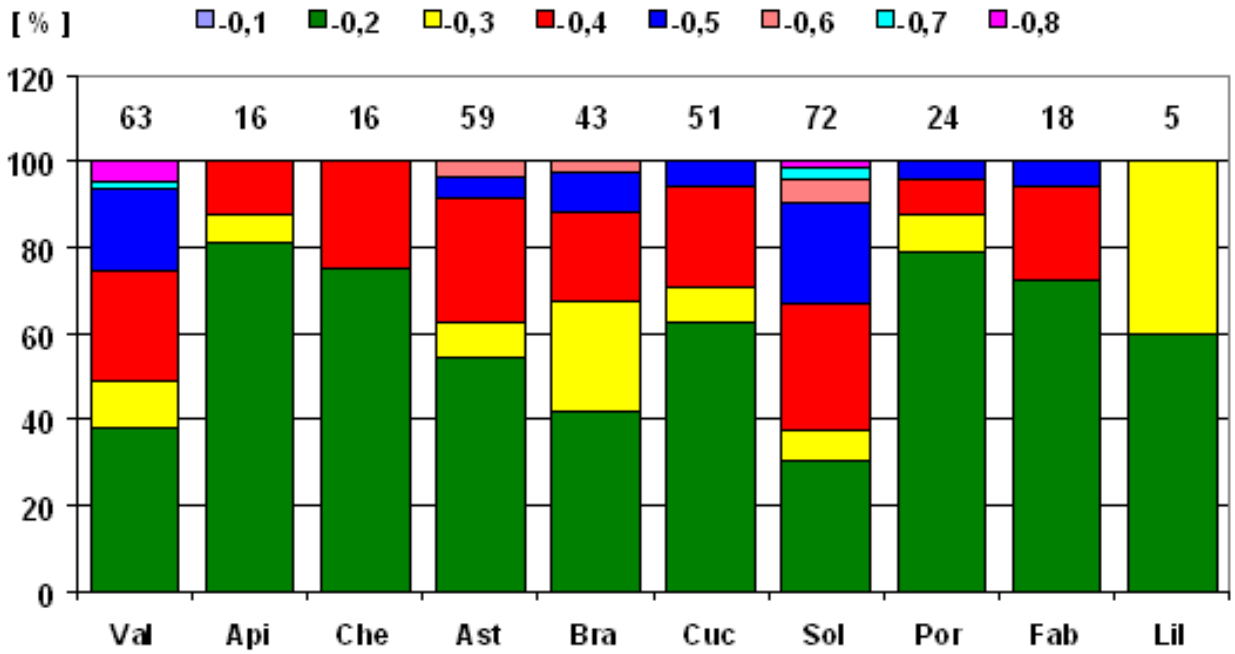
- 3, 6 or 9 crops/rotation are most frequent
- 1/2/3year crop rotations with 1 main crop and 2 additional crops per year

Crop rotations in greenhouse



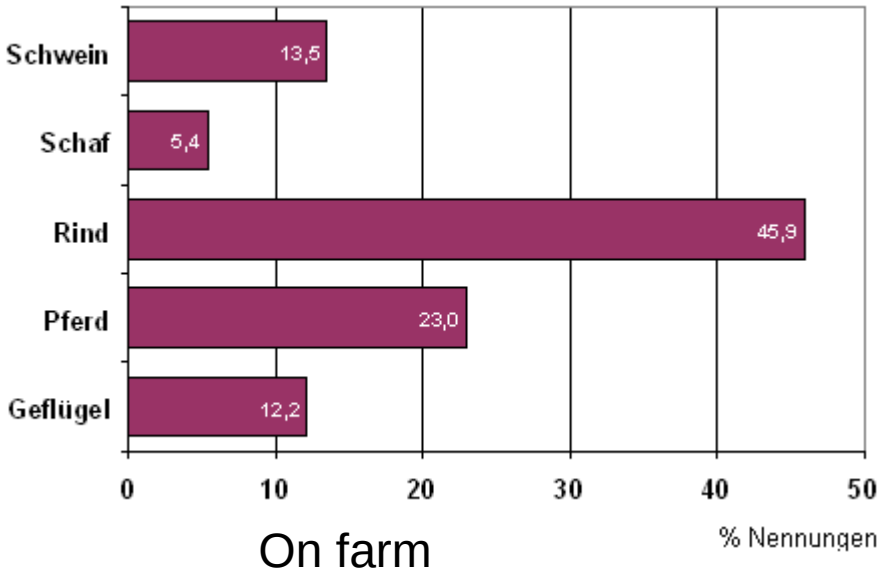
- Frequency in 3 year: means for ex. Corn salad nearly every year, tomatoes 2 of 3Y, cucumber every 2nd Y

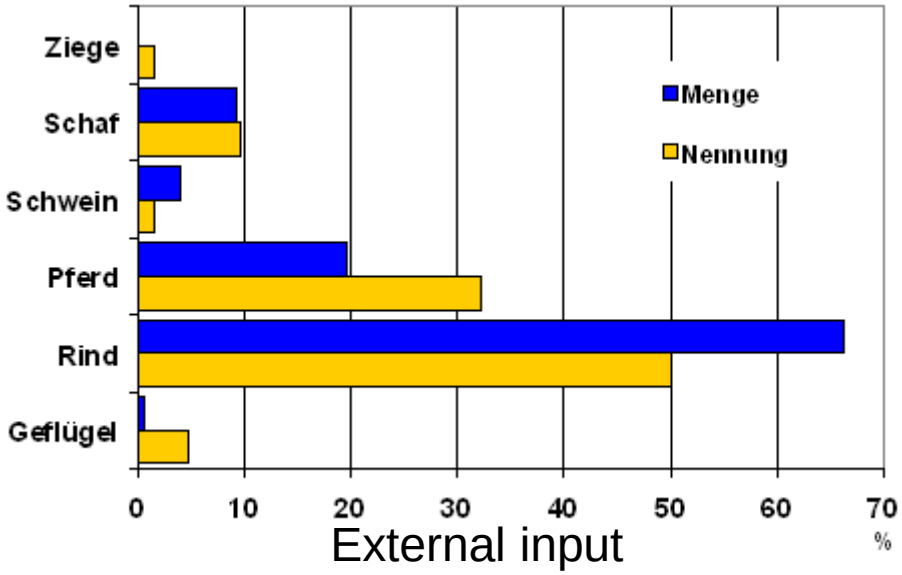
Crop rotations in greenhouse



- Frequency of botanical family in crop rotation
  = Crop bot Fam / N all crops
- Share of the different frequency inside the group of surveyed farms

Fertilizer use

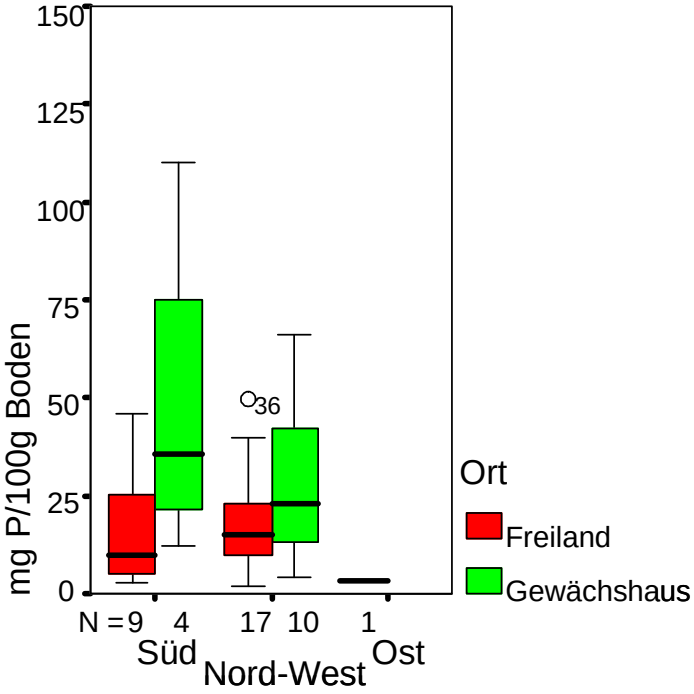




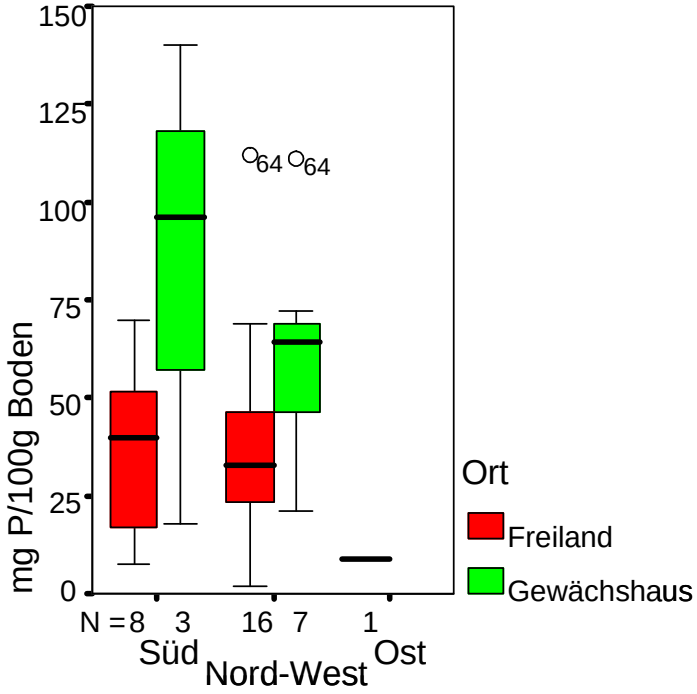
- Use of animal manure
  - Cattle and horse manure most frequent

Fertilizer use

- Consequences of animal manures used for N supply

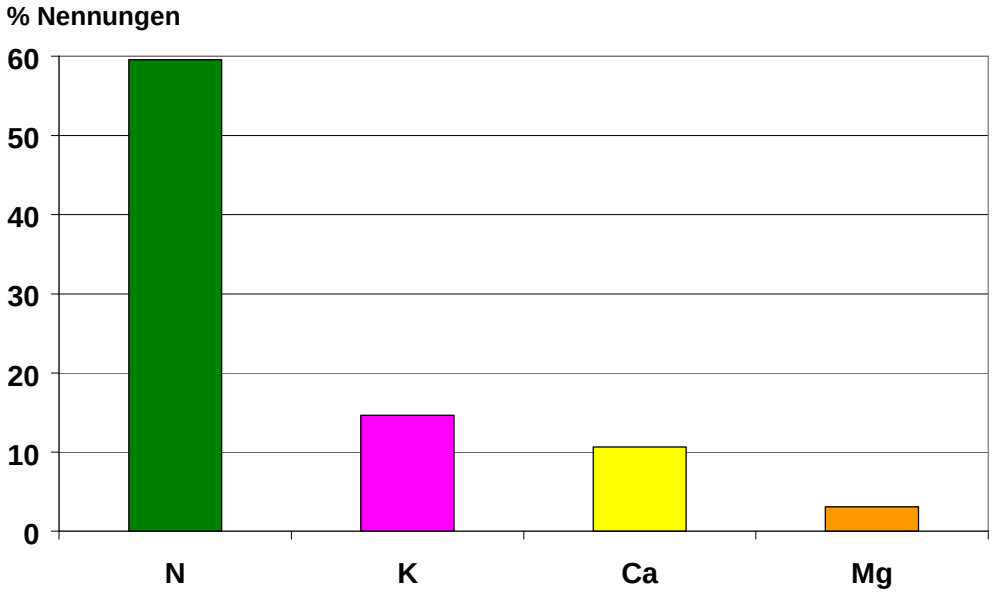


Lowest values



Highest values

Fertilizer use – additional top dressing



- Nitrogen fertilization is the dominating reason
- Imported fertilizer: shred of pulses, vinasse (resid. Sugar prod.), horn products

- High conversion rate in greenhouse area
- Higher number of small farms, bigger farms may be more specialized
- Planning in main crop rotation + 2-3 add. crops
- Base Fertilizer manure, preferable cattle manure – effect on soil nutrient composition

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Fertilizer use

Manure sources	On-farm sources			Off-farm sources		
	South	North/ West	East	South	North/ West	East
Poultry	0	18	6	15	4	0
Horse	28	10	17	38	35	26
Cattle	28	30	43	31	46	65
Sheep	0	3	9	15	8	9
Hogs	4	10	14	0	4	0
Goats				0	4	0
N farms	**25**	**40**	**35**	**25**	**40**	**35**