REGULATING THE PHOSPHORUS TURNOVER THROUGH THE NITRATE DIRECTIVE IN THE EUROPEAN UNION: A SHAMEFUL ANACHRONISM IN THE 21TH CENTURY

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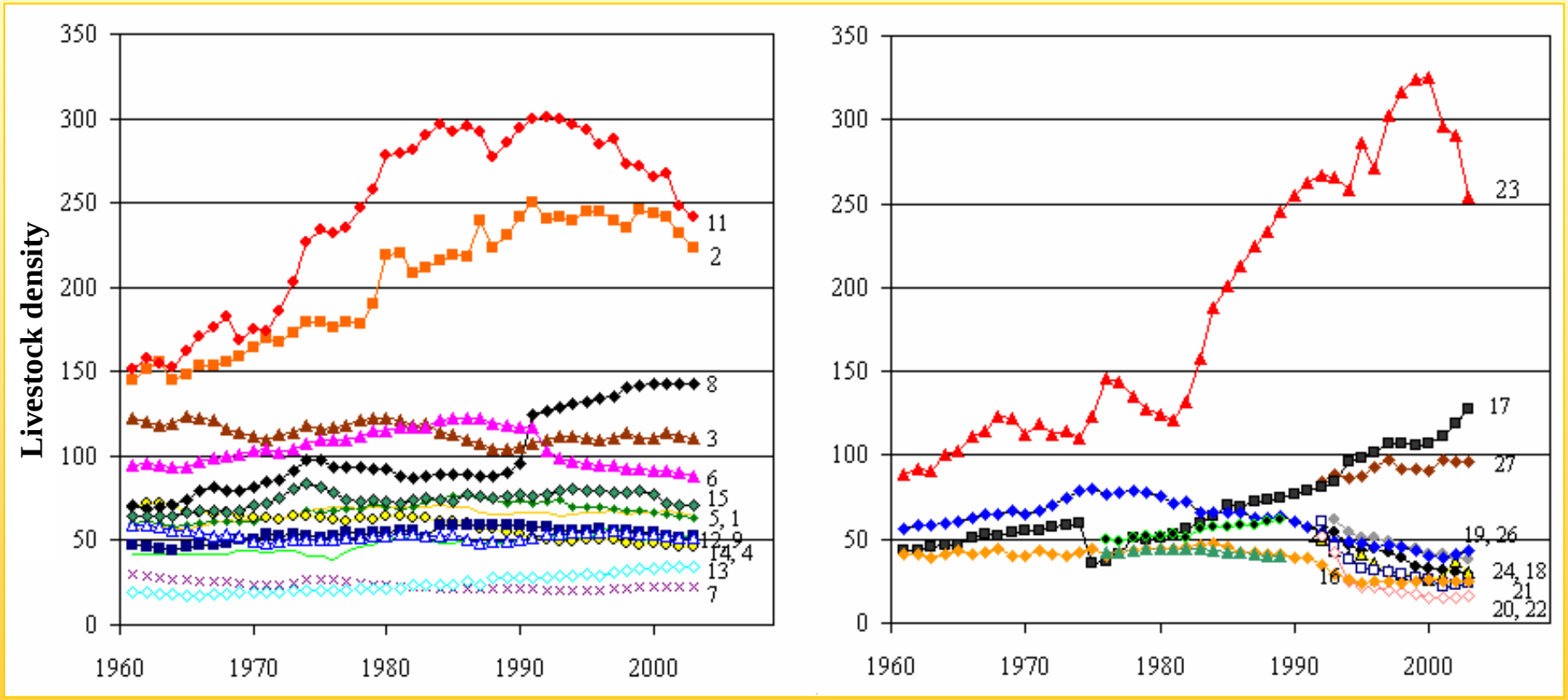
‘Union: a uniting into a coherent and harmonious whole’

Webster’s Dictionary

Livestock density (heads/100 ha) in...

Western Europe

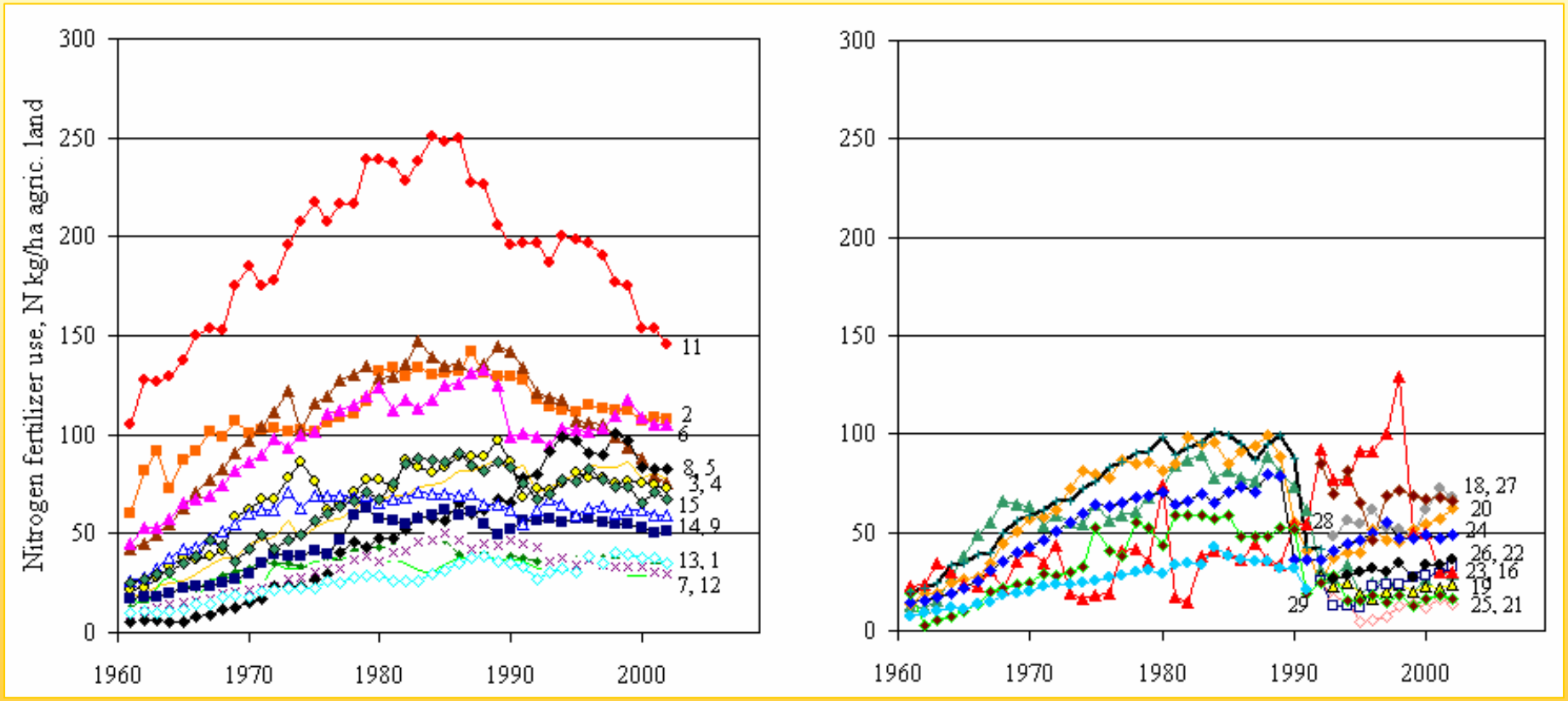
Central and Eastern Europe



N-fertilizer use (N kg/ha) in…

Western Europe

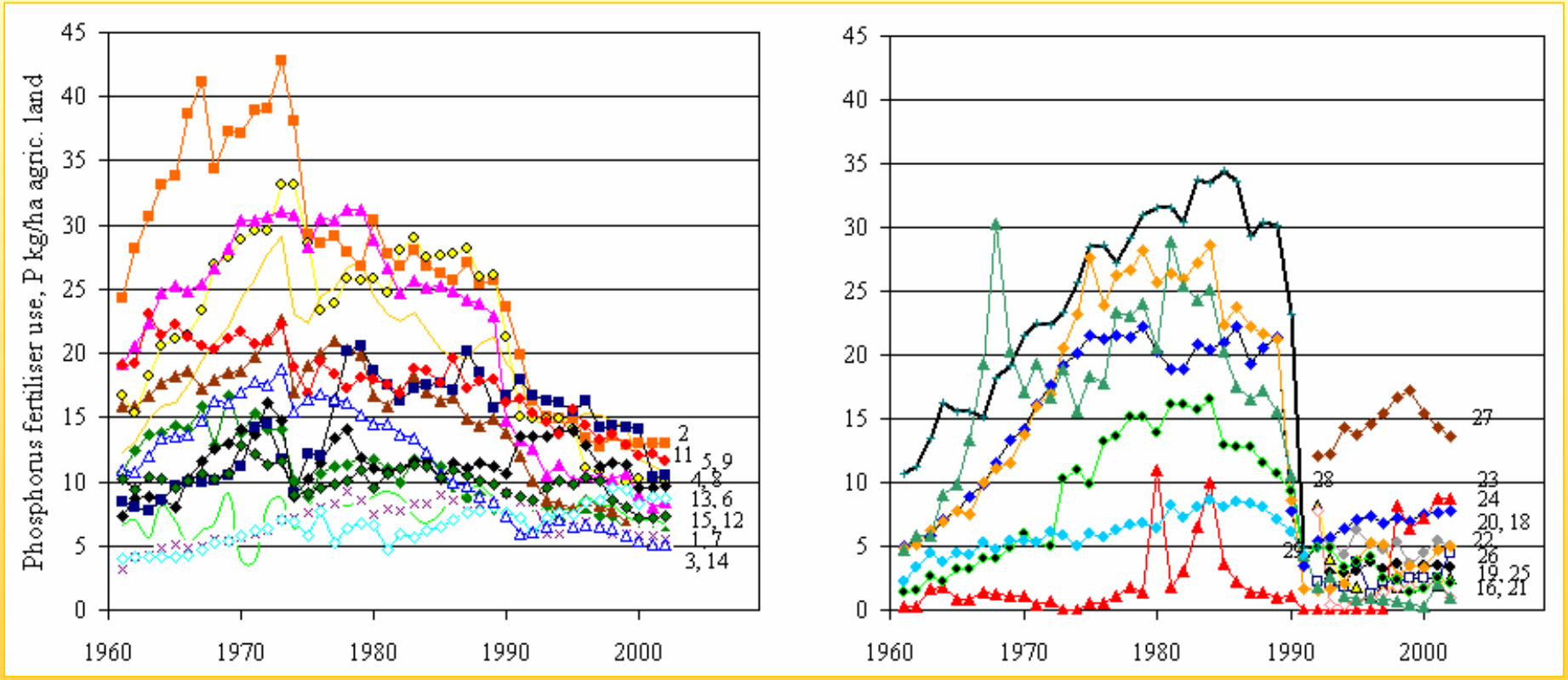
Central and Eastern Europe



P-fertilizer use (P kg/ha) in…

Western Europe

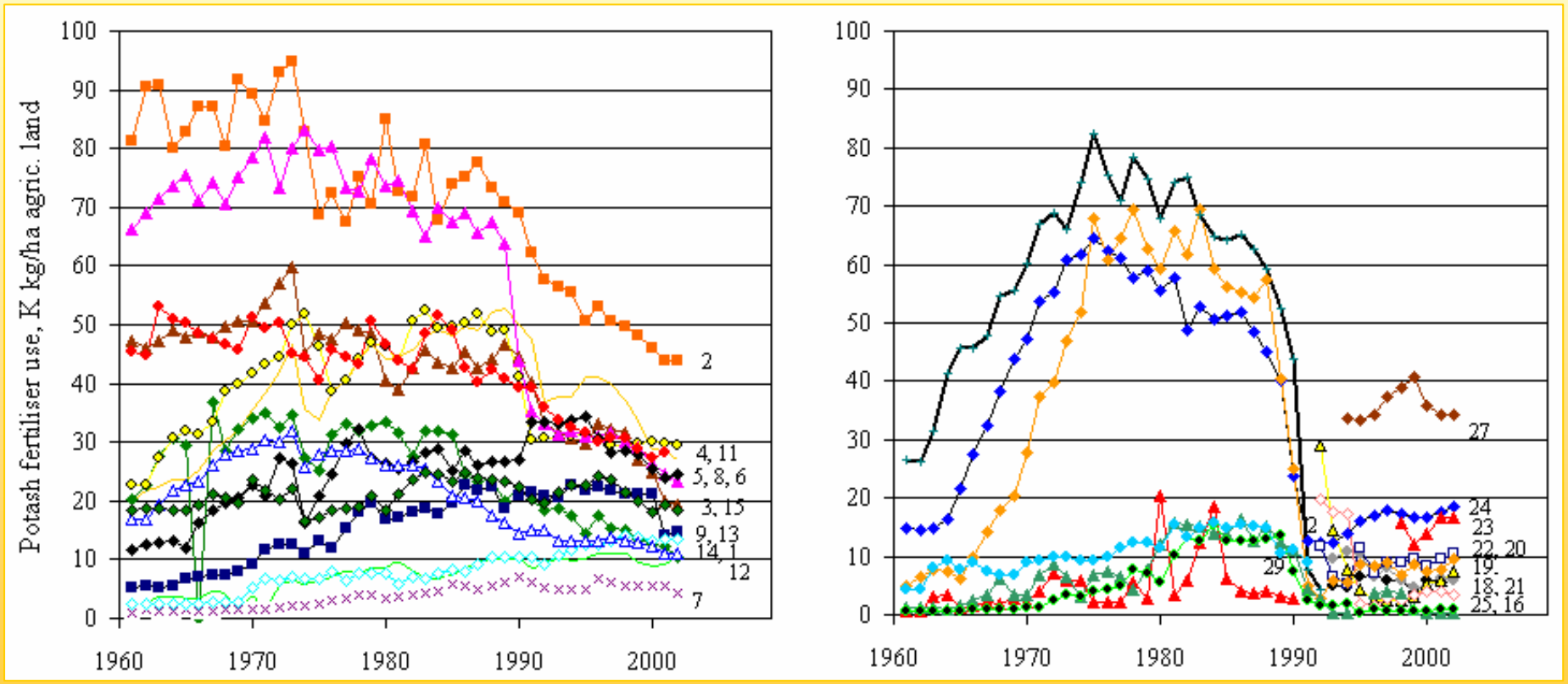
Central and Eastern Europe



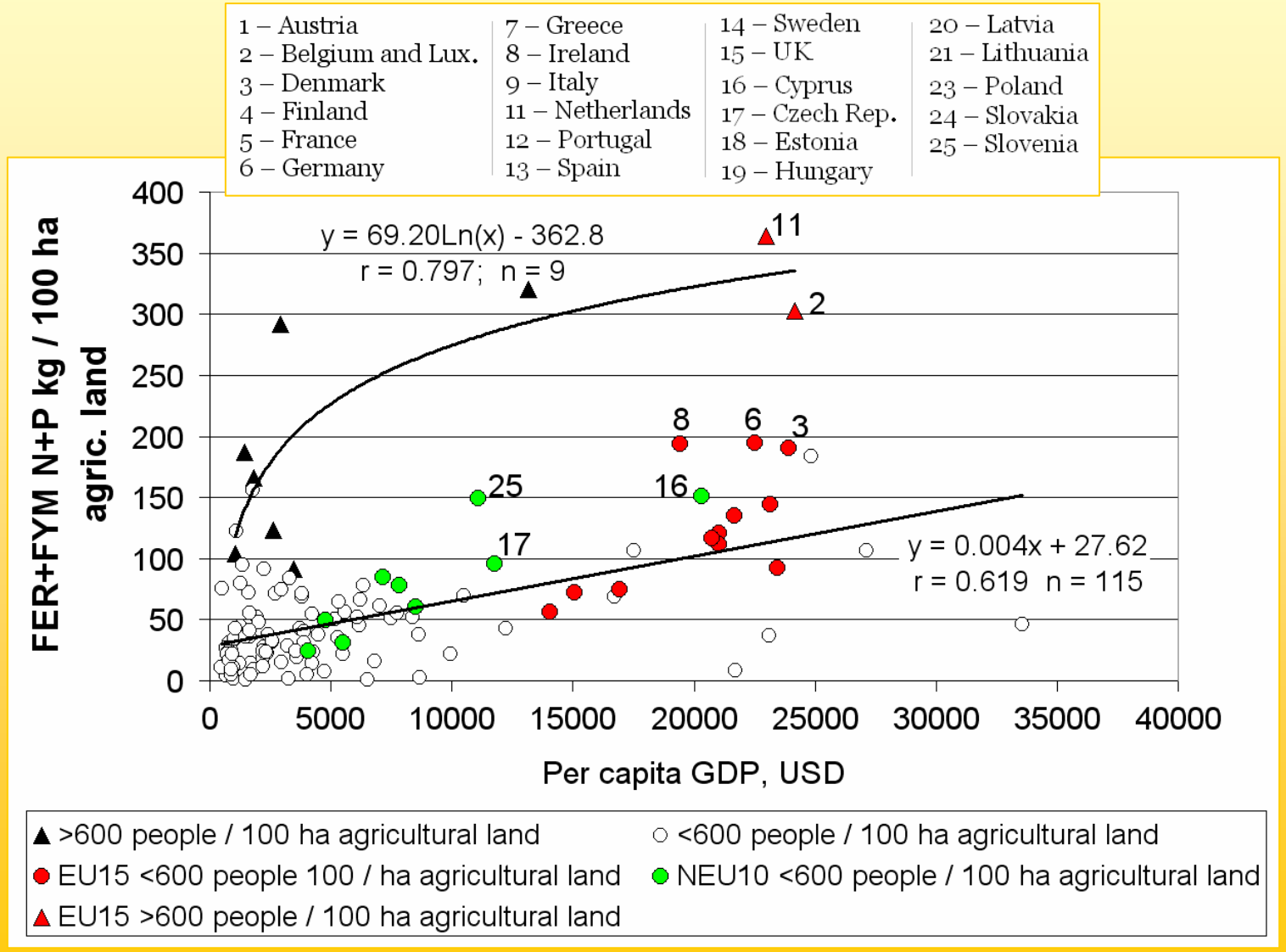
K-fertilizer use (K kg/ha) in…

Western Europe

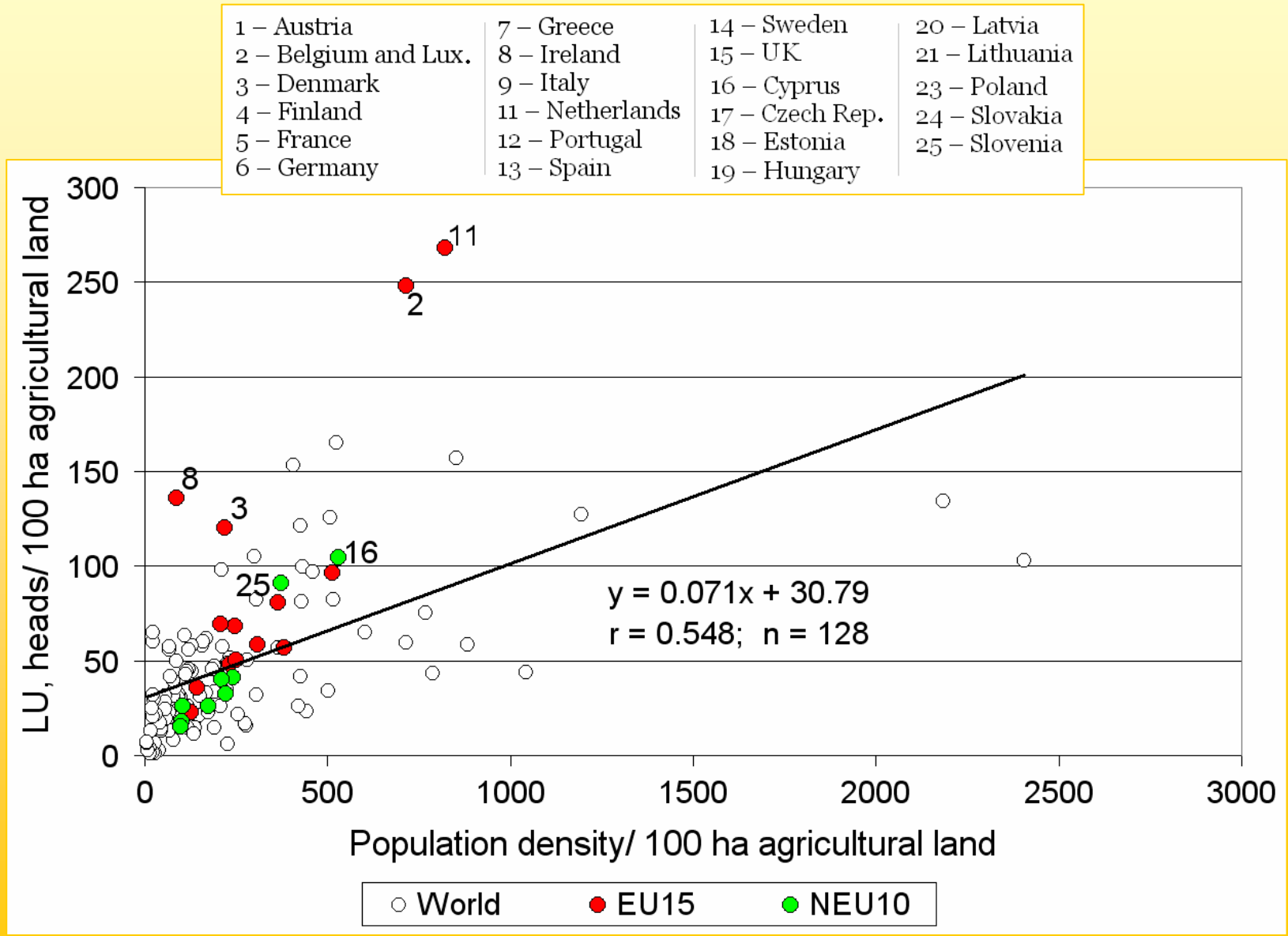
Central and Eastern Europe



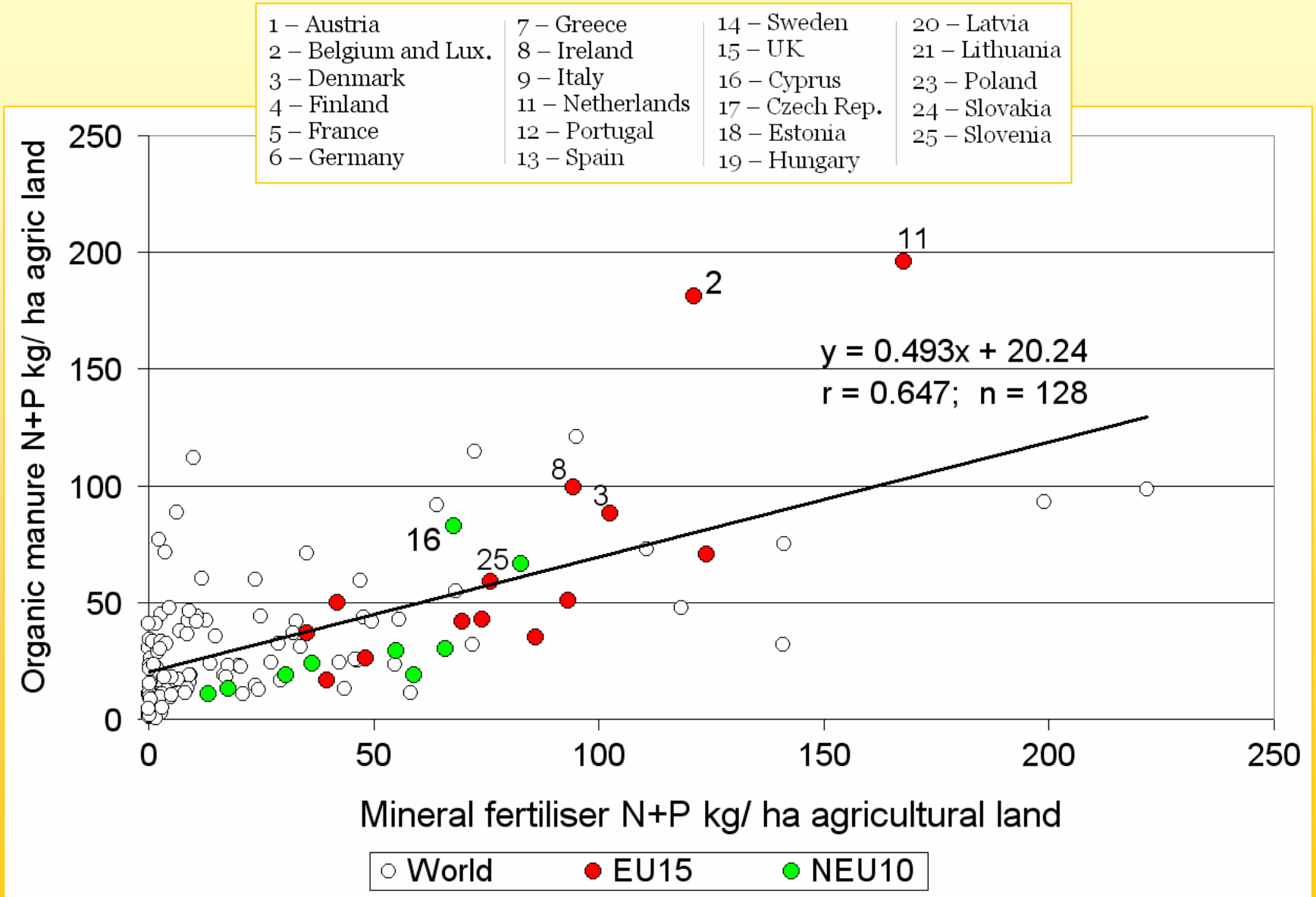
Correlation between per capita income and total NP application as a function of population density in 2000



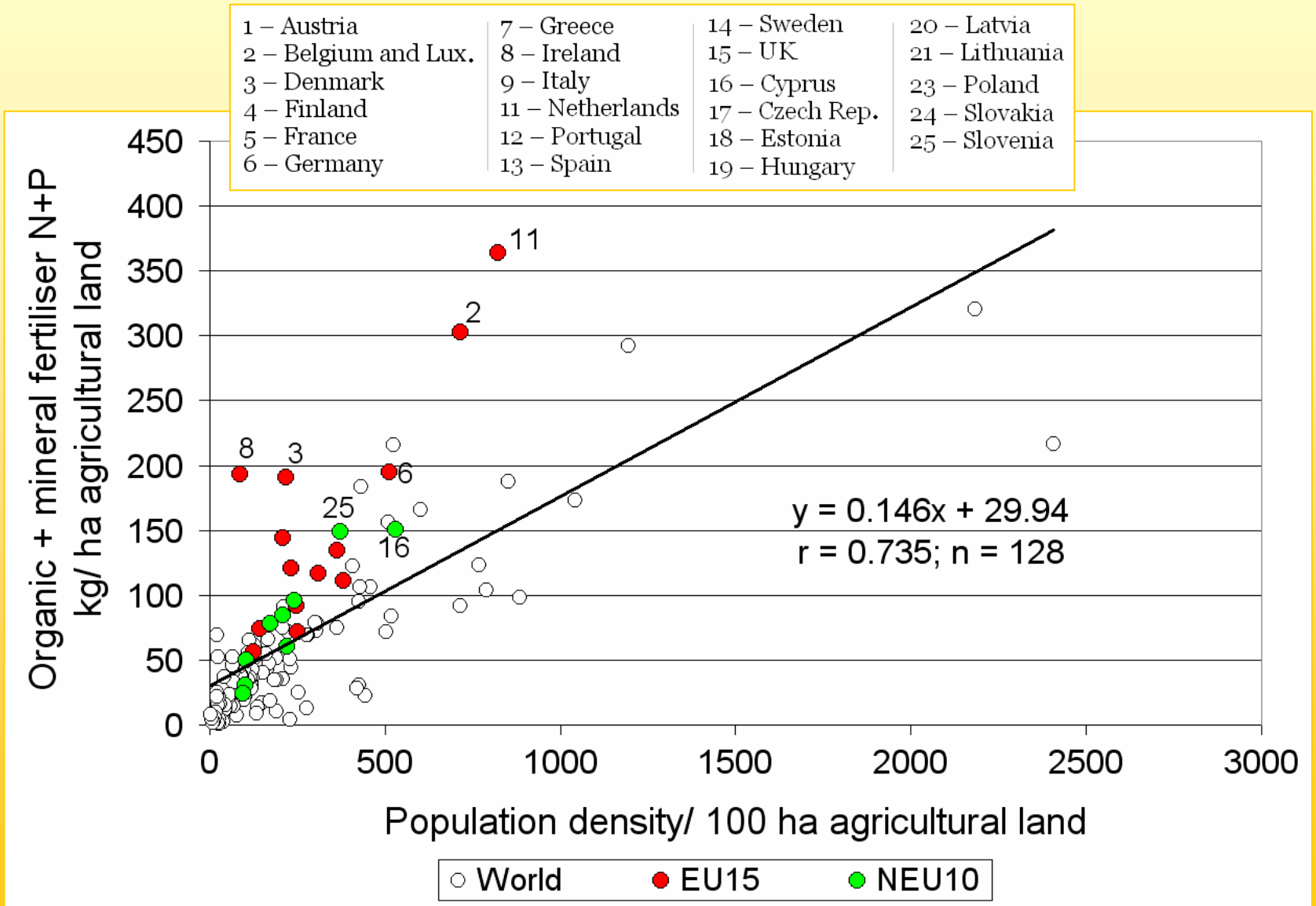
Correlation between population density and livestock density in 2000



Correlation between organic and mineral NP use in 2000

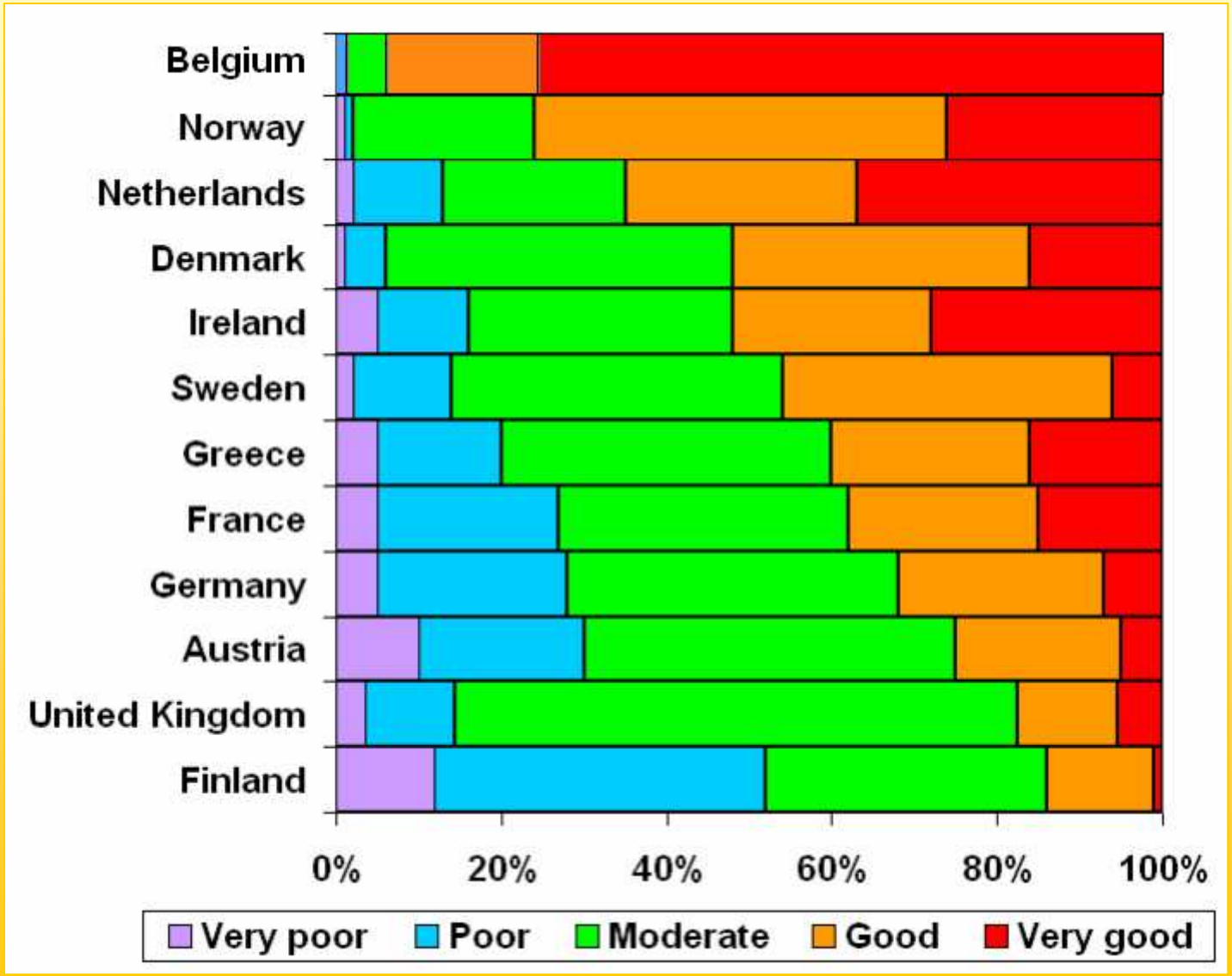


Correlation between the population density and NP use in 2000



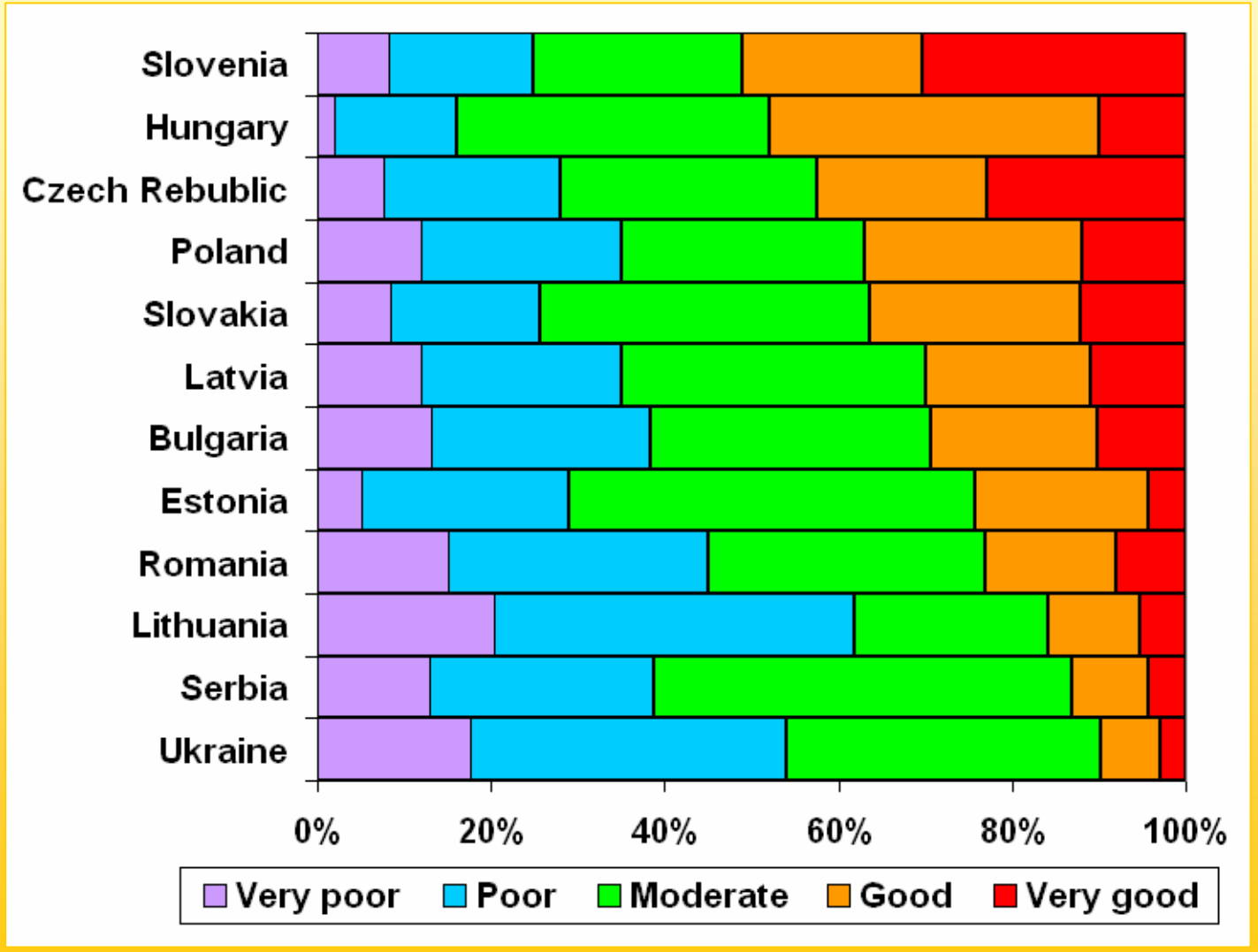
Phosphorus status in the soils of Western European countries in 1991

(Steén, 1997)



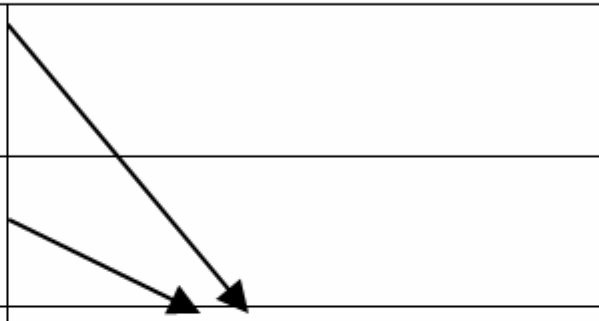
Phosphorus supplies of soils in Central and Eastern European countries in the early 1990s

(Csathó et al., 2006)



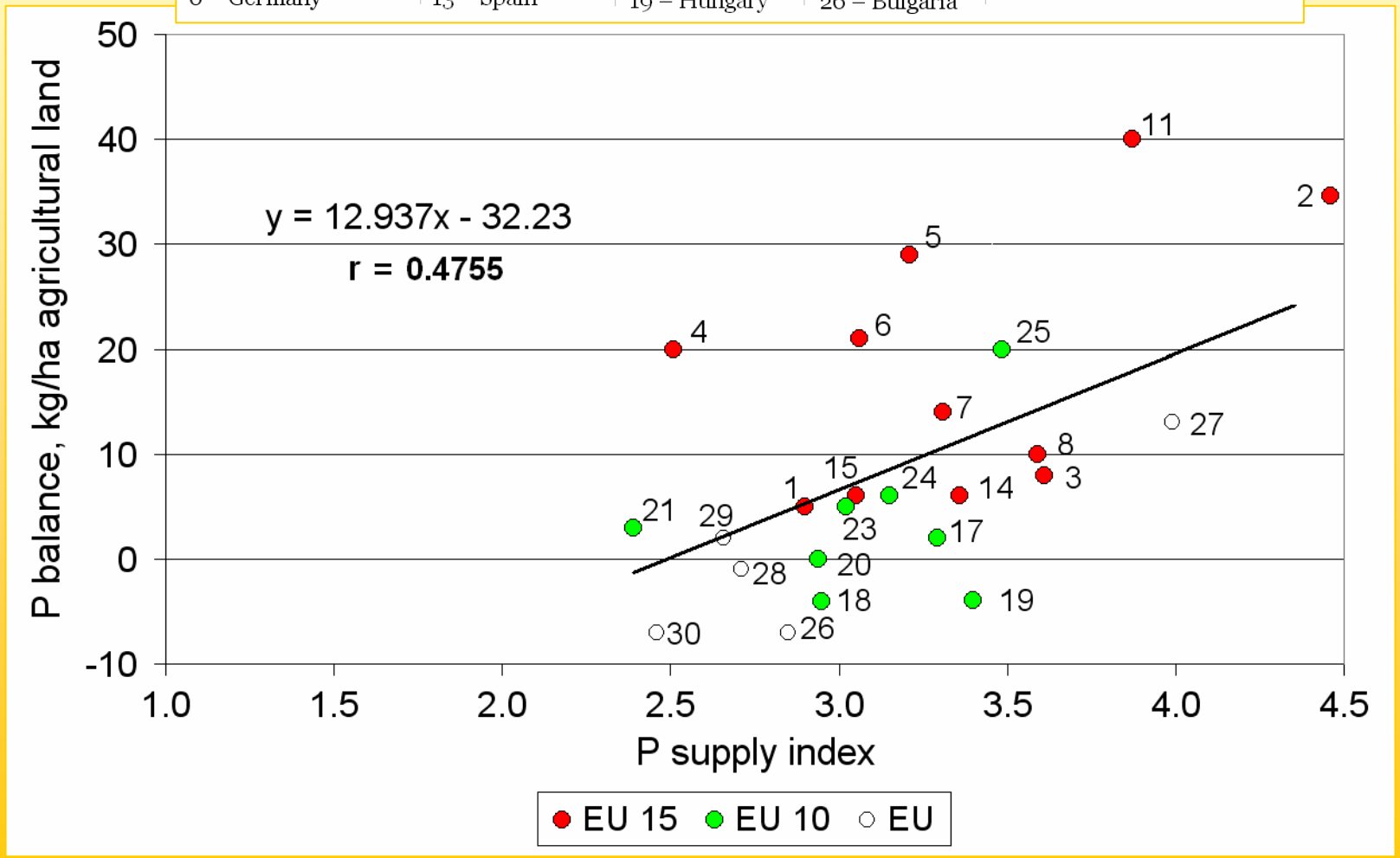
Phosphorus fertiliser recommendation for fields in Germany based on soil fertility class (STP) (Vetter and Fruchtenicht (1974)

Fertility Class	Fertiliser Ratio
E: Very high	0
D: High	0.5
C: Moderate	1.0
B: Low	1.5
A: Very low	2.0

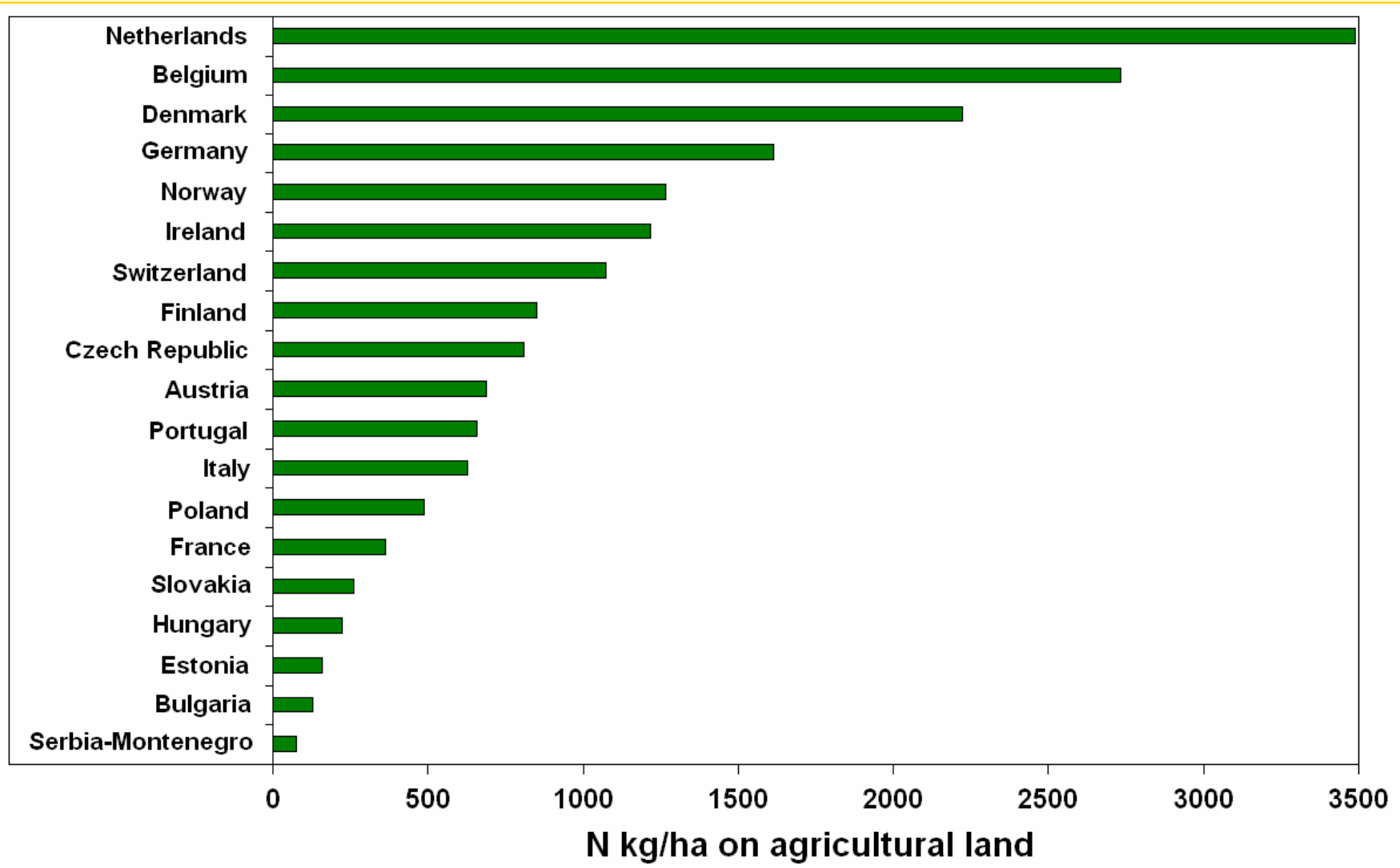


Correlation between P supply and P balances of the EU countries in 1991

1 – Austria
2 – Belgium and Lux.
3 – Denmark
4 – Finland
5 – France
6 – Germany
7 – Greece
8 – Ireland
9 – Italy
11 – Netherlands
12 – Portugal
13 – Spain
14 – Sweden
15 – UK
16 – Cyprus
17 – Czech Rep.
18 – Estonia
19 – Hungary
20 – Latvia
21 – Lithuania
23 – Poland
24 – Slovakia
25 – Slovenia
26 – Bulgaria
27 – Norway
28 – Romania
29 – Serbia and Montenegro
30 – Ukraine

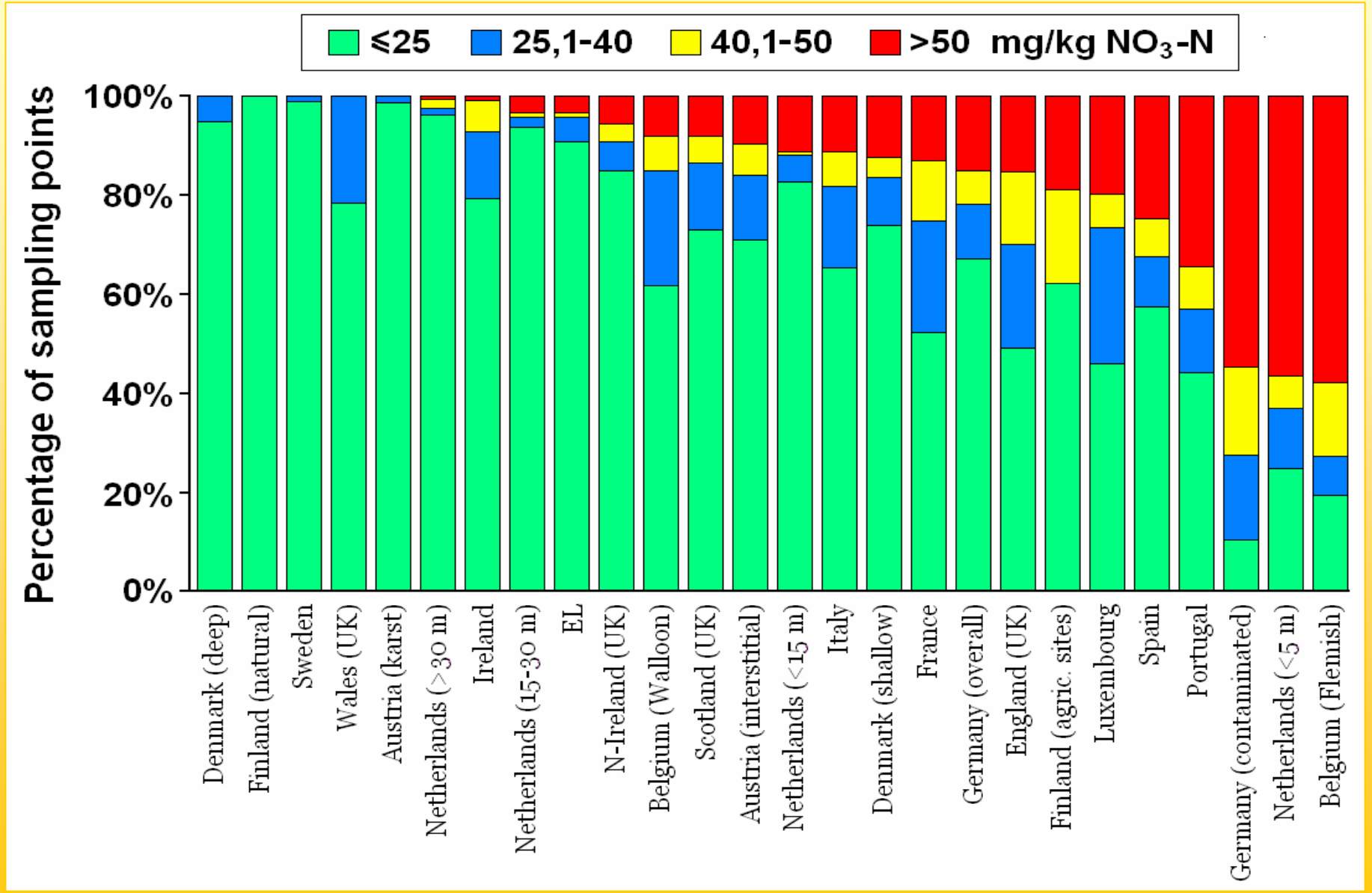


Estimated cumulative N balance of European countries, 1991–2005
(N kg/ha agricultural land)



Nitrate pollution of ground water in the EU

(Hamell, 2007)



EU countries should reduce the recommended mineral fertiliser N rates by the quantity of N applied in the form of farmyard manure/slurry, expressed in fertiliser N equivalency, and taking into account the rate at which farmyard manure is utilised by the crop, within the 3–4-year period. The fertiliser N equivalency of FYM or slurry nitrogen can be considered as 50% on average, varying according to the livestock species and the technology.

On nitrate-sensitive areas, while retaining the maximum permitted application of 170 kg N/ha of organic origin, the rate at which **farmyard manure** is utilised by the crops should also be considered in the directive, calculating

on sandy or sandy loam soils:
with 50% in the 1st year, 30% in the 2nd and 20% in the 3rd

on loam, clay loam and clay soils:
with 40% in the 1st year, 30% in the 2nd, 20% in the 3rd and 10% in the 4th

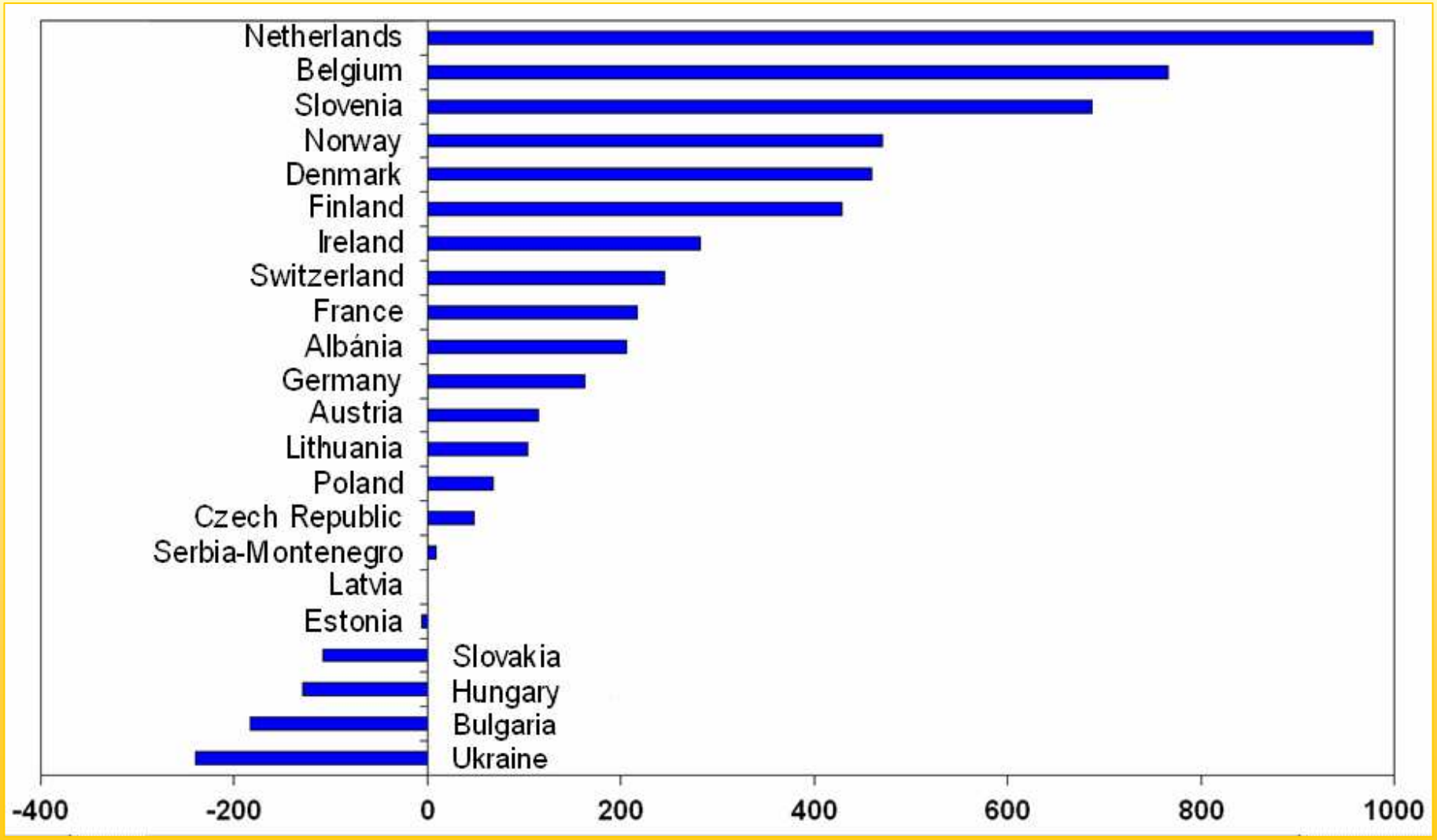
*For **slurry** N*, the rate of utilisation should be calculated as 75% in the 1st year and 25% in the 2nd year

If organic manure or slurry is applied every year, the total quantity of organic manure/slurry that will exert its effect in the given year should not exceed the 170 kg N/ha limit on nitrate-sensitive areas. There should be no derogation given to any country on the 170 kg N/ha/year limit because of the parallel problem of excess phosphorus.

Only fertiliser recommendation systems that have been tested under field conditions for a number of years and that meet strict environment protection and economic criteria should be authorised for use in practice.

In most cases, the application of a total nitrogen quantity equivalent to more than 200 kg N/ha mineral fertiliser (applied as farmyard manure/slurry + mineral fertiliser) cannot be justified from the agronomic point of view and should be officially banned in the interests of environment protection.

Estimated cumulative P balance of European countries, 1991–2005
(P2O5 kg/ha agricultural land)



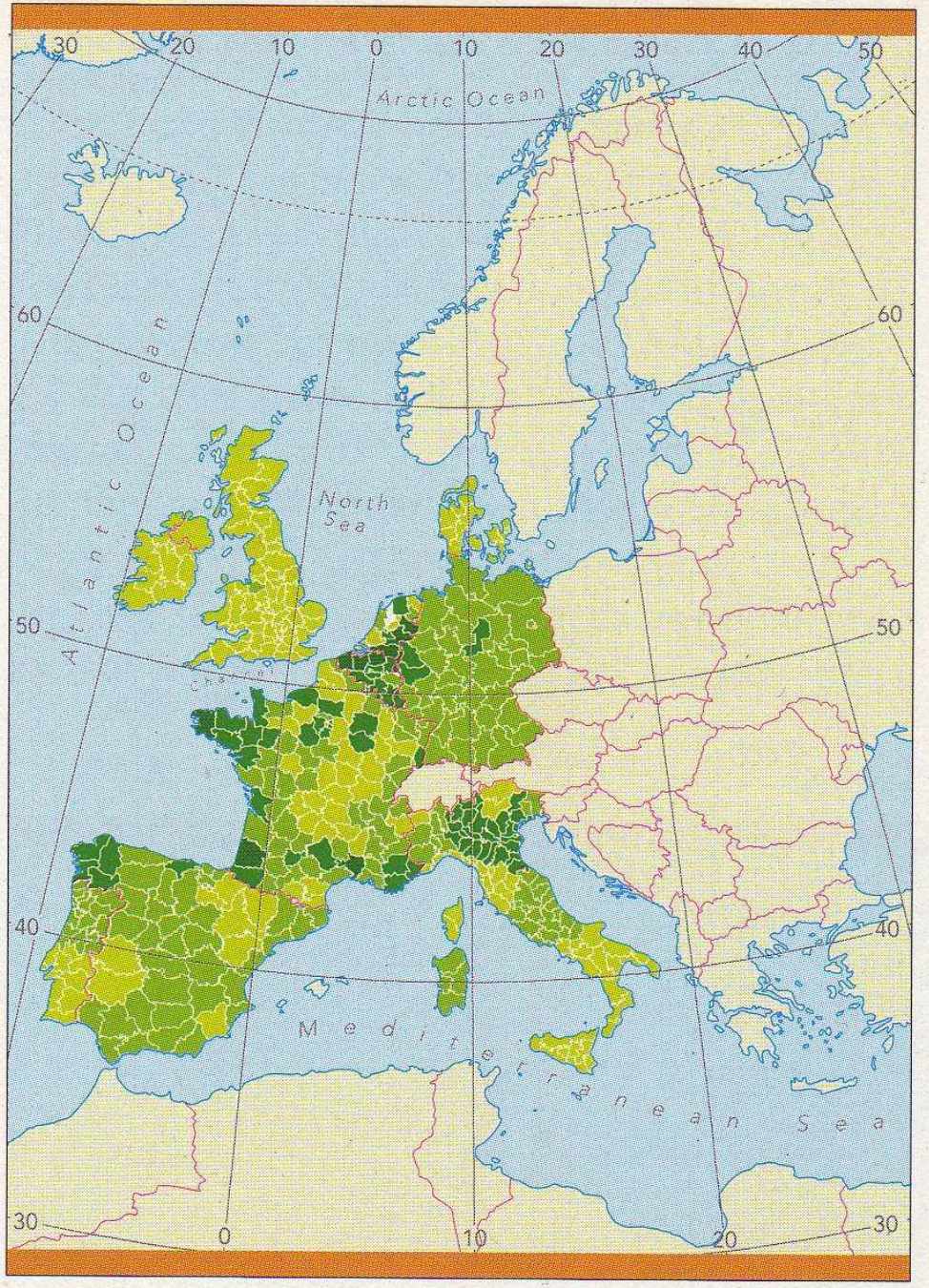
Phosphorus surplus by administrative region early 1990s (EEA, 1999)

0 1000 km

P_2O_5 balance, kg/ha

- < 25
- 25 - 50
- 50 -100
- >100

Source: Eurostat



Ratios of the N and P2O5 loads to surface waters caused by various sectors in countries making up the watershed of the Danube in 1991, 1000 t, or %

(Ijjas & Bögi, 1994; Vollenbroek, J. 1994; Németh et al., 1994)

Country	Area within the Danube watershed 1000 km^2	Danube watershed as a % of the total area	Population		P loads to surface water from various sectors									
					Agriculture						Industrial+atmospheric +background		Total	
					Point source		Diffuse		Total					
			(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)	1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)
Germany	59.6	16.7	2.0	33	(-)	(-)	(2.0)	(33)	2.0	33	2.0	34	6.0	100
Austria	80.7	96.2	4.0	66	(-)	(-)	(1.8)	(29)	1.8	29	0.3	5	6.1	100
Czech Republic	22.5	28.5	0.8	32	(-)	(-)	(0.6)	(24)	0.6	24	1.1	42	2.5	100
Slovakia	48.7	99.3	3.6	77	(-)	(-)	(0.4)	(9)	0.4	9	0.7	14	4.7	100
Hungary	93.0	100.0	8.1	75	(-)	(-)	(1.1)	(10)	1.1	10	1.6	15	10.8	100
Slovenia	15.2	75.0	1.0	21	(0.2)	(4)	(1.9)	(40)	2.1	44	1.7	35	4.8	100
Croatia	33.8	59.7	0.8	73	(-)	(-)	(0.1)	(9)	0.1	9	0.2	18	1.1	100
Romania	233.2	98.0	5.0	9	(23.0)	(44)	(15.0)	(28)	37.9	72	10.0	19	52.9	100
Bulgaria	48.2	43.4	1.6	57	(0.5)	(18)	(0.5)	(18)	1.0	36	0.2	7	2.8	100
Total evaluated	634.9	58.3	26.9	30	(23.6)	(26)	(23.4)	(26)	47.0	52	16.8	18	91.6	100

Other countries in the Danube watershed, which were not evaluated: Moldavia: 8800 km^2; Ukraine: 36,300 km^2; Serbia-Montenegro + Bosnia-Herzegovina: 134,200 km^2; Other: 2800 m^2; Total unevaluated area: 182,100 km^2; Total area of the Danube watershed: 817,000 km^2.

In EU, it should be compulsory that FYM and slurry NP supply is taken into account as fertilizer dose diminishing factor in practice, and this principle should be part of Best Management Practice (BMP)

Excessive soil P supply category should be introduced in the EU fertiliser recommendation systems.

Lower limits for good soil supplies, and suggested lower limits for very good and excessive P supplies for the main soil P test values used in EU countries.

Method	Lower limit for good soil P supply	Suggested lower limit for very good soil P supply	Suggested lower limit for excessive soil P supply	References for good soil P supply
H_2O	10	15	23	Jungk et al., 1993
Olsen	20	30	45	Johnston et al., 1986
Bray-1	22	33	50	McCallister et al., 1987
	25	38	56	Ortega, 1971
Mehlich-3	27	40	60	McCollum, 1991
AL (for acid soils)	44	66	99	Csathó, 2002, 2003
CAL	47	70	105	Spiegel, 2007
DL	60	90	135	Baumgärtel, 1989
AL (for calcareous soils)	66	99	149	Csathó, 2002, 2003

Within EU, on soils excessively supplied with P, either organic, or mineral P application should be prohibited/forbidden

Conclusion #1

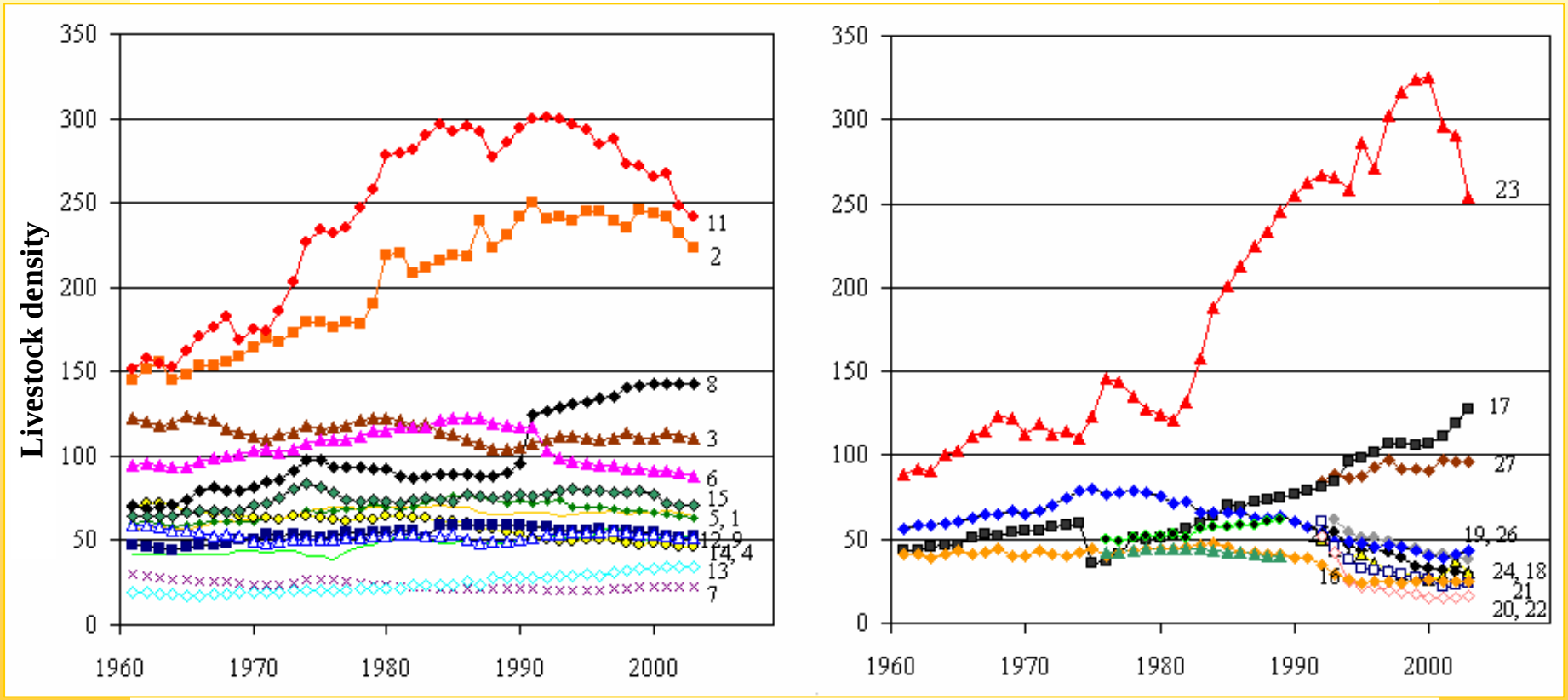
In many areas, more developed in EU, manure surpluses cause environmental threat. In other, less developed areas of EU, nutrient mining causes agronomic and economic problems. In context with both problems, there should be a trend in EU toward optimal livestock density, adjusted to the milk production, egg and meat needs of the population, either in the areas with too high and too low livestock density

(Sims et al., 2005).

Livestock density (heads/100 ha) in...

Western Europe

Central and Eastern Europe



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Source: Eurostat

Conclusion #2

Derogation should be given to the Central and Eastern European EU countries to prolong prohibiting foreigners to purchase field or other agricultural properties until the necessary livestock number changes between the Western and Eastern region of EU is finished.

The benefit from all the changes should go to the local communities.

Thank you for your attention!