

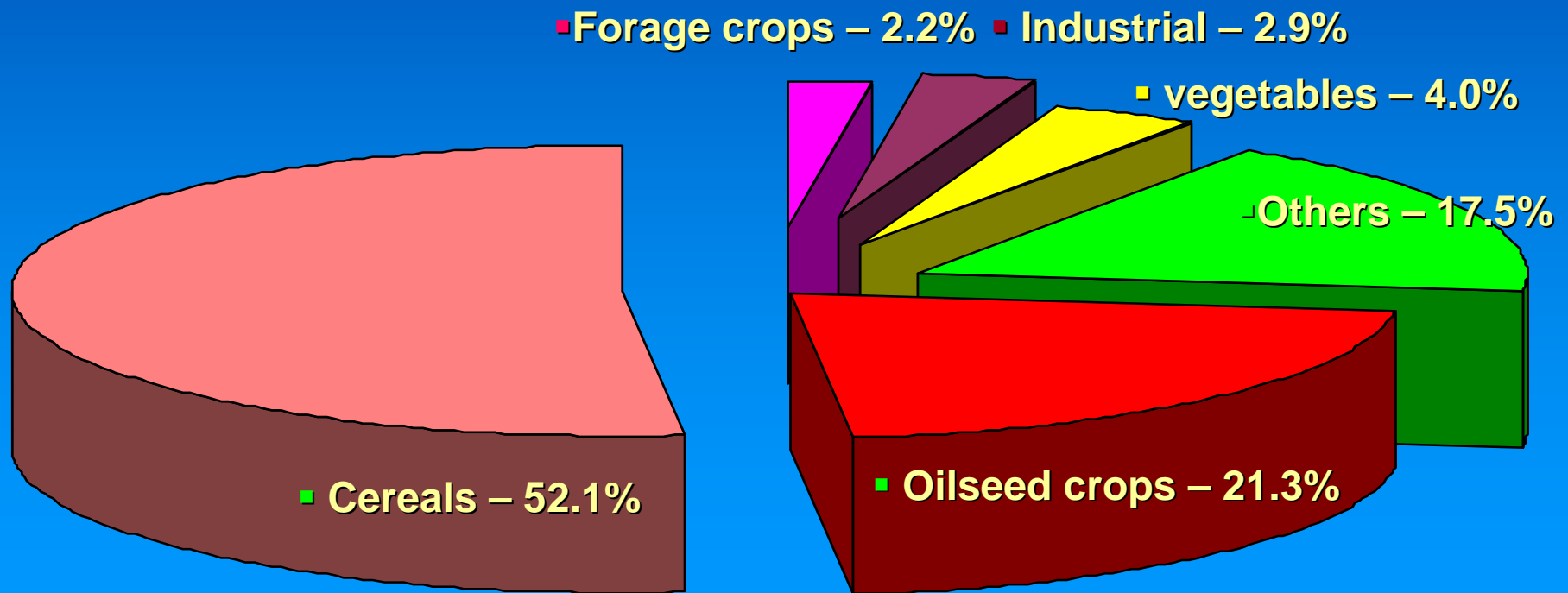
**POTASSIUM APPLICATION
AND
NUTRIENT BALANCE
IN
BULGARIA**

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Thomas Popp*

Main crops

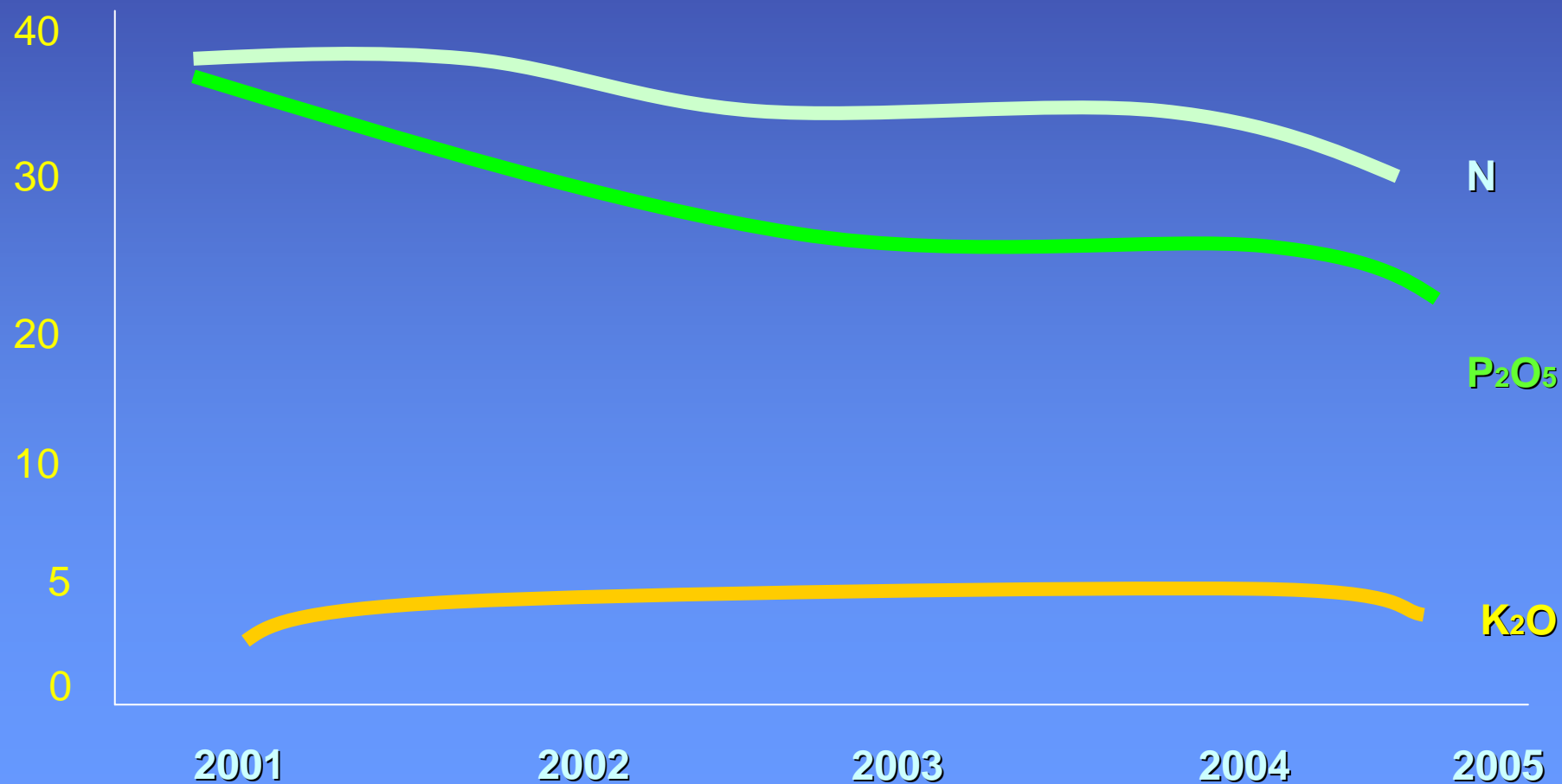
2006

Arable land – 3 128 thousands ha



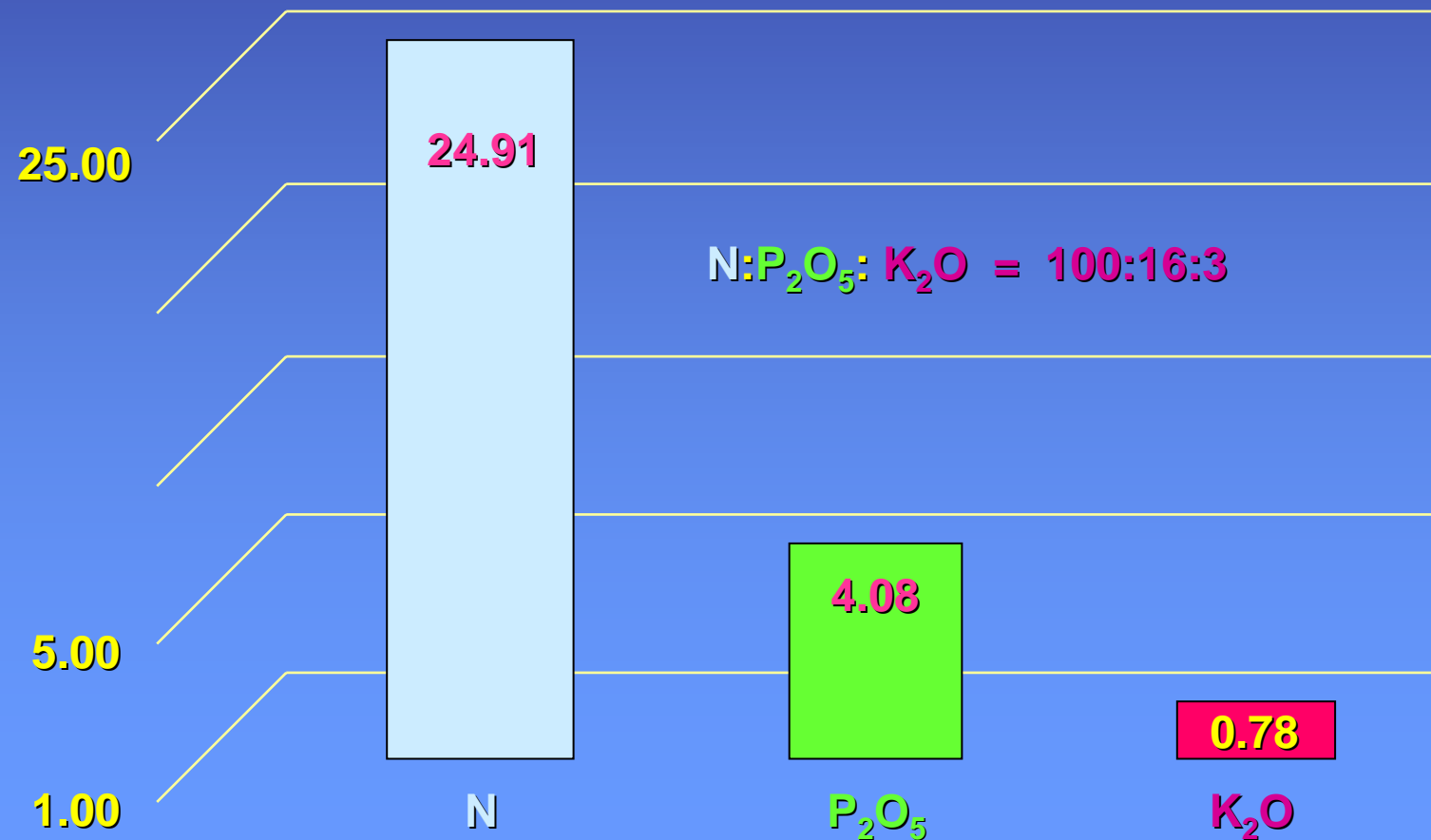
Fertilizers application

Fertilizer consumption kg/ha



Fertilizers application

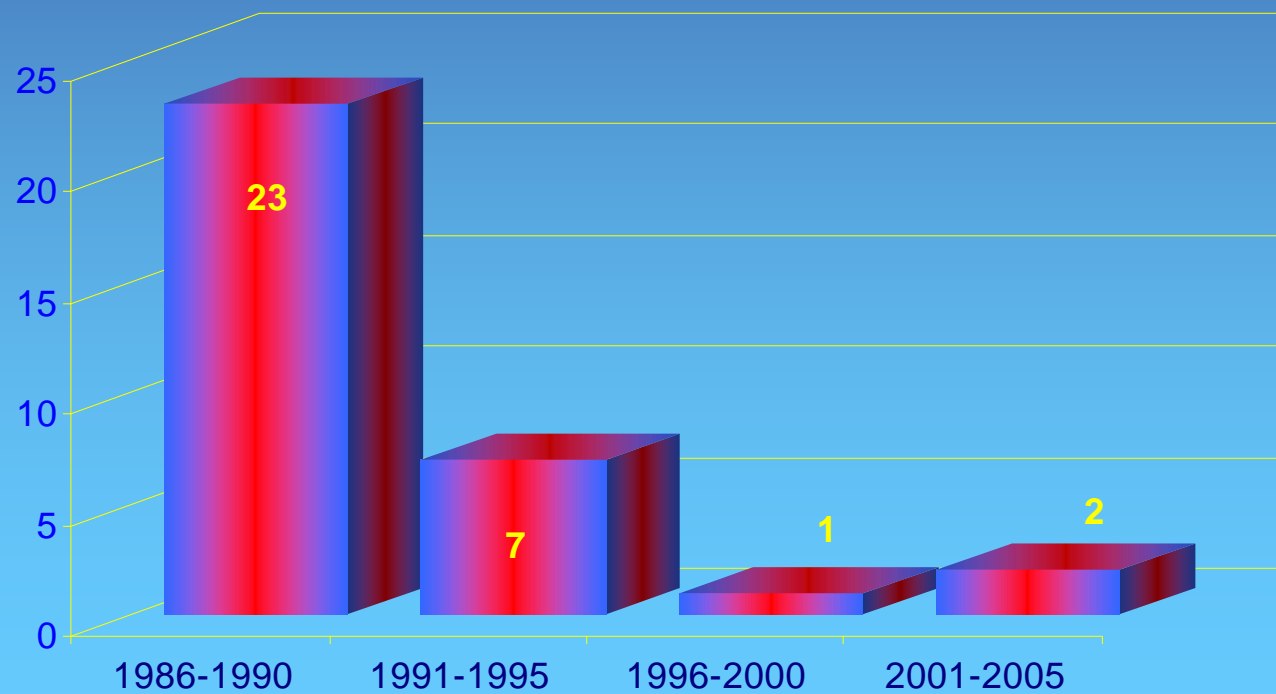
Nutrient application rates kg/ha – 2005



Fertilizers application

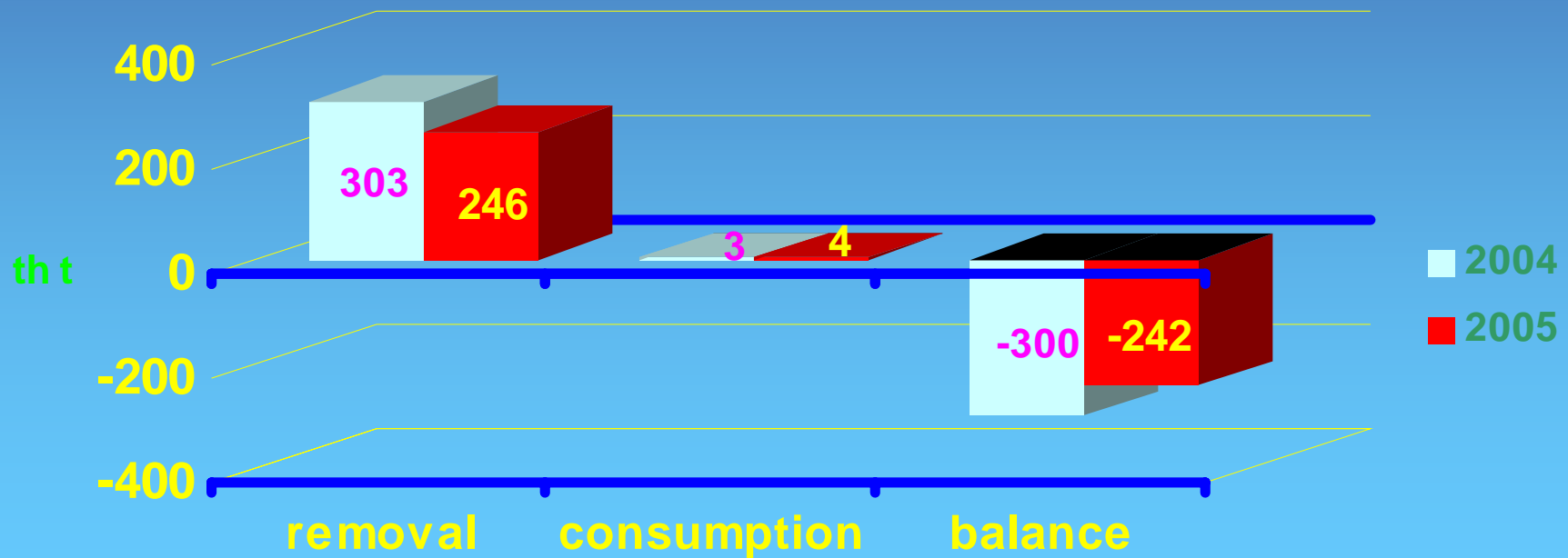
Nitrogen : Potassium ratio

Nitrogen:potassium relation (Nitrogen=100)



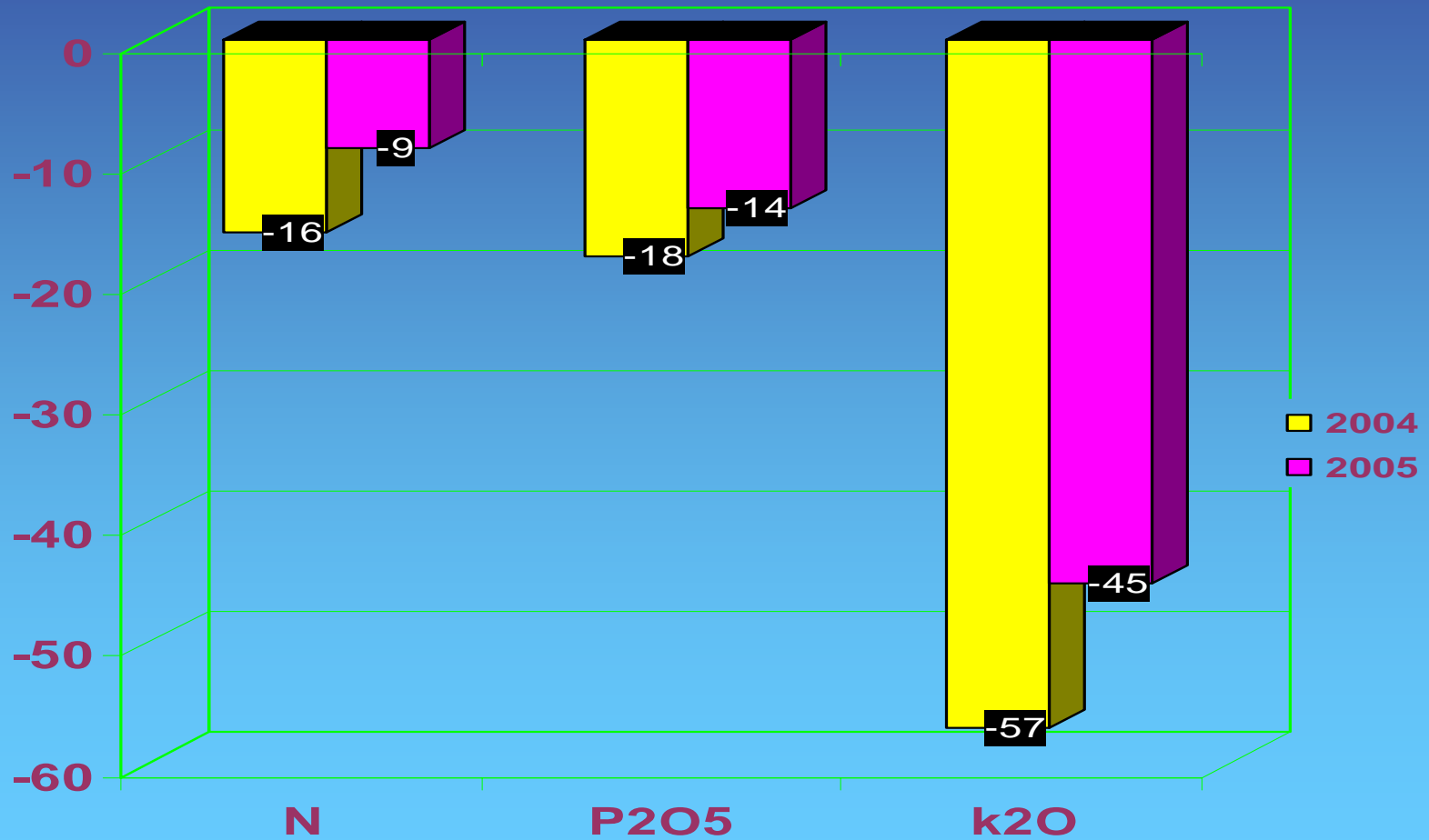
Nutrient balances

potassium removal by crops in comparison to K-consumption



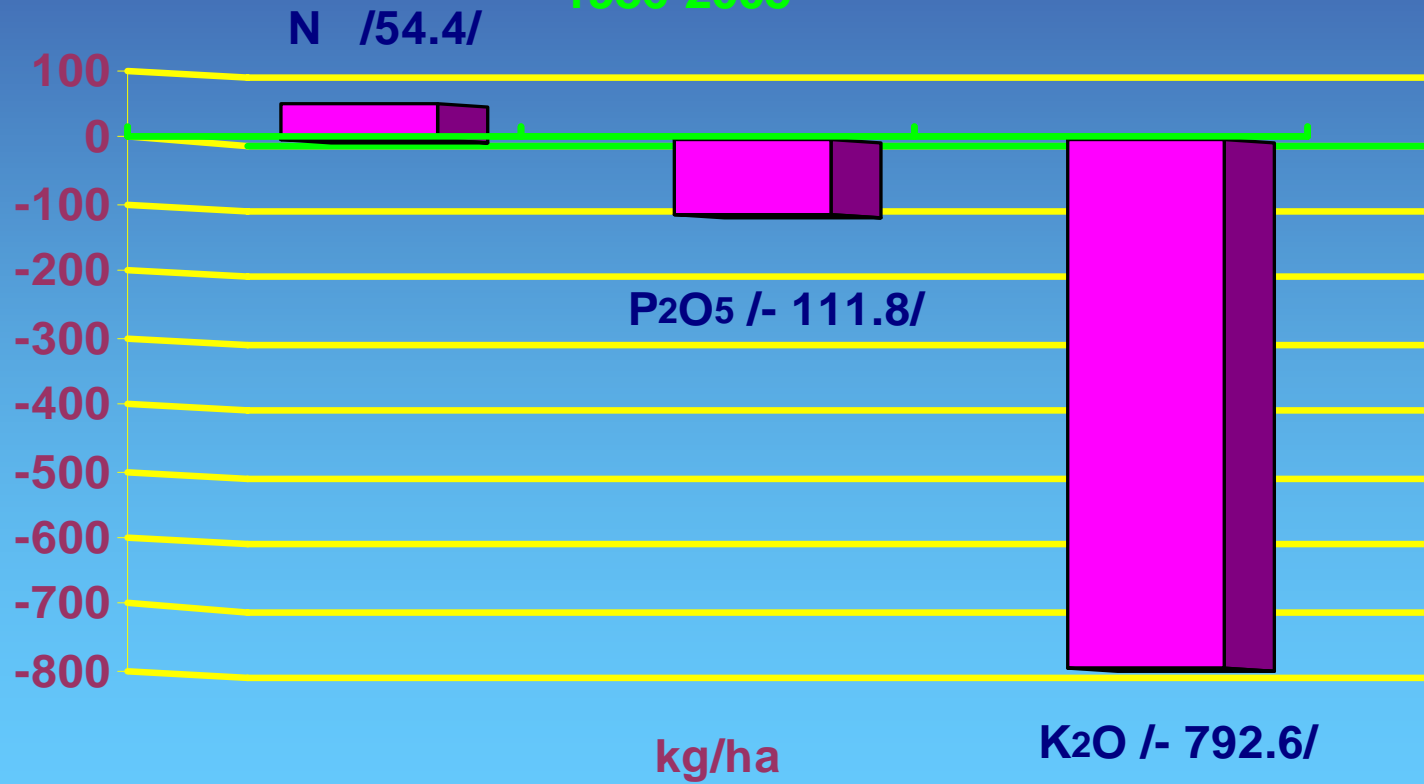
Nutrient deficiency kg/ha

2004 - 2005



Nutrient balances

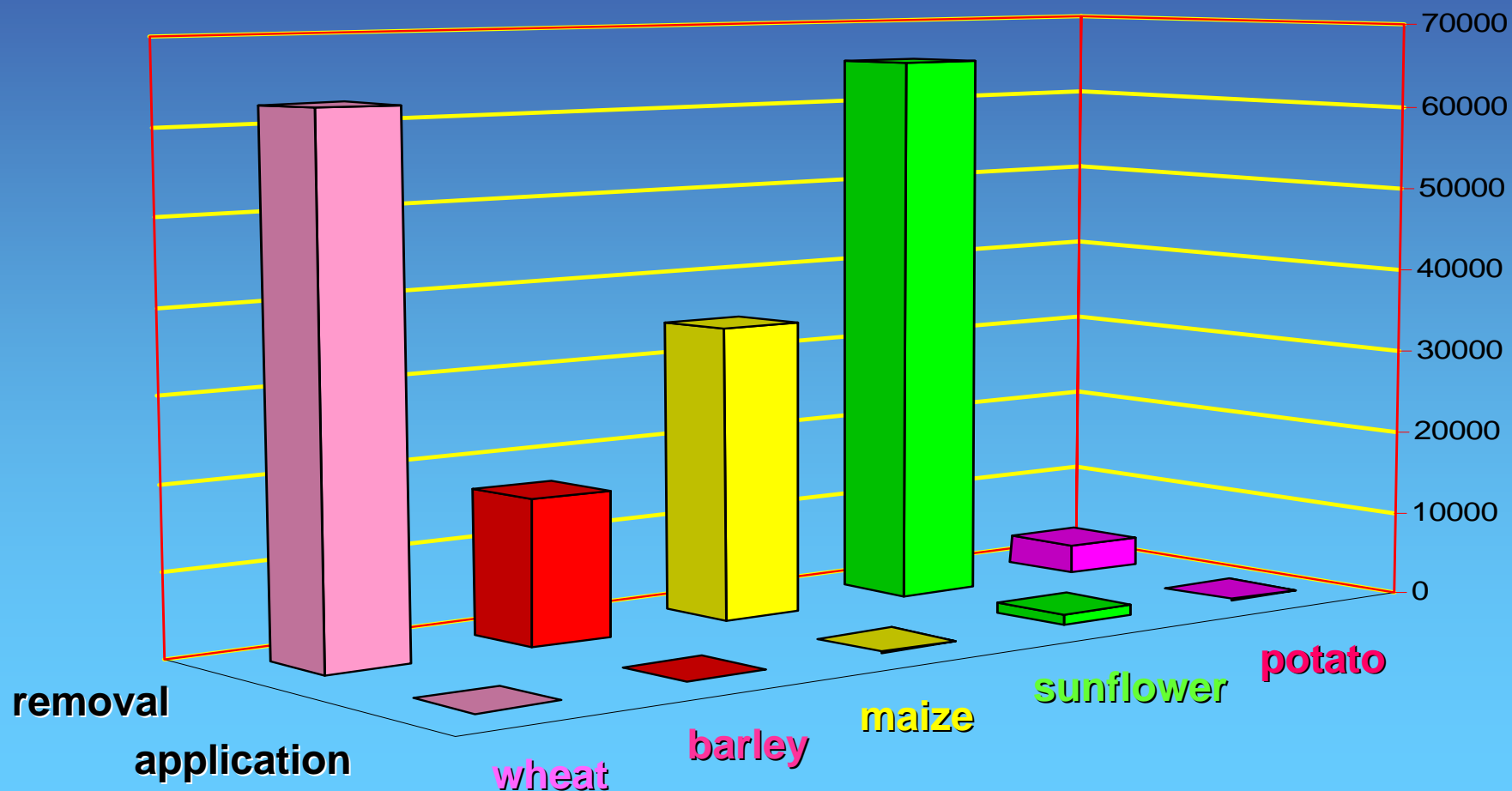
cumulative nutrient balances in kg/ha
1986-2005



Crop fertilization practice in kg/ha

crop	N		P ₂ O ₅		K ₂ O	
	recommended	applied	recommended	applied	recommended	applied
wheat	140	74.8	106	2.2	24	0
barley	103	61.6	114	1.0	20	0
maize	143	41.9	143	3.0	27	0.4
Sunflower	85	34.8	93	5.2	26	2.1

Potassium removal by crops in comparison to K - consumption in Bulgaria 2005



Outcome of the wrong fertilization practice

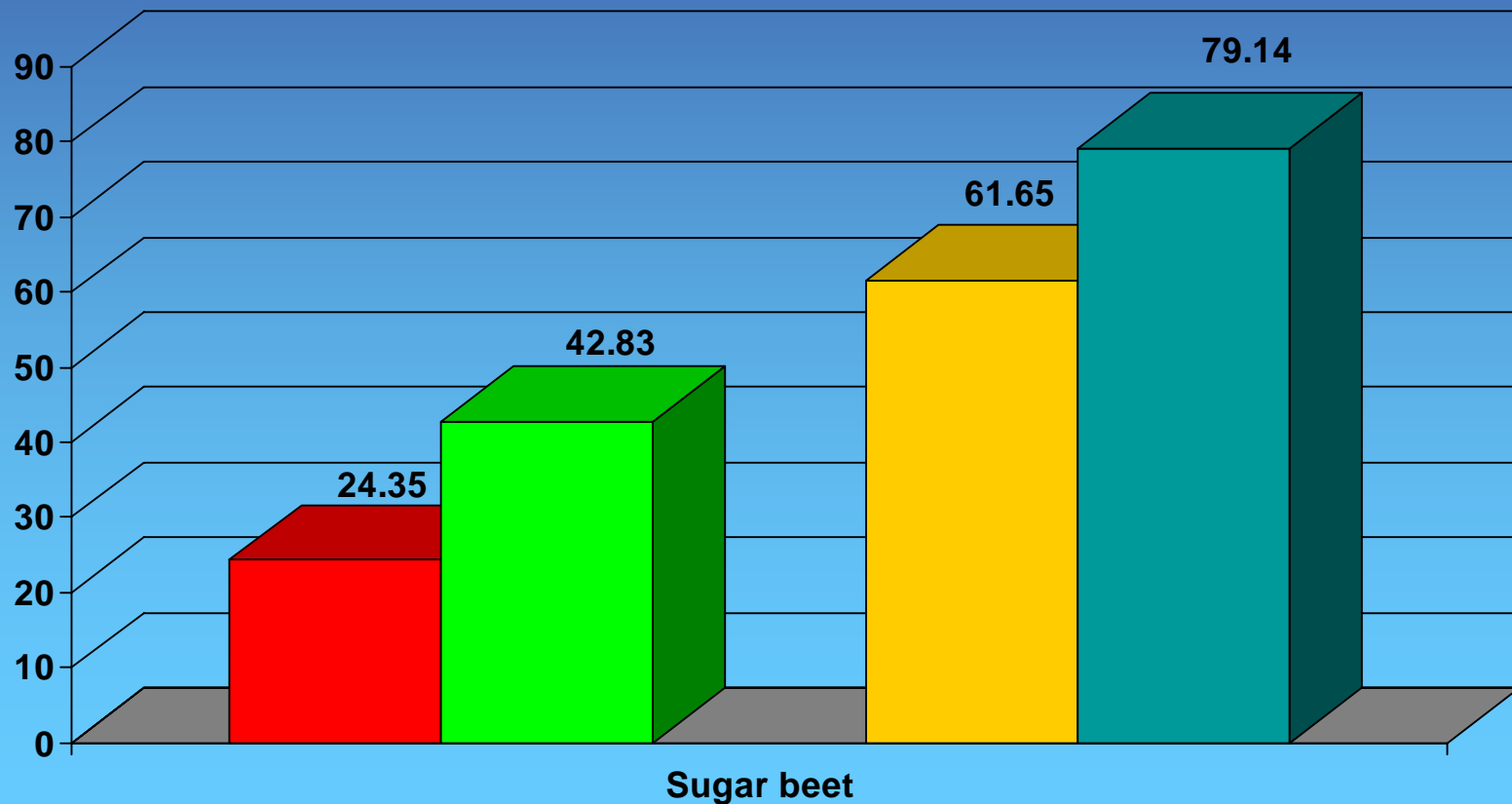
Yield losses

Crop	Yields – t/ha	Yields – t/ha
	1986 - 1990	2005
Wheat	4,20	3,20
Barley	3,90	2,50
Maize	3,80	5,30
Sunflower	1,60	1,50

Average yield level of sugar beet in Bulgaria and Poland in comparisson to Germany and France - FAO, 2004 -



Bulgaria **Poland** **Germany** **France**



Omitted benefits

Wheat

Saved Potassium – 24 kg/ha

Average effect – 5 kg/kg K₂O

Yield loss – 132,217 t

Price - 100 US\$/ton

Omitted benefits – 13,221,700 US\$

Sunflower

Saved Potassium – 24 kg/ha

Average effect – 3 kg/kg K₂O

Yield loss – 43,794 t

Price – 237 US\$/ton

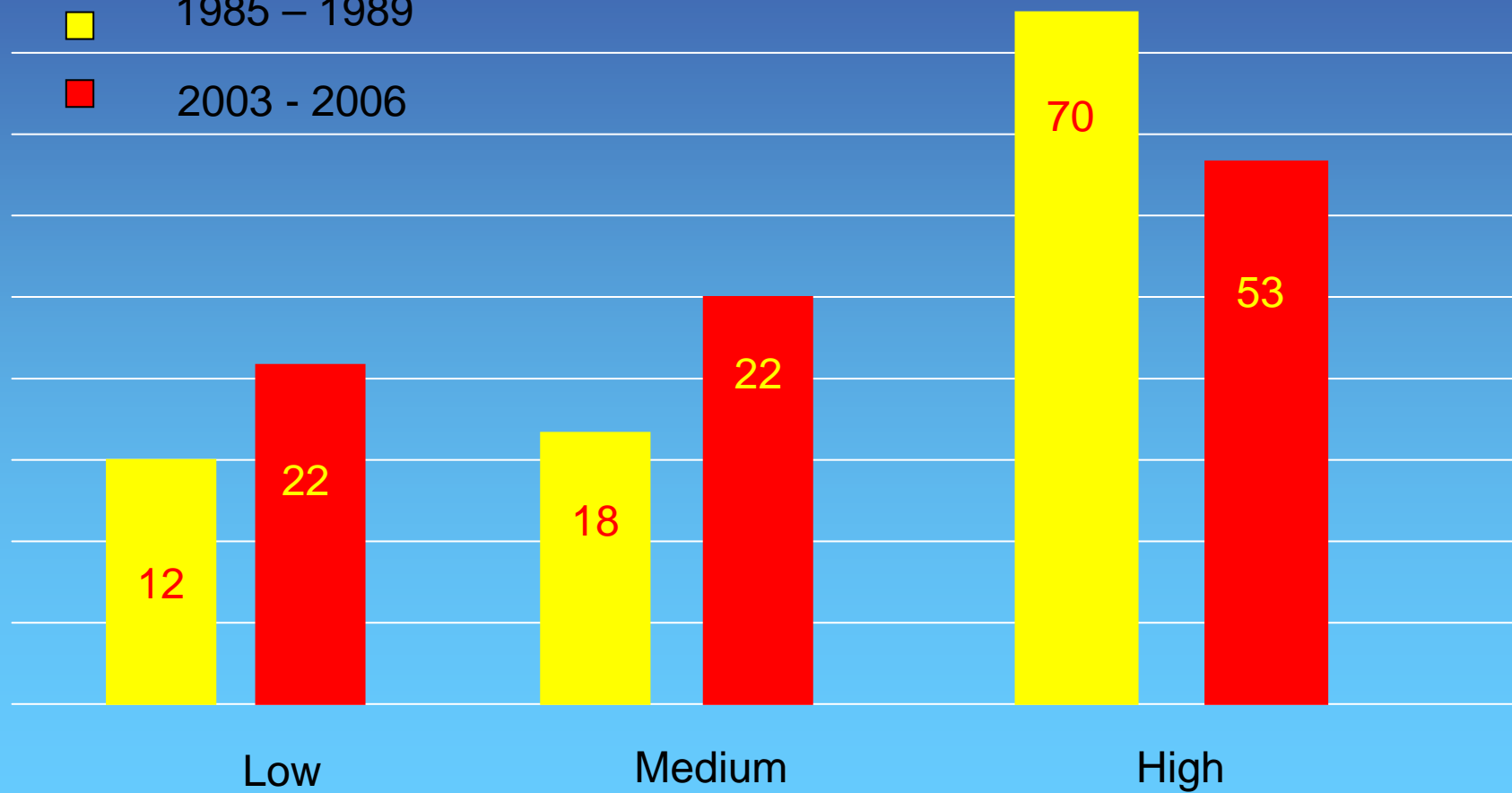
Omitted benefits – 10,379,178 US\$

Quality decline

Wheat – 2006

- **Gluten content in 77.5% of the production was below 21%**
- **The protein content was in the range 7.9-15,8%.**
- **According to the quality range – 88.7% of the grain was in group III.**

Potassium mining in soils



What is needed?

The decision makers have to motivate the farmers to practice balanced fertilization

In 2006 the preferential credit for fertilization was 7 Euro per ha.

The expenses for fertilizers were 40-80 Euro/ha, for fertilization – 5-15 Euro/ha.

What is needed?

Extension workers and fertilizer advisors have to:

- Demonstrate the benefits of balanced fertilization to the farmers
- Convince the farmers to invest in soil fertility

IPI activities

**IPI contributes to improve
the fertilization practice through:**

- **Demo trials**
- **Field days**
- **Leaflets**
- **Seminars**

**Thank you for the
attention!**

