



Socio-economic profitability of gypsum amendment

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Main Results

Economic aspects of using gypsum exceptionally clear:

- 1) Simple cost structure
- 2) Reduces both dissolved phosphorus and particulate phosphorus
 - environmental benefits do not bring about environmental damages as side products

Economic Analysis of Gypsum – Main Features

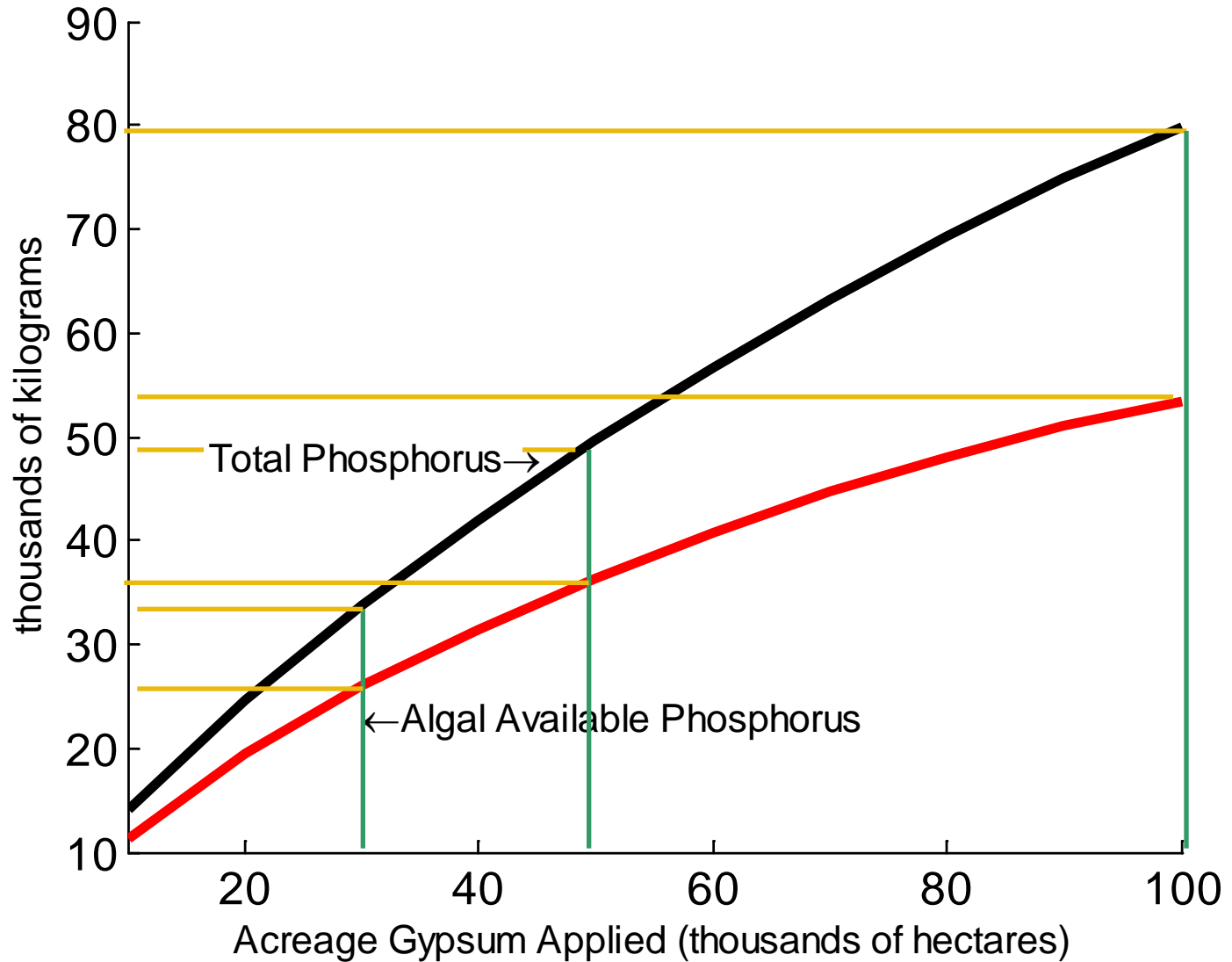
$$\text{Abatement costs} = \frac{\text{Costs of application}}{\text{Achieved reduction in phosphorus load}}$$

- Gypsum application does not affect other farming activities
- Costs due to product price, freight and application
- Discrete character of application
- Reduces both the load of dissolved reactive phosphorus and particulate phosphorus
- Does not affect the loads of nitrogen
- Crucial to know the initial phosphorus load

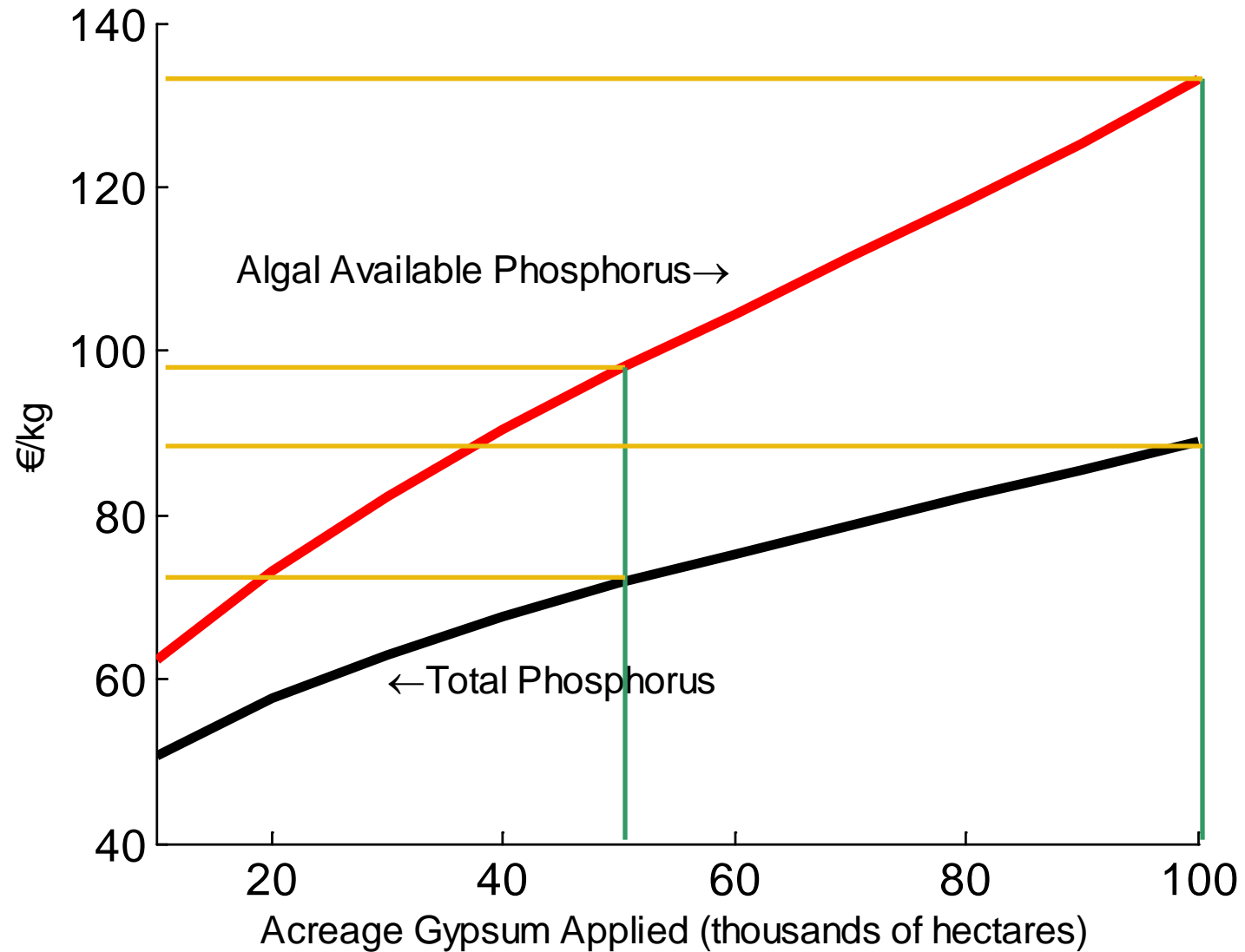
Exemplifying Calculation on Clay Soils in South West Finland

- Cereals and high value crops 100 000 hectares
- Algal available phosphorus = dissolved phosphorus + 0.16 * particulate phosphorus
- Assumption 1: Average slope: 1,5%
- Assumption 2: Cultivation technology ploughing
- Assumption 3: Price of gypsum 18.15 €/tn (the same as in the auction trial in Nurmijärvi)
- Gypsum + freight + application = 71 €/ha pa.
- Reduction in P loads 50%
- Gypsum applied first to parcels with highest initial loads
 - Parcels with high P-values first
 - Distribution of P-values from Uusitalo et al. (2007)

Total Reduction



Average Abatement Costs



Gypsum as a Part of Phosphorus Abatement in Agriculture

- The profitability of gypsum assessed together with choosing phosphorus fertilization levels, constructing vegetative buffers and reduced tillage, for alternative parcel characteristics
- On steep parcels socially optimal to use both gypsum and buffers
- In the long run, gypsum is used simultaneously as the high P-value soils are gradually depleted
- The use of gypsum does not affect markedly the optimal depletion paths
- The overall level of phosphorus abatement determined by the society's (citizens') willingness to pay for improved water quality, i.e. the damage from eutrophication