

# Tools to harmonise data

## Coefficients for N and P content of cereals and temporary grasses for use in the Swedish nutrient balances

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### Summary and Conclusions

Coefficients for nitrogen and phosphorus in harvested crops and crop residues are used and reported for multiple reasons. Sensitivity analysis is an effective tool to evaluate the effect of changing the coefficients used in soil surface nutrient balance calculations.

### Introduction

Gross Nutrient Soil Surface Balances (GNB) for nitrogen (N) and phosphorus (P) are key agri-environmental indicators within the EU and are also important tools to evaluate one of the indicators for agricultural statistics as defined in the Global Strategy. Nutrient output via harvested crops often accounts for the largest item on the output side of the balance/budget. Therefore, there is an increased need to obtain harmonised statistical data related to crop nutrients.

### Aim

The aim of this study was to obtain updated and well-defined coefficients for N and P content in harvested cereals, temporary grasses and crop residues.

### Approach

The use and reporting of coefficients for N and P content in grain and straw of winter wheat (*Triticum aestivum*), spring barley (*Hordeum vulgare*) and oats (*Avena sativa*) and of temporary grasses in Sweden were investigated. Sensitivity analysis was used to quantify the effect on the official national soil surface balances of using a range of different coefficients for nutrient content in the investigated crops.

### Results

Several institutions that use coefficients for N and P in crop products for different purposes were found. Field investigations reporting N and P contents were also identified (Table 1). There was a variation in the N and P coefficients used and/or reported (Table 2). The span of N balances derived from the sensitivity analysis showed surpluses of between 14 and 50 kg N/ha at national level (Figure 1). The sensitivity analysis also showed the importance of focusing on crops covering large areas when revising coefficients.

#### Other results from the project

- The utilisation of crop residues was investigated through a sample survey among 3 000 agricultural holdings.
- Crop residues were removed from the field on 40 percent of the cereal crop area and were predominantly (73 percent) used as litter.

Table 1. Main users and field investigations of N and P coefficients in crops in Sweden.

Institution	Usage* /Field investigation#	Geographic level
Statistics Sweden	Official statistics on nutrient balances	National/ Regional (agricultural production areas, catchments)
Swedish Board of Agriculture	*Agricultural advisory service, for calculation of N and P balances, leaching, climate footprint, etc., at farm level	Farm
SMED/Swedish EPA	*Green house gas inventory report to UNFCCC	National
SMED/Swedish EPA	*Modelling of N and P leaching losses from arable land	National/Regional
Statistics Sweden	*Calculation of OECD/Eurostat GNB for N and P	National/Regional (NUTS2)
Swedish University of Agricultural Sciences /Swedish EPA	*National environmental monitoring of arable soils and cereal crops	National/Regional
Swedish University of Agricultural Sciences	*Variety trials	

Table 2. Nitrogen (N) and phosphorus (P) concentrations (%) in grain and straw of winter wheat (*Triticum aestivum*), spring barley (*Hordeum vulgare*) and oats (*Avena sativa*) at 15 percent moisture content and for whole crop samples of temporary grasses in dry matter. Range of coefficients among main users and reporters listed in Table 1.

	N (Percent)		P (Percent)	
	Grain	Straw	Grain	Straw
Winter wheat	1.66–1.9	0.43–0.7	0.31–0.37	0.1–0.32
Spring barley	1.5–1.7	0.65–0.8	0.34–0.35	0.1–0.32
Oats	1.45–1.8	0.62–0.7	0.33–0.35	0.1–0.32
Temporary grasses	1.1–3.97		0.14–0.48	

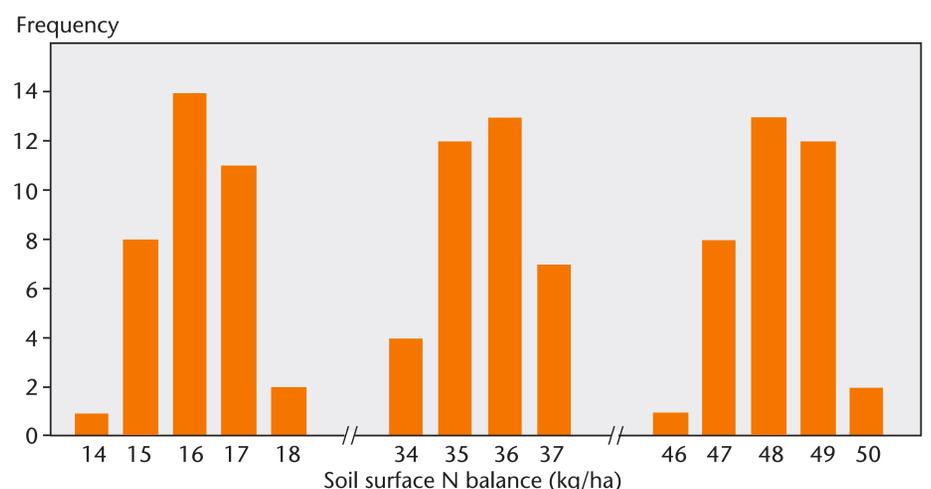


Figure 1. Soil surface N balances for Sweden 2009. Variation due to the range of different N concentrations in grain and straw of winter wheat (*Triticum aestivum*), spring barley (*Hordeum vulgare*) and oats (*Avena sativa*) and of temporary grasses used in the sensitivity analysis. All other in- and outputs fixed. The choice of N content in temporary grasses had a strong influence on the balance, due to the large area of this crop in Sweden.

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