



## **Greenhouse gas budget from intensively managed grasslands in the Netherlands**

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Grassland systems are highly productive accounting for about 20 % of the global terrestrial biotic Net Primary Production. ( $10.7 \text{ Gt. C y}^{-1}$ ). The soil carbon (C) density in grasslands is higher than in any other vegetation type. Under the current climatic conditions, grasslands worldwide are believed to cause a net accumulation of soil organic matter. With the predicted changes in temperature and rainfall the grassland area may expand. In the Netherlands about 30% of the soil surface is covered with grass. In order to evaluate the exchange of greenhouse gases between grassland and the atmosphere a monitoring programme was carried out on a grassland site at Lelystad in the Netherlands in the period 2002-2004.

During this monitoring programme,  $\text{CO}_2$  exchange was measured by means of eddy correlation (Licor 6262), while  $\text{CH}_4$  and  $\text{N}_2\text{O}$  measurements were performed by means of static chambers (Innova 1302). Also autobox measurements (GC-FID and -ECD) and TDL fast box measurements were done for  $\text{CH}_4$  and  $\text{N}_2\text{O}$ .

The Lelystad grassland site is an intensively managed pasture of 3.67 ha of predominantly perennial ryegrass (*Lolium perenne L.*), producing high yields of grass and milk. We monitored  $\text{CO}_2$ ,  $\text{CH}_4$  and  $\text{N}_2\text{O}$  emissions, manure supply, grass uptake by cows in the grazing periods, grass yield, milk yield and meteorological data during a period of one year.

From the available data the greenhouse gas budget can be evaluated. Therefore, we organised the data in growth periods spanning the time between two cuts (mowing or grazing) in order to obtain figures directly related to the uptake and emission for that

period. Some inputs like slurry application are not entirely confined between these growth periods and estimates are necessary to determine what amount contributes to following growth periods.

During a set of five experimental campaigns in the 2002 and 2003 additional measurements were carried out. In each campaign, the cows grazed during a period of five days on the paddock. Most of the methane is emitted from the rumen and a halter was designed to sample a set of six individual cows. Additionally methane plume measurements on the total herd of 60 cows were done to evaluate the emission level of the complete herd. Results will be available at the symposium.