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**BALANCE AND LEACHING OF NITROGEN IN ENERGY CROP
ROTATIONS WITH AND WITHOUT SUGAR BEET**

**Bilan et lessivage d'azote dans des successions de cultures énergétiques avec
et sans betteraves sucrières / Stickstoffbilanz und -auswaschung in
Energiefruchtfolgen mit und ohne Zuckerrüben**

ABSTRACT

Fertilization with nitrogen (N) is essential for plant growth to produce high yielding crops, but can cause harmful environmental impacts via leaching or erosion. Regulatory constraints were set up to meet both, the crops' demand and environmental requirements, to improve the N-fertilization strategy for single crops and crop rotations. Thus, the management of cropping systems must aim at retaining N in the plant-soil system and minimizing losses to other environmental compartments. Especially for biomass production, the N-balance and the risk of N-leaching are important criterions to evaluate single crops and crop rotations in terms of sustainable production.

Within the joint project "The sugar beet as an energy crop in crop rotations on highly productive sites – an agronomic/economic system analysis" we investigate how crop rotations for biogas production differ in N-balance and -leaching. Therefore, crop rotations with and without sugar beet (SB) and/or silage maize (SM) were investigated at two sites (Harste, Aiterhofen; 2011-2013). Most rotations include winter wheat (WW; flour production) which requires a high rate of N-fertilization. Soil mineral N concentrations before winter (0-90 cm) were between 30-60 kg ha⁻¹ and N-balances (input minus removal by crop harvest) were 12 kg ha⁻¹ a⁻¹ (SB), -41 kg ha⁻¹ a⁻¹ (SM), and 31 kg ha⁻¹ a⁻¹ (WW). Although these values do not indicate a substantial risk of N-leaching, considerable differences between sites and years call for more detailed information on N-leaching risk. Therefore, the poster also presents first results of modeled N-leaching.
