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Mitigation of phosphorus losses from agricultural areas and consequences for water quality and food production

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Losses of phosphorus (P) are causing huge problems for water quality all over the world. The agricultural landscape contributes significantly to these problems in many areas and implementation of mitigation methods is needed. At the same time food production is critical for our growing world population. The objective of this presentation is to relate implemented mitigation methods to reduce P losses to food production that is cereal yields, and water quality. The database for this analyses consisted of results from a long term (20 years) catchment monitoring site and a nested field scale site, both having collecting information on water discharge, water quality (suspended sediments, total P, total nitrogen and pesticides), erosion risk, soil tillage, nutrient application and yields. The implemented mitigation methods included changed soil tillage method and reduced P application. The autumn ploughed area in the catchment constituted from 20 % in 2002 to 60% of the cereal area in 1996. The P application varied from 16 to 33 kg $ha^{-1}yr^{-1}$ on average for the agricultural area. At the field site, autumn ploughing was carried out in 5 of 12 years. Average yields of cereals in the catchment varied from 63 kg ha^{-1} in 1994 to 96 kg ha^{-1} in 2004. Evaluation of results on yield response to implemented mitigation methods at the catchment and at the field scale will be presented at the poster. In stream-monitoring showed total P losses up to 3.7 kg TP $ha^{-1}yr^{-1}$. Results show that year to year variations in both yields of crops and loss of P were large and that variations in weather are decisive both. Further discussion of results will be presented at the poster.