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Situation analysis of emissions of ammonia (NH₃) and dust (TSP, PM10, PM2.5) from cattle housing systems

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Within the framework of a situation analysis, an estimate of emissions of NH₃, TSP (total suspended particulate matter), PM10 (particulate matter) and PM2.5 from Swiss cattle housing was undertaken for the years 1990 to 2004 with forecasts to 2020. This situation analysis should provide indications of where data measurements are needed in order to improve the data basis. The emission estimate is based on annual animal numbers, the distribution of animal housing systems, emission data from the literature and derived emission factors.

Switzerland's total cattle livestock declined between 1990 and 2004. Data on the distribution of animal housing systems are only available sporadically in the literature and not in detail. The trend for the individual categories was roughly established from an internal expert survey. Loose housing and outdoor exercise areas have increased in recent years. This trend is expected to continue.

The few existing NH₃ emission values from the literature, mainly from housing with forced ventilation, vary considerably. Temperature and farm-related effects are evident. As often only short-time values are available and the methods used to determine the air exchange rate are sometimes dubious, a comparison cannot deliver statistically significant values for different housing systems. There is a lack of reliable data on housing systems with an outdoor exercise area and on pasturing. Due to the poor data basis, the derived emission factors can only be offered as very approximate ranges and mixed values for all categories of cattle.

An estimate of NH₃ emissions is afflicted with uncertainties. Nevertheless, current and future development trends are discernible. Emissions declined slightly between 1990 and 2000. In subsequent years an increase can be expected due to the rise of loose housing, despite the decrease in cattle livestock. Emissions from outdoor exercise areas could not have been included in the estimate. However, higher NH₃ emissions are expected from housing systems with outdoor exercise areas.

The data basis for dust emissions from cattle housing is deficient for all categories of cattle and all housing systems. Most of the data were merely derived from other particulate fractions. The particle size distribution is also unclear.