



Estimation of metal balances a tool for improving of management in a farm from polluted area Copsa Mica

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Long-term accumulation of heavy metals in arable ecosystems from Copsa Mica area negatively affecting soil fertility and product quality. A sustainable heavy metal management in these agro-ecosystems allows to ensure that the soils continues to fulfill its functions and to provide its ecosystem services (especially supporting and provisioning services). An analysis of the input and output flows of heavy metals in agro-ecosystems and of their resulting accumulation is necessary to define strategies that ensure sustainable management of these metals in agricultural systems. The aim of this study was to calculate the farm-gate and barn balances for the heavy metals (Cd, Pb and Zn) using the data from a farm located in polluted area Copșa Mică. For all heavy metals (Cd, Pb and Zn) farm-gate balances are negative; the export of metal in the farm was done mainly through the manure. The barn balance for cadmium was positive, indicating an accumulation of metal in the system. Inputs of cadmium in the system were estimated at 163.67 g Cd / year and losses of cadmium from the system were made mainly through manure (77.22g Cd / year). Both lead and zinc barn-gate balances are negative. Also externalization of lead and zinc in the system was achieved by manure (969 g Pb / year and 2390 g Zn / year). Monitoring metal balances at different scales (farm-gate, barn) proved to a successful way to identifying farm management issues not revealed by determining metal balances at the farm-gate alone. The main finding was that the substantial amounts of cadmium, lead and zinc were released from internal sources, mainly through fodder obtained from their own land (some plots are located in polluted area). The manure is the main contributor to outflows both for heavy metals. Using this manure as organic fertilizer could lead to accumulation of cadmium in soil with major risk on soil fertility and crop quality.