



Complex system, simple indicators: Evaluation of circularity and statistical entropy as indicators of sustainability in Austrian nutrient management



Julia Tanzer^{*,a,b}, Helmut Rechberger^{a,b}

^a Centre for Water Resource Systems, TU Wien, Karlsplatz 13/222, Vienna 1040, Austria

^b Institute for Water Quality and Resource Management, TU Wien, Karlsplatz 13/226, Vienna 1040, Austria

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ABSTRACT

The successful implementation of sustainable resource management strategies depends on the availability of indicators that are capable of reflecting system complexity adequately but can easily be computed and communicated. However, systematic assessment of the scope and limits of simple indicators is often lacking. In the present study two indicators that can readily be derived from a material flow analysis structure are applied to and evaluated in a large and complex system of phosphorus and nitrogen management in Austria. Circularity (C) is defined as the share of recycled materials in total system throughput, whereas the Substance Concentration Efficiency (SCE), an indicator based on statistical entropy, measures the extent to which a substance is concentrated or diluted while passing through the system. For comparison the indicators were normalized with respect to a best-case and worst-case scenario (\bar{C} and \bar{SCE}). Although both indicators correspond well in their general statements, clear differences in the prioritization of different aspects of sustainability can be observed. While \bar{C} focuses on increasing recycling, emission reduction and system downsizing have stronger effects on \bar{SCE} . \bar{SCE} therefore is considered more suitable for providing first indications on sustainability in Austrian nutrient management.

* Corresponding author at: Centre for Water Resource Systems, TU Wien, Karlsplatz 13/222, 1040 Vienna, Austria.

E-mail address: tanzer@waterresources.at (J. Tanzer).

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