A new study has revealed the diversity in terminology and choice of indicators across eight major frameworks used to assess the environmental impacts of agriculture. The researchers call for further work to quantify and express uncertainty surrounding chosen reference values.

Many efforts have been made to evaluate the environmental impact of farming and nearly all of them make use of indicators. The absolute value of an indicator tells us little about environmental impact. What is important is the distance between the indicator value and a reference value, but how is this reference value identified?

Researchers analysed eight methods typically used to assess agricultural sustainability and suggested ways to improve their use and relevance. All the selected methods, which include the Ecological Footprint (EF) and the European Analytical Framework for the Development of Local Agri-Environmental Programmes (AEMBAC), use established indicators of sustainability and feature in published case studies.

Six of the eight methods identify decision-makers as their target users, whereas the remaining two methods are 'grass-root' types, aimed at local farming or activist organisations. Four methods assess sustainability in environmental, social and economic terms, whilst the other four focus on environmental sustainability only. Each method uses different terminology to describe the end target of sustainability, for example, 'threshold', 'fair earthshare', 'critical flow' and 'sustainability standard'. As such, the study suggests using the generic term 'reference value' to represent the goal of sustainability.

The study suggests making a further distinction between different types of reference values. A 'normative' reference value refers to a previously defined value, such as an emission reduction of 20% by 2020, whereas a 'relative' reference value refers to a similar or ideal system. Normative targets can be even further divided into those that describe desirable conditions and those that describe threshold limits, which represent the condition of a natural resource beyond which the quality is unacceptable.

As a further complication, some studies distinguish between 'science-based' and 'policy-based' targets. Science-based targets use reference values based on objective science-based considerations using experimental data, models or expert opinion. Policy-based targets are more influenced by costs or political feasibility.

In the majority of the methods, the reference values are defined at a local level and so provide a means to introduce site specificity into assessments. For those methods that use both scientific and policy-based sources, the study suggests that a clearer distinction should be made. Policy-based reference values are usually a compromise based on both science and societal considerations and, as such, are less stringent than science-based reference values. By making clear what type of reference values are in use, sustainability assessments will be more transparent to stakeholders and allow for more meaningful and robust comparisons.