

Preface

The indicator explosion: local needs and international challenges

As research and technological change impacts upon the environment, methods to monitor change and sustainability are needed. Sustainability of the environment has generated a thriving industry of regional and global projects and programmes. Sustainable land management, biodiversity, social development, rural livelihoods, conservation of natural resources are but a few of the themes that are being addressed. A range of agroecosystems is explored. Impact and sustainability assessment is also approached through different sectors such as medicine and education. And numerous different frameworks have been proposed, most of which have no direct correspondence.

Indicators proposed for this wide range of studies are numerous yet they are inconsistent across studies, often based upon different definitions. They are sometimes presented merely as data values or variables with no regard for their specific rôle in measuring change. Thus, thresholds and reference points have not been identified for many key indicators. Indicators are proposed without rigorous testing on a range of datasets. Compound indicators involve combination of indicators for different system components, often with weights that are meaningless. Component indicators interact and feedback to each other; their patterns of interaction are unclear.

Databases may be inadequate to support the future accumulation of information. Databases built with appreciation of the need for linkages between indicators of different system components are rare. Because of inconsistency of definition and non-comparability of scale, linkages between databases for different projects may be impossible to create.

Most indicators are proposed at the programme or national level, or have been aggregated to this level from smaller projects. Many of these smaller projects have not included traditional data from local communities. This local need has implications for research in that data may be inadequate to represent clearly the impacts of research and technological change at local levels, and aggregation to higher levels is thus biased. Policy development at all levels will thus be ill-informed.

This special issue of *Agriculture, Ecosystems and Environment* is the result of a European Union INCO-DEV Concerted Action ‘Unification of Indicator Quality for Assessment of Impact of Multidisciplinary Systems’ (UNIQUAIMS). This Concerted Action linked 27 Partners from national institutions in Africa, Asia, China, Central and South America and Europe to address these issues at local and community levels and to make recommendations for consistent indicator identification and unbiased summary for the use of ongoing and future research. The project focussed upon three systems:

1. rural and peri-urban farming systems for improved agricultural productivity;
2. ecosystems converted to agricultural use;
3. degraded ecosystems where attempts to convert natural ecosystems to sustainable use have been unsuccessful.

But the identification of indicators within different sectors and themes nationally and globally soon was obvious, as was the necessity for the maintenance of

quality data with regard to consistency of definition of single and multi-component indicators.

The international challenge then is to identify common indicators having consistent definitions across sectors, themes and countries. Common indicators, or standardised values, need to be found so that studies can be compared easily. These must then be tested in relation to realistic thresholds and targets for a range of datasets from different systems in different locations. More social and political indicators need to be created and tested so that the transfer across different domains or cultures can be validated.

Aggregation in space and in time, compounding and weighting issues must be explored so that bias and misrepresentation at higher levels and at future times can be avoided.

The papers in this special issue highlight problems in many of these areas and give demonstrations of some possible solutions.

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