

Decision Support Tools and Sustainability Appraisal

Paul Bardos and Laurent Bakker

Decision support exists to help those who have to take decisions deal with the complex and wide-ranging information involved in contaminated land management. Decision support can be provided as written guidance (flow sheets, model procedures) and/or software. It aims not only to facilitate decision making but to help ensure that the process is transparent, documented, reproducible and hopefully robust, providing a coherent framework to explore the options available.

The sustainability context of remediation has been in discussion for some time. One of the earliest decision support tools (from the early 1990s) was the REC tool developed under NOBIS which is still in use today. NICOLE has reviewed sustainability concepts for remediation in two workshops to date in: March 2003 (in Barcelona) and March 2008 (in London). Over this period of time sustainability issues have become a more important consideration in decision making and we are at the start of what appears to a paradigm shift from the assumption that all risk based contaminated land management is intrinsically sustainable, to a recognition that remediation processes themselves have sustainability impacts that need to be managed. The industry is at the start of this process and does not have a complete and generally accepted set of concepts, approaches and decision support tools. For example, the REC system is not a full sustainability appraisal. In some ways the situation is analogous to the state of development of risk based decision making some ten years ago when NICOLE was founded. Sustainable remediation is therefore perhaps NICOLE's new challenge for the next ten years (!?).

A wide range of sustainability tools and techniques have been applied to sustainability appraisal, or aspects of sustainability appraisal, or have potential to be used in sustainability appraisal. Some of the principle decision support approaches with potential applicability are summarised in Table 1 below. This table is based on work being carried out for the UK Sustainable Remediation Forum (www.claire.co.uk), which is collaborating with NICOLE. The table describes each technique in terms of its coverage of particular aspects of sustainability. For example a carbon footprint appraisal focuses on a "narrow" segment of environmental sustainability issues (ignoring for example soil functionality, biodiversity and landscape impacts, whereas all of these aspects *could* be considered by a cost benefit analysis, providing it was suitably specified. The Cost benefit analysis is therefore "wide?" – the question mark indicates that it is not necessarily so. Where no entry is made the technique has no coverage.

None of these techniques is an absolute valuation. All are fundamentally flawed in that they can only assess what we know or perceive may be an issue, for example:

- would a contemporary appraisal of DDT have taken into account impacts on birds of prey?
- the current biofuels debate – what appraisal of even known effects ever took place before the initial scope of policy / research was set?

A difficulty inherent in sustainability appraisal is the scope of parameters that might need to be considered. There are many possible “indicators” of sustainable development. For example, the UK has Sustainable Development Policy: Framework Indicators. It also has indicators for:

- Strategic planning for sustainable waste management (2006)
- Indicators of sustainable development for Scotland (2005)
- Indicators for sustainable development for Wales (2006)
- Environmental performance indicators: reporting guidelines for UK business (2005)
- Environment in your pocket 2007 – almost 60 indicators
- Sustainable farming and food strategy indicators (2002+)
- Sustainability appraisal of regional spatial strategies (2005)
- Local development framework core output indicators (2005)

This situation is reflected across a number of countries. In addition the EU has a sustainable development policy. While this has yet to be elaborated to an indicator set, it is clear that its priorities and those of other Member States (say the UK) are not necessarily in line.

A number of contaminated land practitioners believe that sustainability appraisal should focus on a limited set of quantifiable indicators, or “metrics” that would allow quantitative based decision making in selecting the “most sustainable” remediation options. Other practitioners feel that this reliance on quantitative approaches comes with a number of problems, which are:

- Limited scope of appraisal – with no real means of knowing if the right metrics are being used for a particular set of circumstances – beyond the rationale for a “standard” method
- Problems in valuations – valuations are used in quantitative techniques like CBA and LCA which are subject to uncertainties, assumptions and subjective choices which are not transparent to the user
- A lack of inclusiveness – some stakeholders will feel excluded from quantitative techniques, for example because they do not support the valuation approach, because the metrics do not match their views of key issues, or simply because it is seen as too “technical”. This is a major flaw as one of the underpinning aims of sustainable development is to achieve inclusive decision making.

A further important issue is decision making cost – why use quantitative tools if a simpler qualitative tool is able to arrive at a consensus based answer, or can at least identify what particular aspects of a sustainability appraisal need more detailed evaluation.

Table 1 Decision Support Techniques with Relevance to Sustainability Appraisal (indicating coverage of the environmental economic and social elements of sustainable development, whether quantitative or qualitative, and whether contaminated land management applications are known to exist at present)

	Env	Ec	So	Type	CLM
Best Available Technique (BAT)	Wide	Narrow		Qual	yes
Carbon footprint ("area")	Narrow			Quan	yes
Carbon balance (flows)	Narrow			Quan	
Cost benefit analysis	?Wide	?Wide	?Wide	Quan	yes
Cost effectiveness analysis	?Wide	?Wide	?Wide	Qual	yes
Eco-efficiency	Narrow	?Narrow		Quan	?
Ecological footprint	Narrow			Quan	
EMAS / EMS ?	?Wide			Qual	
Energy / intensity efficiency	Narrow			Quan	yes
Environmental risk assessment	?Narrow			Quan	yes
Environmental impact assessment / Strategic environmental assessment	?Wide			Qual	yes
Financial risk assessment		Narrow		Quan	yes
Industrial ecology	?Wide	?Wide		Quan	
Lay participation	??	??	Wide	Qual	?
Life cycle assessment (based)	"Narrow"			Quan	yes
Public Benefit Recording System	?Wide	?Wide	?Wide	Quan	yes
Quality of life assessment	Wide	Wide	Wide	Qual	
Scoring / ranking systems (may include MCA / MAT)	Wide	Wide	Wide	Qual	yes
Sustainability threshold analysis	Wide	Wide	Wide	Qual	

A possible way forward is to adopt a tiered approach. A tiered approach has significant merit. It is flexible and provides options to assess sites to the degree necessary.

Tier 1: Qualitative accessible approach (broad scope, rapid and low cost)

Tier 2: Consensus / consultation to elaborate qualitative assessment

Tier 3: Semi-quantitative (more detail therefore more effort and cost)

Tier 4: Quantitative most complex

The aim of this tiered approach is to make sure decision investment is well targeted , e.g.

- Decide if a consultative / consensus based approach is warranted
- Reserve quantitative approaches for decisions that remain deadlocked
- Use the qualitative / consensus stages to "target" more expensive quantitative assessments.

A stepwise approach supports a sustainable use of resources for the sustainability appraisal process itself

The remainder of this talk will outline a possible tiered approach, focusing on Tier 1 and Tier 2.