A Simple Tool for Preference Rating or Multi-criteria Assessment

Peter K A Barz (MIEMA, CEnv)

IEMA -Institute for Environmental Management & Assessment
info@iema.net

Keywords*:* Qualitative decision-making; Multi-parameter iterative assessment; Relative State of Sustainability.

1.   INTRODUCTION

Many assessment methodologies use a range of assessment parameters and also rely on qualitative decision-making - which may be supported by quantitative findings, as the case may be. In order to assist the organisation, integration and presentation of such qualitative decisions, the 'MyMatrix' software tool has been developed by three partners of the NATURNET-REDIME team [2007] as a simple template for use in diverse practical applications.

The following presents the basic 'MyMatrix' software tool as well as a further development for a specific application.

Figure 1. MyMatrix.

1.1   The MyMatrix Tools

As Figure 1 shows, the 'MyMatrix' software prototype is provided in the form of a simple on-line table that allows the user to enter a) the title or subject of assessment; b) any number of different parameters that influence that subject (the present example only allows for a maximum of 12 parameters); and c) the user's decision or 'rating' of the expected 'impact' of each of these parameters. The latter is achieved by clicking the respective cell in the column of the impact scale that ranges from 'Zero' over 'Low' and 'Medium' to 'High'. On completion of this process and by clicking on 'Make myChart', a standard polar graph (for examples see Figure 3) is produced that is arranged in concentric bands representing the given impact scale - whereby the 'High' impact band (red) forms the centre of the circle and the 'Zero' impact is the band (green) with the largest diameter forming the circumference of the circle. The parameters are identified as headings around the circumference of the polar graph and the individual impact ratings are located opposite to these within the circle on the edge of their respective bands.

Environment		Zero	Low	Medium	High
Air					
Physical Agents *					
Water					
Soil					
Ecology					
Land Use					
Landscape					
Economics		Zero	Low	Medium	High
Employment		◒			
Assets					
Access -Construction			◒		
Construction					
Safety					
Risk				◒	
Operation & Maintenance					
Socio - Culture		Zero	Low	Medium	High
Heritage					◒
Wilderness					
Outdoor Sports					
Recreation					
Access -People					
Education					
Visual					

Figure 2. The SIA Impact Matrix.

The individual impact ratings are joined by a line thus forming an enclosed area which now represents the combined impact of all parameters as a percentage of 'zero impact'

which represents the full area of the circle. In this manner the relative impact of the parameters can be determined. This process is iterative and may be repeated – e.g. with different impact ratings many times.

1.2 The SIA Impact Matrix

The 'MyMatrix' has been further developed as a tool for Sustainability Impact Assessment (SIA) - called SIA Impact Matrix (see Figure 2). In this case the matrix shows the parameters that have been selected as an example of the assessment of a proposal for the construction of a wind farm.

Based on the model of the 3 Pillars of Sustainable Development as promoted by the European Council [2006], the parameters are derived here from the distinct categories of assessment, i.e. environmental impact assessment, as well as existing and user-defined socio-cultural and economic/construction parameters characteristic of such a project proposal. Furthermore, the SIA Impact Matrix has extended funtionality, i.e. on completion of the parameter impact ratings for each category the user may view the resulting assessments for each of the 3 Pillars as distinct polar graphs. A further graph shows the combination of the ratings of the parameters of the three categories as an integrated picture – whereby the area covered depicts the overall 'Relative State of Sustainability' of the construction proposal. This process is iterative and may be repeated as many times as required to obtain a particular outcome – e.g. to obtain a specific (minimum) overall relative rating (percentage) – or to view and change specific ratings in an overall context.

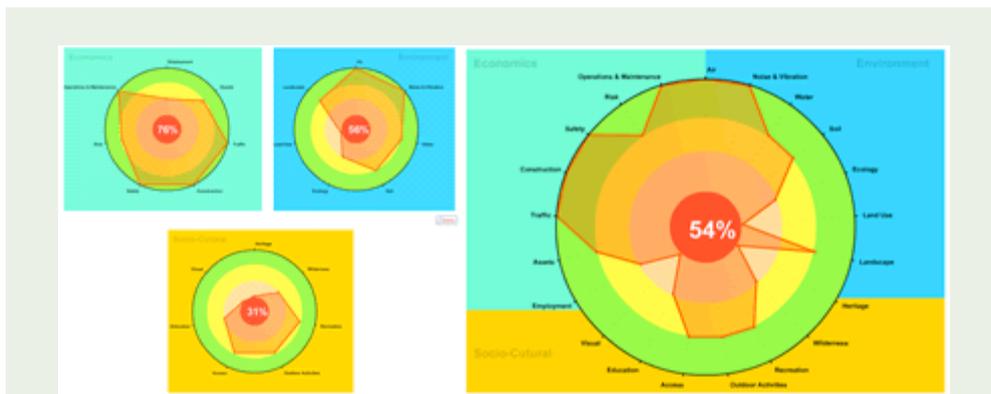Both the Assessment Matrix and SIA Matrix may be found on http://www.env-net.com/.

Figure 3. Example of Presentation of Multiple Impacts via Polar Graphs.

REFERENCES
- European Council, Sustainable Development Strategy (EU SDS); *European Union*, Brussels 2006.
- Naturnet-Redime, New Education and Decision Support Model for Active Behaviour in Sustainable Development Based on Innovative Web Services and Qualitative Reasoning; Priority Sustdev-2004-3.viii.2.e; *European Commission, Sixth Framework Programme*; IPR owners: Environmental Network Limited (ENL), United Kingdom; Department of Remote Sensing and Landscape Information Systems (FeLIS) - Albert-Ludwigs-Universitaet Freiburg, Germany; Ceske Centre for Science & Society, Czech Republic; CZ); Prague 2007.