

# 6. Conclusions and recommendations

## 6.1. Indicator overview

Results from the Murbandy/Moland project and from research on indicator goals and frameworks led to the selection of spatial indicators that can be defined and derived from existing databases. Change in the dimension of urbanised areas, urban sprawl (as the increase in artificial area), green urban area, natural and agricultural area lost due to sprawl, density of road and rail network, evolution of industrial and commercial areas can be monitored directly — and consistently — by the existing databases.

Other indicators, namely some of those included in the European Common Indicators project have been tested, and have demonstrated the possibility of combining socio-economic data. Accessibility to local green public areas, exposure to noise from diverse sources and brownfield/greenfield development have also been tested. 'Total urban edge' has also been explored as an indicator depicting the fragmentation of urban landscapes.

Based on the main land cover types used both in the Corine land cover and the Murbandy/Moland projects, and on a literature review on indicators, a set of spatial indicators was selected. All these indicators can be calculated directly or indirectly from the Murbandy/Moland databases.

Information on these indicators is summarised and presented in Table 6.1. The table shows, for each major Corine urban land cover type, the corresponding indicators with a brief description, unit of measurement, and the institutions that support or recommend its application.

The table includes some of the main European Common Indicators currently being used in a test phase, emphasising the relevance and usefulness of territorial databases in developing sustainability indicators. These are key tools to support decision-making towards sustainable land use planning and management.

## 6.2. Conclusions and recommendations

The monitoring and evaluation of progress towards sustainability is a critical issue in sustainable development thinking. The search for suitable indicators represents an important step on the way to establishing, developing and managing sustainability, at both global and local levels.

Challenges posed by current urban growth trends require integration of a spatial dimension. Monitoring tools such as indicators are intended to support local authorities (as well as national and European authorities) in their work towards sustainability, and provide objective and comparable information for that path. On the basis of these general statements, a literature review of the use of indicators in an urban context, and having in mind the Murbandy/Moland project presented in this report, some conclusions and recommendations can be drawn.

- Indicators for local sustainability must go beyond traditional environmental indicators. A spatial dimension is required to analyse, predict and support land use planning processes.
- Lessons learned from projects and programmes based on the establishment of complex databases to assess urban development and dynamics (e.g. the Murbandy/Moland project) — in particular the importance of the comparable information they provide — should be applied to other cities and urban areas. This will provide new insights in the use of spatial indicators and should contribute to the development of a common set of local sustainability indicators, and thus help monitor progress towards sustainability and contribute to the efforts of developing and testing the proposed European common indicators proposed by the EC Expert Group on the Urban Environment. This report is an attempt to present and disseminate this information which has already been and will be useful for EEA assessment and reporting activities. Ways to foster this

Table 6.1		Summary of spatial indicators that can be derived directly or indirectly from Murbandy/Moland database			
Urban land cover	Indicators			Institution responsible	Murbandy/Moland (●) directly calculated with the database (+) calculated with additional information •
	Name	Brief definition	Unit of measurement of reporting		
Land use	Changes in land conditions	Changes in land condition by type and geographic location, in the condition, suitability and nature of the land resource	Area extent and magnitude of the selected land condition changes, with improvement and deterioration reported separately	UNCSD – Working list of indicators of sustainable development	•
	Sustainable land use	Sustainable development, restoration and protection		EC Expert Group on the Urban Environment – European Common Indicators	•
	Urban land cover	Total area in km <sup>2</sup>	km <sup>2</sup>	EEA – DOBRIS (1995) Chapter 10 – The urban environment	
	Land use change from natural to built-up areas	Amount of land that is converted from 'natural' to built-up areas	km <sup>2</sup> per year per capita	Eurostat – Towards environmental pressure indicators for the EU (TEPI)	+
Forest area	Forest area change	Amount of natural and plantation forest area tracked over time	ha	UNCSD – Working list of indicators of sustainable development	•
Green area	Open area	% of green areas	%	EEA — DOBRIS (1995) Chapter 10 – The urban environment	•
	Accessibility of green spaces: Proximity to green urban areas	% of people within 15 minutes walking distance of urban green areas	%	EEA — DOBRIS (1995) Chapter 10 — The urban environment	+
	Availability of local public green areas and local services	% of citizens within less than 500 m distance from area	%	EC Expert Group on the Urban Environment – European Common Indicators	+
	Green, public space and heritage	improvements needed for green, public spaces and heritage	% of green or public spaces and local heritage in need of improvement	OECD – Local sustainability indicators	+
	Green, public space and heritage sub-indicator	surface of green space per inhabitant surface of public space per inhabitant		OECD – Local sustainability indicators	•
	Proportion of green areas			EC – Urban audit – Terms of reference indicators	•
Derelict area	Total derelict area	area in km <sup>2</sup> % of urban area	km <sup>2</sup> %	EEA — DOBRIS (1995) Chapter 10 — The urban environment	
Built-up areas	Total built-up area	area in km <sup>2</sup> area in km <sup>2</sup> by land use	km <sup>2</sup> km <sup>2</sup>	EEA — DOBRIS (1995) Chapter 10 — The urban environment	•
Urban population	Population	Number of inhabitants in the city		EEA — DOBRIS (1995) Chapter 10 — The urban environment	+
		Number of inhabitants in conurbation		EEA — DOBRIS (1995) Chapter 10 — The urban environment	+
	Population density	Population per km <sup>2</sup>		EEA — DOBRIS (1995) Chapter 10 — The urban environment	+
	Population density			UNCSD — Working list of indicators of sustainable development	+

dissemination task, discussion of new indicators and applications, and the enrolment of other local authorities in such exercise should be foreseen, having in mind the newly established European Topic Centre on Terrestrial Environment, the core set of indicators on terrestrial environment under discussion, and the role of the EEA national focal points and national reference centres on urban environment.

- An evaluation of the usefulness of the Murbandy/Moland databases, carried out with the help of Portuguese local and regional authorities, recognised the importance of this type of land use database in urban planning and management. Data sets such as Murbandy and Moland should be made available to and used by both local and regional authorities. In order to maximise data use, it is recommended that the study areas should be overlaid with administrative boundaries, and that the selection of dates and frequency of data collection be guided by factors affecting landscape change, and be made to match census data.
- Recent European strategic documents such as the EU strategy for sustainable development (COM (2001) 264) and the sixth environmental action programme (6EAP) recognise the significant role of indicators as tools for monitoring policy performance. In this context, spatially-based indicators may contribute to measuring the progress towards sustainable development in land use planning and management. The present exercise should help in the development of the urban thematic strategy in preparation by the Commission, as part of 6EAP.
- Land use and linked issues of ecologically sound urban renewal, understanding and preventing urban sprawl, and integrated urban management are moving higher on political agendas across Europe. Nevertheless, tools to measure the progress towards or away from sustainable use are still missing and/or fragmented among several types of institutions. The urban thematic strategy could play a key role in setting a comprehensive framework and fostering cooperation between all stakeholders involved.
- The most relevant and urgent issues in relation to urban land use are:
  - urban sprawl — a common phenomenon in European cities leading to unsustainable use of land, growing dependency on the private car, congestion, increasing energy use, increase in polluting emissions;
  - contaminated land — city development shifting from industrial settings to more service-oriented ones has left many old industrial areas within urban areas, which are derelict and in many cases contaminated, the so called 'brownfield' sites that require considerable resources for cleaning up. This has led to more extensive use of 'greenfield' sites for urban development, increasing urban sprawl;
  - loss of green spaces — more and more existing green spaces within the urban areas are built up, threatening biodiversity, as well as the quality of life and health of city dwellers.

All these issues can be monitored by the Murbandy/Moland methodologies, and should be assessed and reported as part of the work programme.
- Urban issues, including land use, are complex and horizontal, requiring cooperation between different levels of government, between different policy areas, as well as between different departments. New forms of governance are required and new information tools driven by a keyword: 'cooperation'.
- Recent discussions over the 6EAP have clearly shown that setting targets and monitoring progress is vital. In this respect, the use of indicators to monitor urban land use appears central. Nevertheless, there is a desire to ensure cooperation and technical linkages between many ongoing initiatives, deriving from different Commission services, from city networks, and from national, regional and local exercises to use indicators as a monitoring tool. The European Common Indicators could be a starting point for this kind of dialogue.
- The local government dialogue paper, Accelerating sustainable development: Local action moves the world, in preparation by ICLEI (the International Council for Local Environmental Initiatives) for presentation at the Johannesburg World Summit on Sustainable Development, takes stock of the incredible movement towards implementation of Local Agenda 21 (much

more successful than the response to Agenda 21). It is examined as a strategic tool for conserving and managing local environments, reinforcing a trend towards localisation in line with the principle of subsidiarity, which is emerging in parallel with globalisation. It puts the question of how to vertically integrate the efforts of different levels of power and horizontally integrate different issues emerging from urban development trends.

- In the promotion of social and economic cohesion the European Union has undertaken many actions and has invested considerable funds in projects with spatial implications and relevant in the national, regional and local context. In this respect the provision of information and the improvement of knowledge about the environmental impacts caused by such actions remain of utmost importance, especially in the context of strategic environmental assessment practices.
- Additionally, when referring to urban issues related to land use one should keep in mind that any conclusion should consider the relevance of specific contexts: the country and regional planning systems and related aspects of planning, regulation, implementation of policies and institutional traditions. The Murbandy/Moland project reflects these specific contexts and needs, and its results can be used and explored at both the European and the local levels.
- Guidelines set out by the European Commission for the period 2001–06 (adopted by the Committee for the Development of the Regions, December 2000) call for thematic studies meeting the political objectives of the European Spatial Development Perspective (ESDP) and a structure for sustainable urban development. They also recommend the setting up of databases, map-making tools and indicators for territorial development and methodologies to assess the territorial impact of community and national sectoral policies. Within this framework and in line with the political objectives of the ESDP seven categories of territorial indicators were recorded: geographical position/ accessibility, regional integration, economic situation, natural heritage, cultural heritage, pressure from land use and social integration. Input to these seven categories of indicators could be obtained through further exploration of the Murbandy/Moland results.
- In this context one should also refer to Inspire (Infrastructure for Spatial Information in Europe) — formerly known as the Environmental European Spatial Data Infrastructure (E-ESDI) initiative aiming ‘To make available relevant, harmonised and quality geographic information for the purpose of formulating, implementing, monitoring and evaluation of community environmental policy making’. Its general principle is that data should be collected once and maintained at the level where this can be done most effectively.
- It should be possible to seamlessly combine spatial information from different sources across Europe and share it between many users and applications.
- It should be possible for information collected at one level to be shared between all different levels, detailed for detailed investigations, general for strategic purposes.
- Geographic information needed for good governance at all levels should be abundant under conditions that do not limit its extensive use.
- It should be easy to discover what geographic information is available, fits the needs for a particular use and under what conditions it can be acquired and used.
- All available geographic data should be made easy to understand and interpret by everyone because it can be visualised within the appropriate context, selected with a few clicks of the mouse.
- An extension of these principles applied to further exploration of the Murbandy/Moland project should be pursued. In addition, the huge potential contribution that Murbandy/Moland could bring to Inspire should be considered.
- Conceived as priority actions within the identified environmental areas presented in 6EAP, seven thematic strategies are proposed. They are considered as a way to address key environmental issues that require a holist approach and have a specific definition. One of the areas labelled as a ‘thematic strategy’ is the urban

environment. Their preparation will be carried out in close consultation with relevant parties, such as non-governmental organisations, social and economic partners and public authorities. It is proposed that the thematic strategies be presented four years after the adoption of 6EAP. Indicator development is one of the explicit areas to be developed under the urban thematic strategy. The Murbandy/Moland results, the European Common indicators and E-ESDI could be seen as a converging set of tools to be used in the implementation and monitoring of the thematic urban strategy.

- To prevent duplication, increase availability, create added value services, share geographic information and establish reference requirements for spatial information are aims shared by the EEA and Inspire as well as by the Murbandy/Moland project under the Institute for Environment and Sustainability of DG JRC. The EEA, assuring the environmental thematic coordination (and thus steering environmental component development) of Inspire101, is well positioned to steer the development of a new urban atlas, stimulating the use and broad dissemination of networked databases (anchored on indicator development) and digital maps.