

Annex 3: European common indicators: Towards a local sustainability profile

3a. Methodology sheet: Indicator A.4

Title	Availability of local public open areas and services
Measurement	Citizen access to nearby public open areas and other basic services.

1. Definition

Access is defined as living within 300 m of the open area or other service⁵.

Public open areas are defined as:

- public parks, gardens or open spaces, for the exclusive use of pedestrians and cyclists, except green traffic islands or dividers, graveyards (unless the local authority recognizes their recreational function or natural, historical or cultural importance)⁶;
- open-air sports facilities, accessible to the public free of charge⁷;
- private areas (agricultural areas, private parks), accessible to the public free of charge⁸.

To allow a more complete data analysis, the indicator must be calculated twice: first, relating to areas greater than 5 000 m², and second for all areas used by the public for leisure and open air activities, regardless of their dimension.

Basic services are defined as:

- primary public health services (general practitioners, hospitals, first-aid posts, family advice bureaux or other public centres supplying medical services, such as diagnosis or specialist examinations);
- collective transport lines that, at least for part of a common business day, have a minimum frequency (half-hourly service);
- public state schools (compulsory attendance schools);

- food stores;
- recycling facilities or services for solid waste (including recycling bins).

This indicator does not take the quality of the open area or service into account. In other words, it is assumed that the open areas or services perform — all in the same way — the functions for which they are intended.

Naturally, this is not always the reality: there are open areas that are more attractive and popular than others, and the same goes for services. This weakness is, however, considered acceptable in the light of the possibility of monitoring such level of satisfaction by means of Indicator A1.

The geographical level to be considered is the whole administrative area for which the local authority is responsible.

2. Question

What share of the inhabitants in the municipality lives close to public open areas and other basic services?

3. Context (reasons for indicator/s choice, relevance)

Access to public open areas and basic services is essential in a sustainable community for the quality of life and the viability of the local economy. Having basic services close to home also reduces the need to travel. If basic requirements of food and health are not met, there is a failure to satisfy social needs. The

(5) The European Environment Agency, DG Regional Policy and ISTAT (Italian Istituto Nazionale di Statistica) all use the concept 'within 15 minutes' walk' to define accessibility. It may reasonably be assumed that this corresponds to around 500 m on foot for an elderly person, which in turn may be equivalent to 300 m 'as the crow flies'.

(6) The indicator considers all areas used by the public for leisure and open-air activities. So even paved areas, if used for open air activities (i.e. skating), have to be included; on the contrary, a pedestrian road used for business and commercial activities should not be included.

(7) Sport facilities should be included only if freely accessible to the public and used by common the general public: football fields or similar professional sport facilities should not be included.

(8) Agricultural areas should be included only if used for leisure and open-air activities by the public. This is the case of farms that did 'survive' urban expansion and are close to urban areas. These farms often change their commercial strategies, opening to citizens and schools, selling fruit and other products to the public and offering other services (restaurant, school visits, etc.). Agricultural areas can only be included in such cases.

absence of shops selling fresh fruit and vegetables is an indicator of social exclusion (e.g. in the United Kingdom) and a threat to health. Exclusion also occurs when lack of collective transport for those who rely on it is found.

Sustainability principles covered: 1, 3, 4, 5, 6.

4. Targets (references and criteria for the assessment: standards/targets/ commitments)

There are no known targets or standards for this indicator, but access to open areas and services is recognised as essential for quality of life and local sustainability. Local authorities have an important role in facilitating access to open areas and basic services, for example through the planning process.

5. Unit of measurement

Number of inhabitants living within 300 m of open areas or service divided by total number of inhabitants = % of population.

6. Frequency of measurement

Biennial, except for indicators concerning food stores, for which a triennial frequency is suggested, due to the fact that data collection costs could be considerable.

7. Data collection method and sources

The most reliable method is based on the use of a geographical information system (GIS) to determine the distribution of the data (citizens, open areas, services, according to category). Once the borders of the open areas have been located on the GIS, the areas within a radius of 300 m from the borders are identified. Thus the municipal land will appear to be divided into two areas: the one included in the 300 m belts around the open areas and the one not included. The GIS is consulted to obtain the number of citizens living within the areas included in the 300 m belts and the percentage of citizens is calculated. The operation is then repeated for the points (or lines or borders if appropriate) corresponding to the basic services identified.

Data relating to the geographical distribution of the resident population should be available from the municipality or other administrative bodies (province or region) or from national statistical institutions (e.g. in the case of Italy, from ISTAT).

The local authority should also have data regarding the geographical distribution and

extent of the open areas and services, in particular:

- public parks and gardens or open spaces, for the exclusive use of pedestrians and cyclists;
- open-air sports facilities, accessible to the public free of charge;
- private areas, accessible to the public free of charge;
- primary public health services;
- collective transport lines with a minimum frequency (half-hourly service);
- state schools (compulsory attendance schools);
- recycling facilities or services for solid waste.

The distribution and size of parks, gardens and agricultural areas may also be obtained from remote surveys that can be purchased (i.e. satellite data), although this data must then be verified through the use of maps and on-the-spot inspection.

The availability of data on the geographical distribution of the basic services will vary. Unlike those relating to open areas, these data cannot be obtained by 'remote' methods and requires a special database. Such a database may already be available from the local authority or other public bodies (Chamber of Commerce) or, if necessary, may be purchased from specialised firms (e.g. in Italy, from SEAT (Società Elenchi Abbonati al Telefono)).

An alternative method, should the one suggested above prove inapplicable or too costly, is the collection of data by means of interviewing a representative sample of citizens. A questionnaire must be prepared with a question about each of the services concerned. In this case, the question should relate to walking time (15 minutes) rather than to the distance in metres, as this reduces the risk of mistakes being made in the assessment.

8. Form of reporting/presentation

Public open areas:

- Number of inhabitants living within 300 m of the public open areas divided by total number of inhabitants = % of population (to be presented as a figure); the indicator must be calculated twice: first, relating to areas greater than 5 000 m², and second for all areas.

Basic services:

- Number of inhabitants living within 300 m of each single basic service divided by total

number of inhabitants = % of population (to be presented as a figure for each category of service).

9. Examples of similar applications

In its *State of the environment report* (1999), the city of Turin used an indicator based on the percentage of inhabitants living within 500 m of a green area (defined as a public garden or public park with a surface area greater than 6 000 m²).

Bristol City Council publishes the hectares of public open space and playing fields in every ward of the city each year, and calculates the average area for each of the 35 wards that make up the city for its *Quality of life report*. It also publishes the number of shops selling fresh fruit and vegetables in the city as a measure of the city's ability to meet basic needs.

10. Questions to address/future developments

Further consideration should be given to:

- the maximum distance for access: a more complex indicator concerning different

'spatial ranges' (different buffers) from open areas or services is envisaged;

- the minimum size of a recreational area;
- the services for which the indicator is to be calculated.

If differences in terms of quality of the recreational areas and services offered were to be significant, devising indicators based on levels of quality might turn out to be necessary. The quality level could be assigned by a committee of experts representing different interest groups.

It may be useful to ascertain the cost of creating the databases needed for determining the geographical distribution of services.

11. Keywords

Access, public open areas, basic services, primary public health services, collective transport, state school (compulsory attendance school), food store, recycling facilities.

Annex 3b: Methodology sheet: Indicator B.8

Title	Noise pollution
Measurement	a) Share of population exposed to long-term high level of environmental noise. b) Noise levels in selected areas of the municipality (<i>to be used instead of a) where data for a) cannot be obtained</i>). c) Existence and level of implementation of a noise action plan.

1. Definition

'Environmental noise' means unwanted or harmful outdoor sound created by human activities, including noise emitted from road traffic, rail traffic and air traffic, and from sites of industrial activity. It does not include noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas.

2. Question

- a) To what extent are citizens exposed to environmental noise from road, rail and air traffic, and from industrial sources in their homes, in public parks and other relatively quiet areas?
- b) What are the noise levels in selected areas of the municipality?
- c) Has the local authority prepared and implemented any noise action plan or programme?

3. Context

The impact of environmental noise can have harmful effects on human health and well-being. A sustainable society should offer a mix of main urban functions such as housing, work and mobility, without exposing citizens to 'annoying' noise levels. Although increased mobility increases the chances for noise, this is not necessarily true if the transport mode is not mechanised or if certain forms of collective transportation are involved.

The draft European Directive⁹ on the assessment and management of environmental noise aims to define a common approach for combating the effects of exposure to environmental noise. It lays down a framework for determining exposure to environmental noise, making information on environmental noise and its effects

available to the public, and adopting action plans. The action plans will address priorities that may be identified by the exceedance of any relevant limit value or by other criteria chosen by the Member States. The actions may for example include traffic planning, land use planning, technical measures at noise sources, selection of quieter sources, reduction of sound transmission, and regulatory or economic measures or incentives. The objective is to prevent and reduce environmental noise where necessary, and particularly where exposure levels can induce harmful effects on human health, and to preserve environmental noise quality where it is good. The Directive is expected to enter into force at the beginning of 2002.

Noise policies, or elements of it, have been developed at national and local levels in most Member States.

Sustainability principles covered: 1, 5, 6.

4. Targets

The Proposal for the Community Environment Action Programme 2000–09 includes a target on noise, i.e. reducing the estimated 100 million people regularly affected by long-term high levels of noise in 2000 by 10 % by 2010 and by 20 % by 2020. The long-term objective is to reduce them to a statistically insignificant number.

5. Unit of measurement

- a) Percentage of population exposed, broken down into different value bands of L_{den} and L_{night} (see below for explanation of these units).
- b) Percentage of measurements corresponding to different value bands of indicators L_{den} and L_{night} .
- c) Existence (yes/no) and level of implementation of noise action plan or programme (%).

(9) The full text is available on the Europa website: http://europa.eu.int/eur-lex/en/com/pdf/2000/en_500PC0468.pdf

6. Frequency of measurement

- a) Biennial.
- b) Biennial.
- c) Biennial.

7. Form of reporting / presentation

a) The estimated number of people (in hundreds) living in dwellings exposed to each of the following bands of values of L_{den} in decibels (dB) 4 m above the ground on the most exposed façade: 55–59, 60–64, 65–69, 70–74, ≥ 75 , separately for road, rail and air traffic noise and noise from industrial sources.

The estimated total number of people (in hundreds) living in dwellings exposed to each of the following bands of values of L_{night} in dB 4 m above the ground on the most exposed façade: 50–54, 55–59, 60–64, 65–69, >70 , separately for road, rail and air traffic and for industrial sources (as above).

The figures must be rounded to the nearest hundred (e.g. 5 200 = between 5 150 and 5 249; 100 = between 50 and 149; 0 = less than 50). The computation or measurement methods used for assessing noise exposure should be described.

b) The proportion of measurements corresponding to each of the above mentioned value bands of L_{den} and L_{night} , e.g.:

	50–54	55–59	60–64	65–69	70–74	≥ 75
L_{den}	0 %	25 %	53 %	10 %	2 %	0 %
L_{night}	69 %	17 %	11 %	3 %	0 %	0 %

The total number of measurements taken should be reported.

c) Figures corresponding to the percentage implementation for each single measure/ action identified in the action plan or programme¹⁰, using a two-column table:

Measure/action	Level of implementation (%)
1. ...	
2. ...	

8. Data collection method and sources

a) The share of population exposed to long-term high level of environmental noise is to be determined through the assessment of noise levels and the analysis of this information in conjunction with population maps. Noise levels are to be assessed using the noise indicators L_{den} and L_{night} , either by computation or measurement, or both.

The day-evening-night noise indicator L_{den} is the noise indicator for overall annoyance. This shows an estimate of the number of people (in hundreds) living in dwellings exposed to each of the following bands of values of L_{den} in dB 4 m above the ground on the most exposed façade: 55–59, 60–64, 65–69, 70–74, >75 , separately for road, rail and air traffic noise and for noise caused by industrial sources. The day is 12 hours, the evening four and the night eight.

The night-time noise indicator L_{night} is the noise indicator for sleep disturbance. This shows the estimated total number of people (in hundreds) living in dwellings exposed to each of the following bands of values of L_{night} in dB 4 m above the ground on the most exposed façade: 50–54, 55–59, 60–64, 65–69, >70 , separately for noise coming from road, rail and air traffic and from industrial sources. The night-time noise indicator is determined over all the night periods of a year.

Until common assessment methods for the determination of L_{den} and L_{night} are available, existing national noise indicators and related data could be used for this purpose and should be converted into the indicators mentioned above. The general assessment framework laid down in the latest version of the draft European Directive on the assessment and management of environmental noise can also be used as a guideline.

b) The noise levels in selected areas of the municipality are to be determined through measurements taken at representative locations across the municipal area, allowing for data to be collected that correspond to the indicators L_{den} and L_{night} .

(10) In accordance with the draft European Directive, the action plan must include, among other things, the following elements:

- any noise-reduction measures already in force and any projects in preparation;
- actions planned in the next five years, including measures aimed at preserving quiet areas;
- provisions envisaged for evaluating the implementation and the results of the action plan.

The number of measurements can be determined by the local authority, but must be reported.

- c) Information on the existence and level of implementation of a noise action plan is available from the local authority itself.

9. Examples of similar applications

The calculation of the share of the population exposed to high levels of environmental noise is not yet standardised, though several methods have been presented, including in a number of ISO standards and in various Member States' legislation. The project TERM (transport and environment reporting mechanism, promoted by the European Environment Agency) uses two similar noise indicators to evaluate traffic noise: percentage of

population exposed to four transport noise exposure levels (L_{DN}): 45–55, 55–65, 65–75, >75 dB; and percentage of population highly annoyed by traffic noise of the various modes.

10. Questions to address / future development

Are there any simple methods to calculate the indicator for communities with limited financial resources? In the future, would it be useful to introduce another sub-indicator focusing on the perception of citizens of the level of noise they are exposed to, in order to see whether or not there is a discrepancy between actual measured noise levels and the perception of noise pollution?

11. Keywords

Environmental noise, noise pollution, noise exposure.

Annex 3c: Methodology sheet: Indicator B.9

Title	Sustainable land use
Measurement	a) Artificial areas: artificial surfaces as a percentage of the total municipal area. b) Derelict and contaminated land: extent of derelict land (area, m ²) and contaminated land (area, m ²). c) Intensity of use: number of inhabitants per km ² of 'urbanised land' area. d) New development: quota of new building taking place on virgin area (greenfield) and quota taking place on derelict and contaminated land (brownfield in total area as soil projection) in percentages per year. e) Restoration of urban land <ul style="list-style-type: none"> • Renovation, conversion of derelict buildings (floor surface in m²). • Redevelopment of derelict land for new urban uses – including public green spaces (area, m²). • Cleansing of contaminated land (area, m²). f) Protected areas as a percentage of total municipal area.

1. Definition

This indicator is concerned with sustainable development, restoration and protection of land and sites in the municipality. Urban expansion tends to increase the urbanised area at the expense of virgin land and green areas. Moreover, in many European cities, the socio-economic transformation of the last century led to the abandonment of developed and contaminated land. Sustainable land use means efficient land use within the city through targeted urban development, minimising the take up of agricultural and natural land (greenfield sites), and enhancing developed land through restoration and upgrading.

Other definitions essential for the correct use of the indicator:

Municipal area: area under the administration of the municipality (including rural areas; metropolitan areas should include the whole territory under administration);

Developed/urbanised land: land occupied by buildings, in a continuous or discontinuous manner, corresponding to the Corine land cover 'artificial surfaces' category of land use;

Virgin land (greenfield): land 'uncovered' by artificial surfaces, corresponding to any of Corine land cover classes, except for 'artificial surface';

Derelict building: building no longer in use; both their renovation and conversion have to be accounted as the sum of floor surface expressed in m² for each floor concerned;

Derelict land (brownfield): part of developed/urbanised land (artificial surfaces) no longer in use (for housing, industry or services);

Contaminated land (brownfield): land affected by levels of pollution of the soil or subsoil that are high enough to require remediation before safe reuse is possible;
Protected areas: areas where vegetation and landscape are under specific protection and land cover cannot undergo major changes.

2. Question

Is the municipality committed to a sustainable land use policy, though targeting development, increasing land use efficiency, protecting underdeveloped land and ecologically sensitive sites, and restoring and redeveloping derelict and contaminated land?

3. Context (reasons for indicator/s choice, relevance)

A sustainable city is one that enhances the efficiency of land use within its territory, protects highly valued unbuilt land, biodiversity value and green areas from development, and restores contaminated and derelict land (brownfield sites). Most cities and urban regional authorities implement policies aimed at increasing urban densities through targeted development. There is also a wide range of policies at all levels for protecting sites with agricultural, landscape and ecological value and able to sustain biodiversity, as well as European policies for the restoration of derelict and contaminated land.

In order to monitor the sustainable use of the land, it is advisable to adapt data produced for all EU countries by the Corine land cover (see Box 1). The first indicator will be the 'artificial areas' one: it will give information on the size of the developed area as 'artificial

surfaces' and the percentage of the whole municipality area it corresponds to. The advantage of this indicator is its capacity to record both the effective protection of ecologically sensitive sites (Habitats Directive) and the restoration and reuse of derelict land. All policies aiming to limit the expansion of the city into agricultural or natural areas will allow a smaller exploitation of the areas not classified as 'artificial surfaces'.

To measure efficiency of land use an indicator of the intensity of use is envisaged. The indicator will be defined as number of inhabitants per hectare of urbanised area.

The first indicator only measures large-scale changes: an increase or reduction of just a few hectares of the artificially modelled areas makes little difference to the percentage. Neither can the density or quality of the developed area be deduced from the size of the developed area alone. Moreover, it does not record initiatives for the restoration of derelict or contaminated land intended to allow for its reuse — that is, when derelict sites are reused for new housing or productive activities, but the size of the 'artificial' area does not change. In order to monitor these phenomena, it is advisable to introduce other indicators: one is the proportion of new building taking place on virgin area (greenfield) and the fraction on derelict or contaminated land (brownfield).

To have a better understanding of the restoration and renovation activity some specific information should be supplied concerning:

- renovation: conversion of derelict buildings (floor surface in m²);
- redevelopment for new urban uses, including public green spaces (area, m²);
- cleansing of contaminated land (m²).

Finally, it is advisable to monitor the capacity of the municipality to safeguard the areas of greatest ecological value through the creation of protected sites – in other words, through the introduction of legal instruments or constraints that guarantee land protection. In this case the appropriate indicator is the area of protected sites as a percentage of the total municipal area. The first indicator records the large-scale phenomena (spatial and temporal) and shows whether the urban development is of the dispersed or compact type – in the latter case, with a tendency to limit the use of land. The second measures the capacity of the city to begin processes of regeneration and avoid the waste of land. The third measures the ability of the city to protect biodiversity and the areas having greatest natural and landscape value

Sustainability principles covered: 1, 3, 5, 6.

Box 1: Monitoring land use in Europe

Land use is monitored in Europe by means of Corine land cover, itself a sub-programme of the Corine programme. It includes thematic maps representing the area and dividing it into categories according to the way the land is used. The database is constituted of 44 categories of land use. Data are acquired through the interpretation of satellite photographs and processed by computers with the addition of supplementary data (including maps, aerial photographs, statistics, local knowledge). The 44 categories are divided into groups, each having three levels. The main levels comprise:

1. artificial surfaces
2. agricultural areas
3. forests and semi-natural areas
4. wetlands
5. water bodies.

For each of the main levels there are two lower levels: for example, in category 3 (forests and semi-natural areas), wooded areas (3.1) are distinguished from scrub and heath (3.2); in the wooded areas, broadleaf woods (3.1.1) are differentiated from conifer forest (3.1.2).

The Corine land cover database provides identification and mapping of the 44 categories for minimum mappable areas of 25 ha, using a map scale of 1:100 000.

The existing database was created on the basis of satellite data collected at the beginning of the 1990s. Currently, the whole database is being updated for reference year 2000, using a similar methodology as in the past. A lowering of the digitalisation lower limit from 25 ha to 5 ha is proposed for some classes. In addition, a change of 5 ha of an existing class will be accounted for in the updated version. Furthermore, the updating process should be such that trend analysis with the previous version is feasible. Thus, it is carried out in terms of digitalisation (editing) of change only, rather than of an entirely new digitalisation.

4. Targets (references and criteria for the assessment: standards / targets / commitments)

The increased efficiency and quality of urban environments should be firmly placed within the European spatial development perspective (ESDP), attempting to connect physical aspects of sustainability with other key political agendas, such as social cohesion and economic competition within Europe. Urban regional authorities have played a vital role in developing the ESDP, which now provides a framework for much interregional planning activity within the EU, and between EU and neighbouring countries.

There are, moreover, international agreements for the protection of certain biodiversity sites (e.g. the Ramsar Convention), in addition to European legislation having the same objectives (e.g. Habitats Directive 92/43/EEC). In some countries local nature reserves are to be found, too. Contaminated land is also subject to improvement targets. There are targets devised to direct new development to brownfield sites (e.g. 60 % of new housing in the United Kingdom), while protecting green sites in most countries.

5. Unit of measurement

- a) Artificial surface of the total municipal area: percentage.
- b) Extent of derelict land (m²) and contaminated land (m²).
- c) Number of inhabitants per hectare of urbanised land area.

Newly built areas on virgin land and on derelict or contaminated land: percentage (the total must be 100 %; only derelict land area — soil projection — must be considered, so that the restoration of three floors of a derelict building is equivalent to only one floor).

- e) Renovation of urban land:
 - renovation, conversion of derelict buildings (floor surface in m²);
 - redevelopment of derelict land for new urban uses — including public green spaces (m²);
 - cleansing of contaminated land (m² and public expenditure).
- f) Protected areas of total municipal area: percentage.

6. Frequency

- a) The same as the updating frequency of Corine land use database.

- b) The same as the updating frequency of Corine land use database.
- c) Annual.
- d) Annual.
- e) Annual.

7. Data collection method and sources; methods of calculation

The data on 'urbanised land' are obtained from Corine EU sources (see Box 1); many municipalities, however, already use these data for spatial planning.

The data on areas built entirely anew and the fraction concerning virgin land and derelict or contaminated land, and the protected areas, may be obtained from the plans and programmes of local authorities.

The calculation of the indicators is easy once the respective sizes of the different categories of land use and of the areas affected by restoration and decontamination schemes are known.

The geographical level to be considered is the whole area for which the local authority is responsible.

8. Form of reporting / presentation

- a) Bar graph for each period for which data are available.
- b) Bar graph for each period for which data are available.
- c) Pie graphs for each year.
- d) Bar graphs for each year.
- e) Bar graphs for each year.

9. Examples of similar applications

New housing development on brownfield sites as percentage of new housing is published each year in the *Bristol quality of life report*, as is the total number of local nature reserves.

Norwich City Council publishes the amount of land developed from year to year, the proportion of this land that is on brownfield sites and the increase or reduction in greenfield sites compared to the previous year.

10. Questions to address / future developments

As regards efficiency of land use, it is possible to consider a larger number of indicators intended to verify various aspects in greater detail. The city of Oslo, the JRC and the EEA have suggested a number of indicators allowing a more complete examination of the questions at issue; today these appear to be

problematic because of difficulties in data collection; however, they could be taken into consideration for the future. The city of Oslo's proposal is outlined below.

- Efficiency of land use: intensity of use by use types:
 - employment (employees per hectare industrial/business development);
 - transport (estimated passenger kilometres per hectare transport infrastructure).

- Availability of habitat:
 - unbuilt area for habitat type or land cover.

11. Keywords

Development, restoration, regeneration, protection, derelict, contaminated, greenfield, brownfield, biodiversity, land use.