

<b>Indicator</b>	
6	Land take by intensive agriculture.
<b>Measurement</b>	
6.1	Proportion of agricultural land farmed intensively.
<b>What should the measurement tell us?</b>	
<p>Intensive agriculture is an agricultural production system characterised by the significant use of inputs and seeking to maximise production. It relies on the use of chemical fertilisers, herbicides, fungicides, insecticides, plant growth regulators, pesticides. It is associated with the increasing use of modern practices and agricultural mechanisation.</p> <p>In recent years it has been realised that intensive agricultural practices have negative effects on the environment and on food chains in a number of ways. They provoke a depletion of the fertility of the land over time (some of the most fertile farmlands in the world have been turned into deserts by intensive agriculture), they contribute to diffuse loads of pathogenic organisms (from animal manures), pesticides and nitrogen export in coastal waterways and to the erosion of soils transported as suspended sediment. These factors and the physical removal of critical habitat areas, can contribute to an overall reduction in biodiversity.</p> <p>The indicator shows the proportion of agricultural land that is being managed under intensive systems. It is an aggregation of all pressures on biodiversity resulting from intensive agricultural practices, such as: use of available genetic resources, use of pesticides, use of fertilisers, loss of traditional land use practices, grazing intensity, loss of corridor landscape elements etc.</p>	
<b>Parameters</b>	
(i)	% of agricultural land farmed intensively in all coastal NUTS5.
(ii)	% of agricultural land farmed intensively in all non-coastal NUTS5.
<b>Coverage</b>	
<b>Spatial</b>	<b>Temporal</b>
Coastal NUTS 5	Annually since at least 1990 or Corine land Cover datasets if unique source available.

<b>Data sources</b>		
<p>* LEAC database (based on CLC CHANGE DB). * Land-use: FAOSTAT.</p> <p>Farm structure statistics give information for each member state and for the European Community as a whole (with 9, 10 or 12 member states depending on their dates of accession) on agriculture in general and on certain characteristics according to size classes expressed in terms of area, number of animals, economic size, volume of work, etc. and according to type of farm. Data from Eurostat are based on Farm Structure Survey (FSS) reported by member states to Eurostat. The collection of agricultural statistics is compulsory under Community legal acts directly applicable in the member states. Therefore, each member state is obliged to organise, at intervals laid down by regulation (2-3 year intervals), exhaustive or sample surveys, to draw up tables of results according to a set programme of tables and to transmit them to Eurostat.</p> <p>It is important to stress that area estimation generally cannot be a sub-product of mapping. In particular, estimating land cover area or land cover change area from thematic maps, such as CORINE Land Cover (CLC), simply by pixel counting or polygon measurement, generally leads to strongly biased results for two main reasons:</p> <p>(i) Area statistics have an implicit scale that is very different from the scale of CLC. (ii) Different types of photo-interpretation error are not random and generally do not compensate.</p> <p>Similar problems (even more acute) will appear if land cover change is estimated directly from CLC2000.</p> <p>However CLC provides valuable information for the estimation of areas. Finding efficient ways to combine CLC with other sources of data for the computation of area estimates is one of the targets. The main source of data for this purpose is the EU survey, LUCAS (Land Use/Cover Area frame Survey). A first step in this direction has been the computation of fine scale profiles of CLC classes.</p>		
<b>Methodology</b>		
<b>Steps</b>	<b>Products</b>	
1	From your data source (CLC or national map of land uses) classify the land use categories that correspond to intensive agriculture <sup>(1)</sup> .	List of land use categories classified as agricultural land farmed intensively.
2	For the wider reference region and for each year available, overlay NUTS 5 boundaries with CLC data and/or your national land use data. Clip polygons labelled as categories identified in step 1 for each <i>coastal</i> NUTS 5. Add up (using GIS statistics function) the area of the polygons.	Area of agricultural land farmed intensively in hectares within <i>each</i> coastal NUTS 5 for each year available.

3	Clip polygons labelled as agricultural land for each <i>coastal</i> NUTS 5. Add up (using GIS statistics function) the area of the polygons.	Total area of agricultural land in hectares within <i>each</i> coastal NUTS 5 for each year available.																																																
<i>All of the following steps should be taken for each year available</i>																																																		
4	Add together the area of agricultural land farmed intensively for every coastal NUTS 5.	Total area of agricultural land farmed intensively in hectares within <i>all</i> coastal NUTS 5 (map 1).																																																
5	Add together the total area of agricultural land for every coastal NUTS 5.	Total area of agricultural land in hectares within <i>all</i> coastal NUTS 5 (map 1).																																																
6	Divide product of step 4 by product of step 5 and multiply by 100.	<u>% of agricultural land farmed intensively in all coastal NUTS5</u> (graph 1).																																																
7	Repeat step 4 for non coastal NUTS 5.	Total area of agricultural land farmed intensively in hectares within <i>all</i> non-coastal NUTS 5 (map 1).																																																
8	Repeat step 5 for non-coastal NUTS 5.	Total area of agricultural land in hectares within <i>all</i> non-coastal NUTS 5 (map 1).																																																
9	Divide product of step 7 by product of step 8 and multiply by 100.	<u>% of agricultural land farmed intensively in all non-coastal NUTS5</u> (graph 1).																																																
<b>Presentation of the data</b>																																																		
Map 1	Map of the reference region showing the area of agricultural land and the proportion of agricultural land that is being managed under intensive systems in each coastal and non-coastal NUTS 5.																																																	
Graph 1	Column showing the percentage of agricultural land that is being managed under intensive systems in coastal and non-coastal NUTS 5.	<table border="1"> <caption>Proportion of agricultural land farmed intensively (Estimated Data)</caption> <thead> <tr> <th>Year</th> <th>coastal NUTS5 (%)</th> <th>non-coastal NUTS5 (%)</th> </tr> </thead> <tbody> <tr><td>1990</td><td>0</td><td>0</td></tr> <tr><td>1991</td><td>0</td><td>0</td></tr> <tr><td>1992</td><td>0</td><td>0</td></tr> <tr><td>1993</td><td>1</td><td>0</td></tr> <tr><td>1994</td><td>2</td><td>0</td></tr> <tr><td>1995</td><td>3</td><td>0</td></tr> <tr><td>1996</td><td>4</td><td>0</td></tr> <tr><td>1997</td><td>5</td><td>1</td></tr> <tr><td>1998</td><td>6</td><td>2</td></tr> <tr><td>1999</td><td>8</td><td>3</td></tr> <tr><td>2000</td><td>10</td><td>4</td></tr> <tr><td>2001</td><td>15</td><td>6</td></tr> <tr><td>2002</td><td>20</td><td>8</td></tr> <tr><td>2003</td><td>25</td><td>12</td></tr> <tr><td>2004</td><td>50</td><td>25</td></tr> </tbody> </table>	Year	coastal NUTS5 (%)	non-coastal NUTS5 (%)	1990	0	0	1991	0	0	1992	0	0	1993	1	0	1994	2	0	1995	3	0	1996	4	0	1997	5	1	1998	6	2	1999	8	3	2000	10	4	2001	15	6	2002	20	8	2003	25	12	2004	50	25
Year	coastal NUTS5 (%)	non-coastal NUTS5 (%)																																																
1990	0	0																																																
1991	0	0																																																
1992	0	0																																																
1993	1	0																																																
1994	2	0																																																
1995	3	0																																																
1996	4	0																																																
1997	5	1																																																
1998	6	2																																																
1999	8	3																																																
2000	10	4																																																
2001	15	6																																																
2002	20	8																																																
2003	25	12																																																
2004	50	25																																																
<b>Adding value to the data</b>																																																		
A more comprehensive indicator could include intensive as well as arable livestock agriculture. The indicator could be weighted according to regional sensitivity of habitats and landscape types.																																																		

### Aggregation and disaggregation

Aggregation is possible from the smallest census unit to national and European levels.

Calculation can also be tested at 1 and 10km coastal buffers.

The indicator could be disaggregated to the component impacts.

### Notes

Limitations of the indicator:

(1) Need for harmonisation of the definition of "intensive". In practice many relatively small-scale farmers employ some combination of intensive and extensive agriculture. When data are less precise and few categories of agricultural land uses are defined, one may consider irrigated crops as intensive agriculture (in Mediterranean regions). When more specific categories of agricultural land use are defined, one may discern which may be considered intensive agriculture and which may not. For example, agricultural areas are defined by CLC land cover as follows:

12 Arable land	Non-irrigated arable land
13 Arable land	Permanently irrigated land
14 Arable land	Rice fields
15 Permanent crops	Vineyards
16 Permanent crops	Fruit trees and berry plantations
17 Permanent crops	Olive groves
18 Pastures	Pastures
19 Heterogeneous agricultural areas	Annual crops associated with permanent crops
20 Heterogeneous agricultural areas	Complex cultivation patterns
21 Heterogeneous agricultural areas	Land principally occupied by agriculture, with significant areas of natural vegetation
22 Heterogeneous agricultural areas	Agro-forestry areas

From these, only categories 13 and 16 would be considered as intensive agriculture.