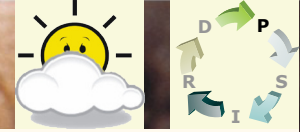


SOIL





Definition

Changes in and current status of agriculture, forest and other semi-natural land taken by urban and other artificial land development. It includes areas sealed by construction and urban infrastructure as well as urban green areas and sport and leisure facilities. The main drivers of land take are grouped in processes resulting in the extension of:

- housing, services and recreation,,
- industrial and commercial sites,
- transport networks & infrastructures,
- mines, quarries and waste dumpsites.

Units

Units of measurement for changes and current status recording and mapping are hectares. For data presentation, the unit in km² can be used as well.

Results are presented as:

- current status of land cover based on the nomenclature adopted at European level, at five-year intervals;
- changes in land cover, at five-year intervals, presented in % of the total area of the country and % of the various land

cover types..

Note: Particular attention is paid to areas changing as a result of urban systems extension leading to negative impact on the environment.

Policy relevance of the indicator

Legal grounds

Under the Law on Environment, every citizen is entitled to have an access to environmental state information. This indicator provides not only data on the state of the environment (land cover), but it also facilitates uniform access there to, both at national and European levels.

Based on the Law on Land Survey and Registration, by means of regular land survey information is provided on the types of land cover. Although these parameters do not correspond with the CORINE land cover nomenclature, there is a possibility for unique integration of land cover elements.

Law on Urban and Spatial Planning.

Targets

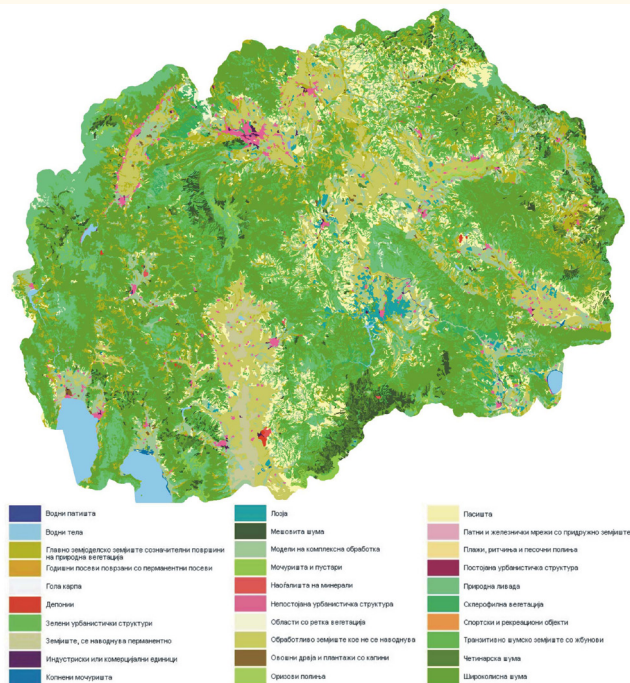
Tracking the changes in land cover and mapping

of current status. Changes are monitored over five-year intervals. Methodology and nomenclature have been additionally harmonized at European level, thus enabling integrated monitoring of changes at regional and European levels.

Key message

Based on the CORINELandCOVERmethodology, the largest portion of the land in the Republic of Macedonia is under forest and semi-natural areas, covering 1.548.855 ha or 59,8% of the total area. The category of agricultural land area covers 939.013 ha or 36.9% of the total area, the category of water bodies covers 56.444 ha or 2.2% of the total area, the category of artificial areas covers 41.480ha or 1.6% of the total area, and the smallest area of 2.000 ha or 0.1% of the total area is wetlands.

Map 1. CORINE Land COVER 2000 (data of 1996)



Map 2.CORINE Land Cover over all changes 2000-2006

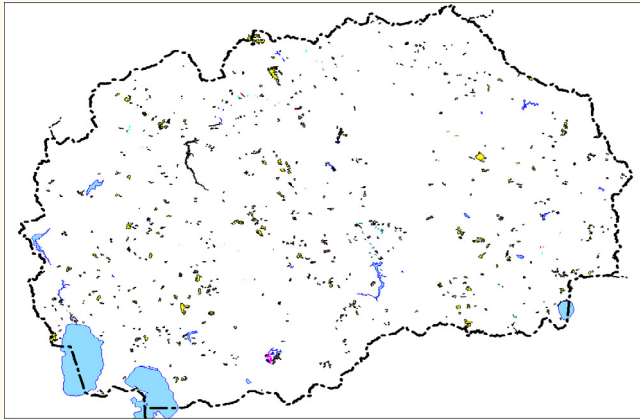
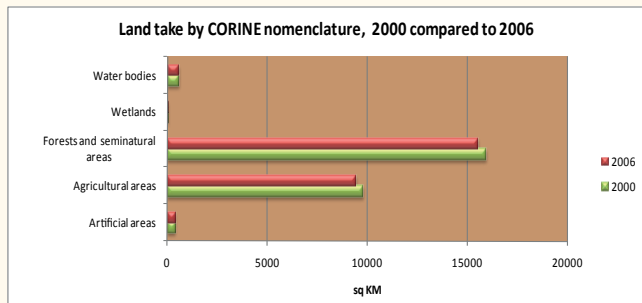


Figure 1.Changes in areas according to CORINE Land Cover nomenclature, 2000 relative to 2006



Assessment

Owing to characteristics of land cover of the territory of the Republic of Macedonia, out of 44 possible classifications under the CORINE Land Cover Nomenclature, 31 classifications have been identified up to the third level of the Nomenclature.

CORINE Land COVER changes between 2000 and 2006 cover territory of around 35.565 ha which is around 1.4% of the total territory of the country.

Concerns rising fact is that the biggest change occurs in area of class 311 (broad-leaved forest) into class 324 (transitional woodland with shrubs) covering total area of 18.171 ha, or 44.57% of the total changes. This change is most probably due to wood cut and forest fires.

Opposite process of changes from class 324 (transitional woodland with shrubs) into class 311 (broad-leaved forest) concerns total area of 4.275 ha, or 14.13% of the total changes is due to new forest growth.

Methodology

- Methodology for the indicator calculation

The assessment of CORINE Land Cover in 2000 and 2006 was based on data from satellite images.

Owing to characteristics of the land cover of the Republic of Macedonia, out of the possible 44 classifications, 31 were identified. In addition to this and for the same reason, the minimum spatial unit treated within the project was reduced at 20 hectares instead of 25 hectares.

The substance of the process is photo-interpretation of satellite images consisting of:

- Delineation of boundaries of areas representing unique land area units at images with «false» colours;
- Application of interpretation keys, supporting documentation and satellite/aeroplane images for marking with identification number - class in nomenclature;
- Extrapolation of this marking and identification of all segments of the image exhibiting similar characteristics: colour, structure and composition.

Technical Guideline for CORINE Land Cover development was prepared by the European Environmental Agency.

Data specification

| Title of the indicator | Source | Reporting obligation |
|------------------------|---------------------|----------------------|
| Land take | – CORINE Land Cover | – EEA |

Data coverage:

Table 1: Percentage of individual areas by CORINE Nomenclature

| | Area in km ² | | % of total area | |
|--------------------------------|-------------------------|--------|-----------------|-------|
| | 2000 | 2006 | 2000 | 2006 |
| Artificial areas | 389 | 414 | 1,51 | 1,61 |
| Agricultural areas | 9.739 | 9.390 | 37,88 | 36,52 |
| Forests and semi-natural areas | 15.879 | 15.488 | 61,75 | 60,23 |
| Wetlands | 20 | 20 | 0,08 | 0,08 |
| Water bodies | 591 | 564 | 2,30 | 2,19 |

Table 2. CORINE level 1 overall changes 2000 – 2006 (in hectares)

| class | reduction | increase | overall changes |
|--------------------------------|-----------|----------|-----------------|
| Artificial areas | 385 | 2.624 | 2.239 |
| Agricultural areas | 7.423 | 4.516 | -2.907 |
| Forests and semi-natural areas | 27.564 | 26.720 | -844 |
| Wetlands | 60 | 84 | 24 |
| Water bodies | 81 | 1.569 | 1.488 |

General metadata

| Code | Title of the indicator | Compliance with CSI/ EEA or other indicators | | Classification by DPSIR | Type | Linkage with area | Frequency of publication |
|-----------|------------------------|--|-----------|-------------------------|------|---|--------------------------|
| MK NI 014 | Land take | CSI 014 | Land take | P | A | <ul style="list-style-type: none"> – management – nature – other – population – soil – tourism – transport – urbanization | 10 - annually |



Definition

The term «contaminated site» refers to a well-delimited area where the presence of soil contamination has been confirmed and the severity of possible impacts to ecosystems and human health are such that remediation is needed, specifically in relation to the current or planned use of the site. The remediation or clean-up of contaminated sites can result in a full elimination or in a reduction of these impacts.

The term «potentially contaminated site» includes any site where soil contamination is suspected but not verified and further investigations need to be carried out.

The progress in the management of contaminated sites has been designed to show reduction and elimination of negative effects to ecosystems and human health where environment degradation has been confirmed.

The management of contaminated sites starts with investigation that can further lead to rehabilitation or treatment of contaminated site, measures for its conservation and maintenance and revitalization of contaminated sites:

The indicator shows progress in five main steps:

- 1) site identification/ preliminary study;
- 2) preliminary investigation;
- 3) main site investigation;
- 4) implementation of remediation measures;
- 5) measure completed.

Units

- Number of sites managed up to a certain step out of the five main steps of the indicator.
- Share of economic activities in soil contamination as percentage of sites where the activity is present compared to the total number of sites

Policy relevance of the indicator

List of relevant policy documents

The Second National Environmental Action Plan of the Republic of Macedonia.

Legal grounds

Our country lacks legally prescribed limit values for concentrations of certain contaminating substances in soil and standards for their detection in soil. Generally, the existing legislation is intended to prevent new contaminations.

Soil protection is regulated by several laws, including those concerning environment, nature protection, agricultural land, etc., but there is no soil specific law, with clearly defined institutional responsibilities.

Targets

Remediation of tailings, stabilization and re-cultivation of industrial landfills.

Key policy issue

What progress has been made in contaminated sites management and what is the share of economic activities contributing to soil contamination?

Key message

The management of contaminated sites in the period from 2005 to 2011 showed progress with regard to the main site investigation, as well as implementation of

remediation measures. With regard to completion of remediation measures, no progress has been recorded, i.e. completion of remediation measures has not been recorded in none of the identified hot-spots.

With regard to economic activities contributing to soil contamination expressed in percentage, the highest share belongs to mining and metallurgy with 31.25%, and oil refining and leather manufacturing industry with 6.25%.

Figure 1. Progress in contaminated sites management

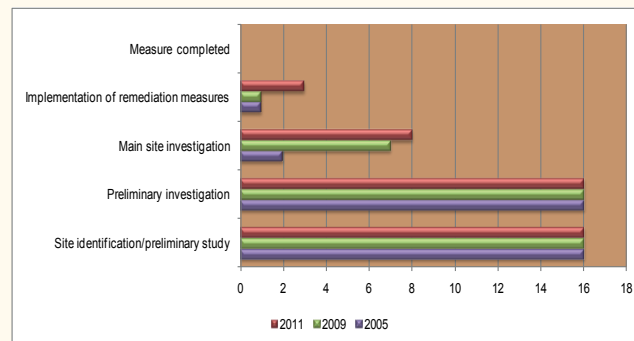
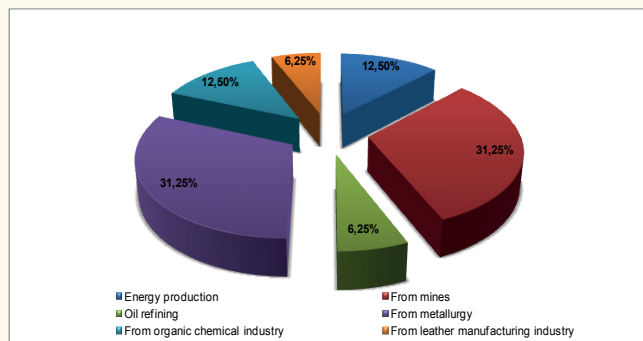


Figure 2. Share of economic activities in soil contamination



Assessment

In the Republic of Macedonia, identification and preliminary investigations have been carried out with 16 sites, where soil contamination has been detected and those sites have been marked as hot-spots. Main investigations have been carried out with eight sites. Remediation measures have been implemented with three sites, while completion of measures has not been recorded with none of the sites.

With regard to economic activities contributing to soil contamination expressed in percentage, the highest

share belongs to mining and metallurgy with 31.25%, followed by organic chemical industry with 12.5% and oil refining and leather manufacturing industry with 6.25%.

Data specification

| Title of the indicator | Source | Reporting obligation |
|--|---|---------------------------|
| Progress in the management of contaminated sites | Ministry of Environment and Physical Planning | Soil contamination (TE-2) |

Data coverage:

Table 1: Progress in contaminated sites management

| Five main steps in the progress in contaminated sites management | 2005 | 2009 | 2011 |
|--|------|------|------|
| Site identification/preliminary study | 16 | 16 | 16 |
| Preliminary investigation | 16 | 16 | 16 |
| Main site investigation | 2 | 7 | 8 |
| Implementation of remediation measures | 1 | 1 | 3 |
| Measure completed | 0 | 0 | 0 |

Table 2: Estimated share of economic activities in soil contamination

| Economic activity | Number of sites | Share |
|-------------------------------------|-----------------|-------|
| Energy production | 2 | 12,5 |
| From mines | 5 | 31,3% |
| Oil refining | 1 | 6,3% |
| From metallurgy | 5 | 31,3% |
| From organic chemical industry | 2 | 12,5% |
| From leather manufacturing industry | 1 | 6,3% |
| Total | 16 | 100% |

Methodology

■ Methodology for the indicator calculation

Data for the indicator calculation was taken from the National Waste Management Plan of the Republic of Macedonia or Special Study E, and from CARDS 2006 Project concerning development of remediation plans with financial requirements for elimination of industrial hot-spots, as well as Feasibility assessment and development of main technical design for water protection measures in the mine Buchim – UNDP Macedonia.

The estimated shares of economic activities contributing to soil contamination are calculated as e.g. $\frac{\text{[number of mines contributing to soil contamination]}}{\text{[total number of sites or sites where soil contamination has been confirmed]}} \times 100$.

■ Source of applied methodology

According to European Environmental Agency.

Uncertainty

■ Methodological uncertainty

Although there is a definition of contaminated site, because of the lack of limit values for the concentration of certain toxic chemicals in the soil, it is difficult to determine the exact number of sites where soil contamination has been confirmed.

The assessment of contaminated site depends to a great extent on the individual expert assessment.

■ Uncertainty of data set

All sites where certain industrial/economic activity is performed have not been accounted as sites with determined contamination, although such activities

generate chemical substances.

General metadata

| Code | Title of the indicator | Compliance with CSI/EEA or other indicators | | Classification by DPSIR | Type | Linkage with area | Frequency of publication |
|-----------|--|---|--|-------------------------|------|--|--------------------------|
| МК НН 015 | Progress in the management of contaminated sites | CSI 015 | Progress in management of contaminated sites | R | A | <ul style="list-style-type: none">- chemicals- industry- management- nature- почва- soil- transport- urbanization- waste- water | annually |



Definition

The indicator provides information on the number of forest fires on the territory of the Republic of Macedonia. It also provides information on the magnitude of forest fires presenting the area subjected to fire and the type of wood mass seized by fire, as well as the total damage caused by fire.

Units

The area seized by fire is expressed in ha (hectares), while wood mass seized by fire is expressed in m³. The total damage from forest fires is expressed in denars, as well as number of forest fires.

Policy relevance of the indicator

List of relevant policy documents:

The Second National Environmental Action Plan (NEAP 2) defines measures for improved protection against forest fires, instructions on the need for capacity strengthening for sustainable forest management, as well as development of strategy for forest protection against fires.

Strategy for Sustainable Development of Forestry in

the Republic of Macedonia.

Legal grounds

- Law on Forests, which regulates forests and forest resources management and protection. Protection of forests is integrated and indivisible part of the overall forest management. In the context of forests protection against fires and regulation of measures in this area, we should also mention the 2001 Rulebook on specific measures for forest protection against fires.
- Law on Natural Rarities Protection
- Law on National Parks Protection
- Law on Fire Prevention

Targets

Compliance with the legislation concerning forests and forest resources protection. Reduction of forest fires number, reduction of wood mass and forest area affected by forest fires. Reduction of costs and damages resulting from forest fires. Increase of the public awareness in relation to fire prevention and undertaking all possible measures to reduce human

factor as forest fires cause.

Key policy issue

What is the status of forest fires in the Republic of Macedonia? What is the number of forest fires, what is the area and wood mass affected by fire?

Key message

In the Republic of Macedonia, in the period between 2002 and 2011, rapid increase in the number of fires, area and mass affected by fire was tracked in 2007, reaching the maximum of 652 fires. Then, there was a trend of gradual fall by 2009, and then started to rise in 2010 and 2011 again.

The number of fires in 2011 compared to the number of fires in 2009 noted rise by 395%. In other years, the number of fires was between 182 and 61 fires per year.

Figure 1. Number of forest fires

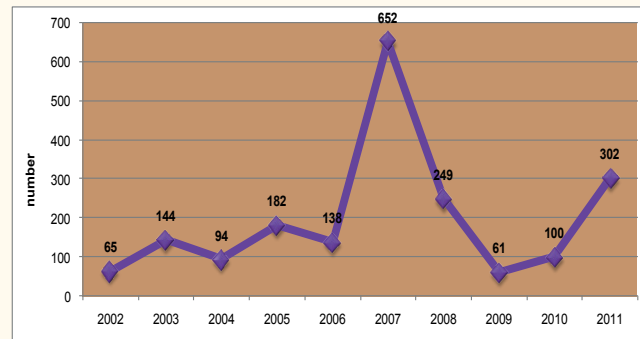


Figure 2. Area under fire

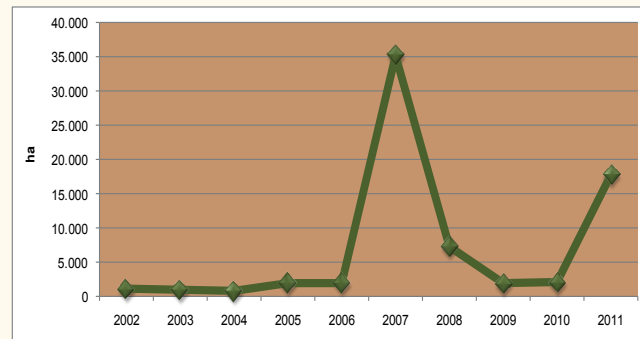


Figure 3. Wood mass subjected to fire

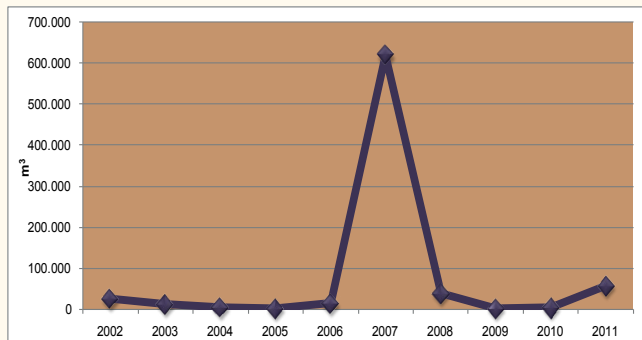
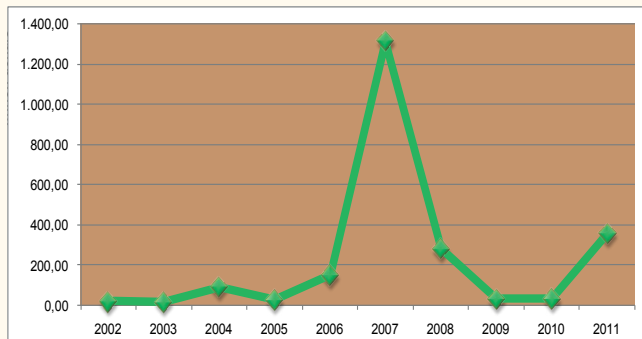


Figure 4. Total damage from fires expressed in denars



Assessment

Forest fires are among the most severe problems in forestry, as well as environment as a whole in the Republic of Macedonia. Great quantity of wood mass is destroyed by forest fires and this is an economic problem. Forest fires cause pollution of air, soil and water. Burnt woods are source of pathogens and pests. There is also increase in erosive processes in burnt areas, disturbed balance of water regime, loss of vegetation and desertification. Almost 95% of forest fires are caused by man. At an average, forest fires destroy around 7.192 ha forest per year. In the period from 2002 to 2011, the average number of forests per year was 199, In 2007, due to extreme draughts and human factor, the number of forest fires reached 652 fires at an area of around 35.000 ha.

In proportion with the parameters discussed above, the overall damage from fires by year expressed in denars was highest in 2007 reaching the value of 1.311.167.721,95 denars and in 2011 with a value of 355.053.833,58 denars. The total average damage from fires in the period from 2002 to 2011 amounted 230.626.886,65 denars per year.

Data specification

| Title of the indicator | Source | Reporting obligation |
|------------------------|---|----------------------|
| Forest fires | – Public Enterprise for Forests Management - "Macedonian Forests" | |

Data coverage:

Table 1: Number of fires, area affected by fires in ha, wood mass affected by fires in m³

| Year | Number of fires | Area affected by fire in ha | Wood mass affected by fire in m ³ |
|------|-----------------|-----------------------------|--|
| 2002 | 65 | 1.186,30 | 24.661,28 |
| 2003 | 144 | 1.068,88 | 10.987,00 |
| 2004 | 94 | 892.05 | 4.322,30 |
| 2005 | 182 | 2.084,10 | 1.063,00 |
| 2006 | 138 | 2.085,95 | 12.978,00 |
| 2007 | 652 | 35.248,06 | 617.678,67 |
| 2008 | 249 | 7.411,70 | 37.362,50 |
| 2009 | 61 | 1.990,60 | 1.551,00 |
| 2010 | 100 | 2.143,35 | 3.443,00 |
| 2011 | 302 | 17.812,84 | 5.5743,30 |

Table 2: Total damage resulting from forest fires by year presented in denars

| Year | Total damage from fires in denars |
|------|-----------------------------------|
| 2002 | 18.531.939,00 |
| 2003 | 15.594.691,00 |
| 2004 | 91.083.591,00 |
| 2005 | 25.287.638,00 |
| 2006 | 148.712.782,00 |
| 2007 | 1.311.167.721,95 |
| 2008 | 280.083.235,00 |
| 2009 | 29.746.034,00 |
| 2010 | 31.007.401,00 |
| 2011 | 355.053.833,58 |

Methodology

■ Methodology for the indicator calculation

Data and the indicator calculation were made by the Public Enterprise for Forests Management of the Republic of Macedonia - «Macedonian Forests».

General metadata

| Code | Title of the indicator | Compliance with CSI/EEA or other indicators | | Classification by DPSIR | Type | Linkage with area | Frequency of publication |
|-----------|------------------------|---|--|-------------------------|------|---|--------------------------|
| MK NI 038 | Forest fires | | | P | | <ul style="list-style-type: none"> - Soil - Forestry - Agriculture - Nature - Urbanization | annually |