

Soil that becomes impenetrable...



Explanation of the diagram
"The magic of soil" sheet

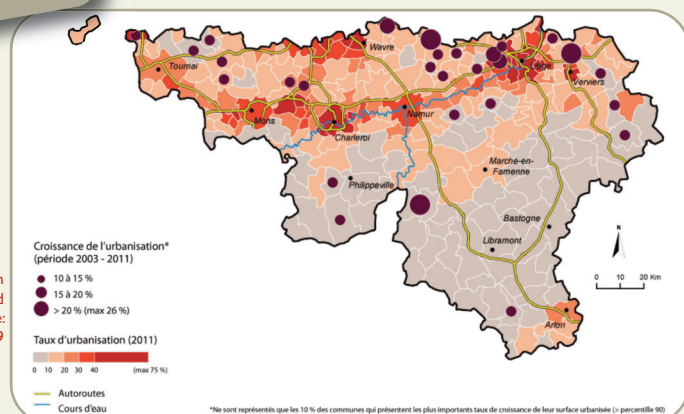
In urban areas, suburbs and even in the countryside, **soil is increasingly being covered with impermeable synthetic materials**, such as asphalt or concrete, which prevent it from absorbing rain water. Water flows faster over these surfaces, creating a risk of flooding.

Growing urban development and continuous rising demand for land and transport infrastructures are of concern as they are increasing impervious surfaces all over Europe, and Wallonia is no exception.

However, we can all contribute to tackling this problem by reducing our use of sealing materials on our land or around our homes.



In Wallonia



Growth of urbanisation in Wallonia (period 2003-2011) source: ICEW 2012, p.119

Some impermeable surfaces



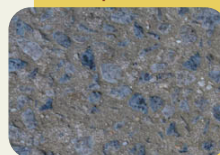
- Concrete or asphalt roads, paths or car parks
- Buildings
- Roofs
- Patios, courtyards or terraces made from impermeable materials

- Compacted soil

Sheet number 8 "Compacting"

Five typical surfaces, from least permeable to most permeable

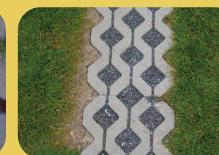
Impermeable asphalt



Paved surface



Grass pavers - concrete



Gravel - turf



Turf

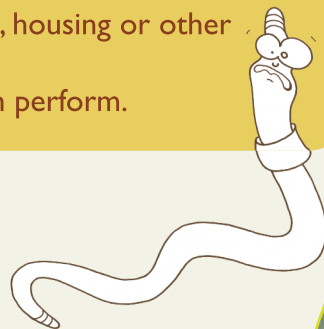


Sealing prevents soil from fulfilling its functions > Page 18
How can we combat soil sealing > Page 20

Sealing makes soil incapable of fulfilling its **functions**

In many cases, land is sealed to create solutions for business, housing or other needs.

However, sealing reduces the range of functions that soil can perform.



1 Soil is home to living organisms

Billions of organisms live in soil and play an essential role in its functioning: insects, worms, fungi and bacteria decompose organic matter, stir up the soil and enrich it with mineral salts.



Sealing soil deprives these organisms of water, oxygen and food.


Sheet numbers 3 and 4
"Organic matter" and "Biodiversity"

2 Soil is essential for wildlife

Soil plays an essential role in the survival of the animals living on its surface (mammals, insects, birds, etc.) as it supports the vegetation that provides them with shelter, food, laying sites, etc.



Sealing soil results in the disappearance of much of this vegetation. Beyond a certain point, the habitat of wild animals can be broken up and migration corridors (for frogs, for example) obstructed by roads or buildings.



3 Soil plays an essential role in plant production

Soil has an agricultural function (produces our food) and a silvicultural function (produces wood).



Sealing soil prevents it from fulfilling these agricultural and silvicultural functions. Over the last 25 years, agricultural land has paid the heaviest toll for increasing urbanisation, losing around 6% of its surface area, mainly as a result of sealing.




More information Sheet numbers 3 and 4
"Organic matter" and "Biodiversity"

4

Soil absorbs, filters and stores rain water

Whenever it rains, some of the rain water is absorbed by plants. Some of it seeps into the soil where it is then available for plants. The remainder percolates very slowly to the groundwater bodies that provide us with our drinking water.

Soil and subsoil also filter this water, removing impurities and some surface pollution.



Sealing soil prevents it from absorbing, filtering and storing rain water.

- Water is no longer absorbed, resulting in a greater risk of flooding.
- Sealing natural water runoff channels can lead to mudslides.
- Water runs over surfaces, collecting pollutants along the way (pesticides sprayed over pavements, private paths, etc) and flows into watercourses, which it then contaminates.
- This affects the water that reaches groundwater bodies and, over time, can result in problems with drinking water supplies.



Sheet numbers 1, 6 and Intro "Erosion",
"Diffuse pollution" and "Magic of soil"



5

Soil helps to regulate the climate

Water circulates constantly between soil, vegetation and the atmosphere.



Sealing soil interrupts the water cycle.

This can have a significant effect on temperature and the local rainfall regime.

Vegetation also helps to lower temperatures. Artificial surfaces, in contrast, tend to drive temperatures up as they absorb more solar energy.



Excessive sealing of soil and the disappearance of green areas often creates a "heat island" effect, especially in cities.

6

Soil creates landscapes

Landscapes have historic and cultural connotations and therefore represent an important element in a population's identity. They have a beneficial effect on quality of life. They are an essential element in personal and social wellbeing, as well as a potential source of revenue (tourism).



Excessive sealing of soil can contribute to the deterioration or disappearance of landscapes.

How can we **COMBAT** soil sealing?



Recreate permeable areas

Public authorities are taking action: projects (replacing concrete surfaces with vegetation, vegetable gardens, etc, in urban areas) are taking place all over Europe and around the world.



Encourage vegetation in the garden

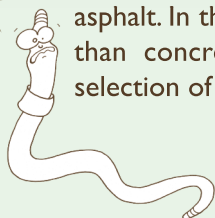
Trees, shrubs and plants absorb water. They are natural allies in combatting water runoff and flooding. They help to regulate the climate and also cool local air, creating cool zones. To avoid adverse effects on biodiversity caused by the introduction of invasive exotic species, choose local plants where possible.



Reduce sealed surfaces

As far as possible, avoid systematically covering paths, terraces, courtyards, approaches to garages or parking areas and entrances with concrete or asphalt. In the case of land on a steep slope, rather than concrete or even turf, opt for a diverse selection of vegetation to capture water.

Okay!



Opt for permeable materials where possible

Various porous materials are available from retail outlets: gravel, ramial chipped wood, wooden boards, honeycomb paving tiles, plastic or concrete grass pavers and porous concrete, for example. If you choose blocks or bricks for a surface, make sure that the joins are permeable.

A winding and stony path that allows water to flow into bends and between slabs will allow better seepage of water.



Make our sealed surfaces work!

Rain water collected from gutters can be used to water plants or your garden during summer droughts. Installing a rain water tank gives you even more options. You can also direct flows from gutters to permeable areas capable of holding large volumes of water (rain gardens).



General publications by the SPW – online information

Les Indicateurs Clés de l'Environnement Wallon 2012 (ICEW 2012), Direction de l'Etat Environnemental, SPW Éditions - DGARNE - DEMNA- DEE, 2013 (available for download in French, English and German)
www.etat.environnement.wallonie.be

Tableau de bord de l'environnement wallon 2010, SPW Éditions - DGARNE – DEMNA - DEE, 2010 (available for download in French, English and German)
www.etat.environnement.wallonie.be

Rapport analytique sur l'état de l'environnement wallon 2006-2007, MRW – DGRNE, Namur, 2007 (available for download in French, English and German)
 “L'imperméabilisation et la compaction des sols” pp.520 ssq. – scientific report
 (available for download)
www.etat.environnement.wallonie.be
www.dgo4.spw.wallonie.be

Belgique et Europe

Lignes directrices concernant les meilleures pratiques pour limiter, atténuer ou compenser l'imperméabilisation des sols, European Union, 2012 (available for download)

Surfaces dures - coûts cachés, Rechercher des solutions pour remédier à l'occupation des terres et à l'imperméabilisation des sols, European Union, 2013
<http://bookshop.europa.eu/fr/>

Teachers

- *Le sol - Qu'est- ce que le sol? Comment se forme un sol? Quelles fonctions remplit le sol? Quelles sont les menaces qui pèsent sur les sols?*, educational report, Prosensols, s.d. (available for download)
 - *Les menaces qui pèsent sur les sols*, educational report, partenariat Prosensols, s.d. (available for download)
 - Educational folder and sheets on soil (from age 12)
www.prosensols.eu

Creusons le sol, Symbioses, le magazine de l'Education relative à l'Environnement, N°98, second half of the year 2013
www.reseau-idee.be (available for download)

Photography credits

p. 17 GISER ; F.X. Heynen
p. 18 European Atlas of Soil Biodiversity EC/JRC P. Henning-Krog;
 Education-Environnement asbl Y. Diakoff;
 SPW Jean-Louis Carpentier 343;
p. 19 A. Batteux, Education-Environnement asbl; F.X. Heynen;
p. 20 Education-Environnement asbl Y. Diakoff

