Wallonie

Diffuse soil pollution



A wide problem ...



Unlike *local pollution*, which originates from a specific source and can be extensive in some cases, *diffuse pollution* is more widespread and affects soil more or less to a lower extent.

Sheet 5 "Local pollution"

Explanation of the diagram "The magic of soil" sheet "The magic of soil" sheet to identify: primarily, atmospheric fallout of pollutants from road traffic, industry or residential heating, as well as certain agricultural and horticultural practices, such as spreading fertilisers or pesticides in fields, parks or private gardens. These diffuse inputs (or excess enrichment of soil in the case of nitrogen or phosphorus) can cause soil to deteriorate and jeopardise its effective functioning, ultimately posing the potential threat of pollution of water resources.

Dispersion of air pollutants does not stop at national borders. This issue therefore requires concerted action at a regional, national and international level. Considerable progress has been achieved since the 1990s, in particular for phosphorus from agricultural sources and acidifying pollutants.

Farmers are becoming increasingly aware of the

"Acidification







Main pollutants and sources of diffuse pollution > Page 42 Risks of diffuse soil pollution > Page 44 Individual actions > Page 44 Public and private spaces: banning pesticides can be achieved! > Page 45

Main pollutants and sources of diffuse pollution

[]

bodies.

Pollutants can accumulate in soil (accumulation).

Pollutants can be "leached"

(lixiviation or leaching). This means that they are carried

down through soil, potentially reaching groundwater



Pollutants can be swept away over sealed surfaces by soil erosion or water runoff until they reach surface water bodies.



Air-borne pollutants can travel and be deposited in a new location (suspension/deposit).



Sources of diffuse pollution, pollutants emitted and dispersion modes

Trace metal elements (TMEs)

The family of trace metal elements (TMEs, until recently called "heavy metals") consists primarily of arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), mercury (Hg), nickel (Ni), lead (Pb) and zinc (Zn).

Soil naturally contains trace metal elements: resulting from the degradation of base geological material ("source rock") and usually remaining in low concentrations. However, human activities are responsible for major TME contaminations.



Atmospheric fallout of TMEs originates from combustion of fossil energies, metallurgy, transportation and incineration of household waste. The agricultural sector also contributes to inputs in soil, as inorganic fertilisers, manure and slurry all contain TMEs (for example, copper which is used as a food supplement for pigs).

TMEs tend to settle in the surface layer of soil. They are not degraded and therefore accumulate. They can be carried towards surface water, attached to particles of eroded earth.



Nitrogen (N) and nitrates

Nitrogen is present soil in either organic form (in decomposing plants) or mineral form, including nitrate (NO_2) and ammonium (NH_4) , which are created by the mineralisation of organic nitrogen by soil micro-organisms.



Nitrogen is essential for plants' growth. It is therefore spread over crop-growing soil in either organic (manure, slurry, etc.) or mineral form (nitrogen fertilisers). However, soil can become saturated in nitrogen if inputs exceed plants' absorption threshold. The excess nitrate is then guickly carried away ("leached") to deeper levels of soil until it reaches groundwater bodies. It can also migrate to surface water.

When nitrogen fertilisers are applied, losses of nitrogen in gaseous form (ammonia or NH_2) can result in acid atmospheric fallout.

Since the early 1990s, spreading of nitrogen has been declining in Wallonia. Sheet 7 "Acidification"



Phosphorus (P) is a mineral element that is essential for life and it also plays a major role in plants' growth. Phosphate fertilisers are therefore used widely to improve crop yields. As with nitrogen, excessive spreading of phosphorus can saturate soil if quantities exceed plants' ability to absorb. However, very little phosphorus is leached to groundwater bodies due to Walloon soil's effectiveness in trapping phosphorus. On the other hand, phosphorus can contaminate surface water as it is swept away with earth eroded by rain.

Inputs of phosphorus have been falling since the middle of the 1990s in Wallonia.





Pesticides

are substances used to combat crop pests and plant diseases (fungicides, insecticides, etc.) or to remove unwanted plants (herbicides). Unlike nitrogen or TMEs, pesticides do not occur naturally in the environment and inputs can be attributed solely to human activities. They can be carried by rain water to deeper levels of soil (leaching). They can also be transported to watercourses, attached to particles of eroded earth (erosion), or swept by rain water over sealed soil (concrete, pavements, compacted earth, etc.).





Acidifying substances

Sulphur dioxide (SO₂), nitrogen oxides (NO_x) and ammonia (NH₃) originate from combustion of fossil fuels (coal, oil, etc.) or storage and spreading of livestock manure. They can be transformed into acid compounds which are harmful for both the environment and plants when they are air-borne and/or deposited onto soil. Emissions of acidifying substances have fallen substantially since the 1990s.



Risks of diffuse soil pollution

Trace metal elements (TMEs) Pollution of surface water, toxic effects for fauna, flora and human health Sheet 4 "Biodiversity" (consumption of contaminated plants, for example), slowdown in the activity of soil micro-organisms, decline in soil's fertility, etc.

Nitrogen

Saturation of soil with nitrogen, harmful effects on fauna in watercourses, eutrophication* of watercourses or water bodies, nitrate pollution of groundwater and supply water, etc.

Phosphorus

Eutrophication* of watercourses or water bodies

* Eutrophication: proliferation of algae in a watercourse or water body further to excessive inputs of nutrients (nitrogen, phosphorus, etc.). Decomposition and mineralisation of dead algae by bacteria consume dissolved oxygen. This endangers the life of other organisms in the watercourse or water body and, over time, can lead to its asphyxiation.

Pesticides

Pollution of groundwater and surface water, pollution of water collections and additional costs incurred by clean-up operations, toxic effects for earthworms and soil micro-organisms, risks for human health and more.

Acidifying substances

*

 (NO_x, SO_2, NH_3) Soil acidification, harmful effects for plants, acidification of surface water, etc.

Sheet 7 "Acidification"

Individual actions

Diffuse soil pollution is not "less serious" than local pollution. Although the concentrations of pollutants are lower, this situation nevertheless raises long-term environmental and health problems.

One of the most concerning issues at the moment is pollution of surface water and groundwater (and therefore water collection) by nitrates or pesticides spread over fields, public spaces or private gardens.

Public and private spaces: Banning pesticides

In Wallonia, pesticides are used mainly by farmers. Followed by individuals, such as gardening enthusiasts, professionals in maintenance of green spaces and public spaces and rail network managers.

In recent years, we have seen a fall in the volumes of pesticides spread **in agriculture** as a result of greater awareness among farmers and more careful use of products. However, efforts must continue.

A downward trend can also be observed among **individuals**. However, the average quantities spread per unit of area are higher in comparison with farmers. In many cases, lack of knowledge is resulting in overly frequent applications, errors in the time and extent of spreading, rinsing of spraying equipment down drains, etc. These practices make a significant contribution to diffuse pollution of soil and water.

can be achieved

Legislation

The 37 measures introduced under the **Programme Wallon de Réduction des Pesticides (PWRP)** (Walloon Pesticide Reduction Programme) are designed to allow Wallonia to progressively meet the targets set by the federal plan, which transposes the European Directive on the sustainable use of pesticides at a national level.

One of these measures is "zero phyto": on I June 2019, a complete ban will come into force on the use of pesticides in public spaces managed by municipalities, authorities and similar bodies. These products will need to be replaced by gentle and environmentally friendly methods.

Choose environmentally friendly methods

Wherever possible, we need to replace chemical pesticides, which kill soil life, with alternative methods: manual weeding or mulching, selection of suitable and more pest-resistant plants, development of welcoming environments for wild fauna targeted by predators, use of environmentally friendly products, etc.



Are weeds unwanted in all situations and everywhere?

Dispose of old pesticides and packaging with care

Incorrect storage of old pesticides or their packaging represents a potential source of diffuse pollution: packaging must be taken to container parks where it can then be processed through the appropriate channels.

Bibliography

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) http://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) http://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) "La contamination diffuse des sols", pp. 486 ssq. - Scientific report (available for download) http://etat.environnement.wallonie.be

Environmental review of companies in Wallonia

Acidifying atmospheric emissions from the chemicals industry http://environnement.wallonie.be (companies)

Walloon legislation and good practices

Programme Wallon de Réduction des Pesticides (PWRP - Walloon Pesticide Reduction Programme) www.wallonie-reductionpesticides.be www.adalia.be

L'Environnement au jardin. Guide des bonnes pratiques pour la respect de l'environnement dans les activités de jardinage, ZEGELS, A., SPW Éditions, les Guides de l'Éco-citoyen, 2009 (available for download) http://environnement.wallonie.be

Comité régional PHYTO www.crphyto.be

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.
-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)

Farmers

GISER unit – SPW – DGO3 www.giser.be

GREENOTEC asbl www.greenotec.be

About agro-environmental measures http://agriculture.wallonie.be About the Programme Wallon de Réduction des Pesticides (PWRP - Walloon Pesticide Reduction Programme) http://agriculture.wallonie.be

Comité régional PHYTO www.crphyto.be

DAFOR - SPW - DGO3 www.agriculture.wallonie.be

NITRAWAL www.nitrawal.be

Local authorities, managers of public spaces

Comité Régional PHYTO www.crphyto.be

Pôle de Gestion différenciée www.gestiondifferenciee.be

Union des Villes et Communes de Wallonie www.uvcw.be

Photography credits p.41 SPW Jean-Louis Carpentier 6987, 8215 and 5290 p.44 Education-Environnement asbl A. Batteux; F.-X. Heynen ; SPW Jean-Louis Carpentier 8550 p.45 Education-Environnement asbl Y. Diakoff; SPW Jean-Louis Carpentier 6892 ; Education-Environnement asbl A. Batteux