

19. Environmental yardstick for pesticides

FAIRWAY partner: Luuk Lageschaar (CLM Research and Advice, NL)



Brief description

A DST to quantify the environmental impact of the use of pesticides in outdoor and greenhouse crops. For each pesticide the yardstick assigns environmental impact points for the risk to water organisms, the risk of leaching to groundwater and the risk to soil organisms. The yardstick shows the risk to pollinators, beneficials and applicators. It is used in the Netherlands as a management tool for farmers and technical consultants, as a tool for monitoring the environmental performance of farmers, as a tool for setting standards for ecolabels and as a tool for the supply chain to be able to purchase sustainable agricultural products, and as a policy evaluation tool.

Contaminants covered (e.g. nitrate, pesticides etc.)	Pesticides
Intended end users (e.g. farmer, water quality manager, policy maker)	Farmers and advisors, ecolabel managers, supply chain managers sustainability, policy makers
Level of expertise and/or training required	The tool and impact sheets use green-yellow-red colour coding for easy distinction between pesticides. For the selection of alternative pesticides, expertise or professional advice may be necessary.
Geographical resolution (e.g. field, catchment, national)	Field scale. Output can be scaled up to regional or national level. Suitable for all farms growing crops (arable, greenhouse, horticulture)
Temporal resolution (e.g. daily, annual, long-term).	Environmental impact specified for wet (autumn-winter) and drier season (spring-summer)
Real-time component (e.g. live weather data, soil moisture data feeds etc.)	None
Number and type of mitigation measures included	Choice of pesticide, dose rate, organic matter content of soil, season, application technique (drift) and width of untreated buffer zone
Platform (e.g. paper-based tool, phone app, bespoke software).	Bespoke software with an excel database, internet application, printable sheets.
Frequency of updates	Every 6 months new pesticides are added and new environmental data are added if available
Cost/availability	Free for comparison of 3 pesticides. Free environmental impact sheets for different crops. Subscription for unlimited comparison of pesticides and the possibility of exporting the results to an Excel sheet. For a free download or a subscription visit the following website: https://www.pesticideyardstick.eu For large groups of farmers, a separate calculation tool was developed. Contact CLM for more information.
Number of users or number of copies distributed/downloaded/purchased	More than 15.000 users in arable farming, ornamentals and fruit. The website is used 9.000 times per year, on average.
Links to demo material and other relevant information (e.g. user guides).	Animation on https://www.pesticideyardstick.eu , environmental impact sheets including instructions, infographic on https://fairway-is.eu/index.php/key-messages/infographics/282-environmental-yardstick-decision-support-tool
Additional comments	

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Input data required to run the DST	Pesticide name and dose used are required. Drift percentage, season and organic matter can be added to personalise the data.
Outputs (including links to water quality and economic or financial aspects)	Outputs can impact on both surface water quality (ecological quality: risk for water organisms) and groundwater quality (risk of leaching in comparison to the drinking water norm). The tool is used to inform policy makers on the effect of collective changes in farmers' pesticide use over the years, before these changes can be seen in ground water monitoring due to time lagging effects.
Age/provenance of supporting data used to develop the DST	Risks to water organisms and soil organisms are computed on data supplied by the Ctgb (Board for authorisation of plant protection products). Risk to groundwater are based on leaching model PEARL. These risk calculations comply with the authorisation procedures and data in Europe. Risks to pollinators and natural enemies are based on the side effects database of Koppert Biological Systems, supplemented with data from the PDDB database. Risk to the applicator is based on data supplied by the Ctgb.
Country-specific calibration or data requirements (including restrictions on use)	
Details of validation and testing	The yardstick is regularly validated against filed data of pesticides in ground and surface water. Furthermore the yardstick was tested in a European study on comparing pesticide tools (Reus <i>et al.</i> 2001). Finally the practical applicability was tested in several groups of farmers during its development.
Date developed/released (or planned release date)	First developed between 1991 - 1994 ; effects on pollinators added in 2005, current version released in 2017
Author/developer names and affiliations	J.A.W.A. Reus, G.A. Pak, G.M. Bouwman, P.C. Leendertse CLM Research and Advise
Member state(s) where developed	NL
Member State(s) where currently used	NL, BE, GB and outside the EU. The yardstick is currently being used for calculations on USA farm data and is available in English.
Key publication references	Bouwman, G.M. & J.A.W.A. Reus (1994). Milieumeetlat voor bestrijdingsmiddelen: Pilotstudie en plan voor verdere introductie en beheer. Centre for Agriculture and Environment, Utrecht. Leendertse, P.C., Reus, J., 1997. Een milieumeetlat voor bestrijdingsmiddelen in de glastuinbouw (An environmental yardstick for the use of pesticides in greenhouse horticulture). Milieu 2: 87-94. Reus, J.A.W.A., Leendertse P.C. (2000). The environmental yardstick for pesticides: a practical indicator used in the Netherlands. Crop Protection, 19, 637-641 https://www.researchgate.net/publication/228551191_The_environmental_yardstick_for_pesticides_A_practical_indicator_used_in_the_Netherlands Reus, J.A.W.A. (1991). Milieumeetlat voor bestrijdingsmiddelen: ontwikkeling en plan voor toetsing (Environmental yardstick for pesticides: development and test plan). Centre for Agriculture and Environment, Utrecht. Reus, J.A.W.A. (1992). Milieumeetlat voor bestrijdingsmiddelen: toetsing en bijstelling (Environmental yardstick for pesticides: testing and adaption). Centre for Agriculture and Environment, Utrecht. Reus, J.A.W.A. & G.A. Pak (1993). An environmental yardstick for pesticides. Med. Fac. Landbouww. Univ. Gent 58: 249-255.

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Any other useful information (e.g. screenshots of DST input/outputs)

Example of data input and outputs for the online yardstick for field crops

1: Choose soil type and season

Soil type:

Season:

2: Choose one or more pesticides

Pesticides	Dose (kg/ha or l/ha)	Drift (%) ?
ACROBAT DF	1.00	1.00
MALVIN WG	1.00	1.00
TALENT	1.00	1.00

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Result							
Pesticides	Active substance (kg/ha)	Environmental effects			Associated risks		
		Aquatic organisms	Soil organisms	Groundwater	Pollinators	Natural Enemies	Applicator
ACROBAT DF	0.742	30	48	2	B	B	!
MALVIN WG	0.800	54	10	26	A	A	!
TALENT	0.930	9	300	0	?	?	!

Aquatic and soil organisms and groundwater	Risk applicator	Use in integrated pest management
0-100 EIP	I Irritant	A Suitable
100-1000 EIP	S Harmful	B Moderately suitable
>1000 EIP	G Toxic	C Not suitable
	ZG Very toxic	? Unknown
	B Corrosive	

Use in practice

Farmers or their advisers use the tool to choose pesticides with less environmental impact or choose a non-chemical control option or reduced-emission application techniques if they see that a pesticide has a high impact on groundwater quality or soil and water biota. Currently retailers and the certification body of Planet Proof use the data from the tool in prioritizing which pesticides should be restricted in use.