

# Kleine landschapselementen voor zuivere lucht en zuiver water

Fred Tonneijck



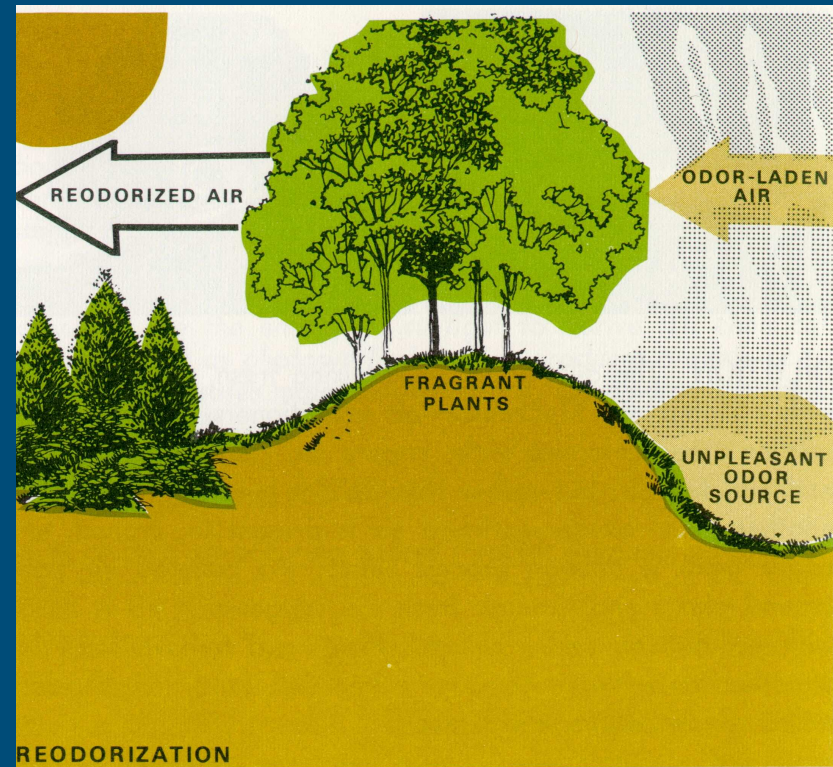
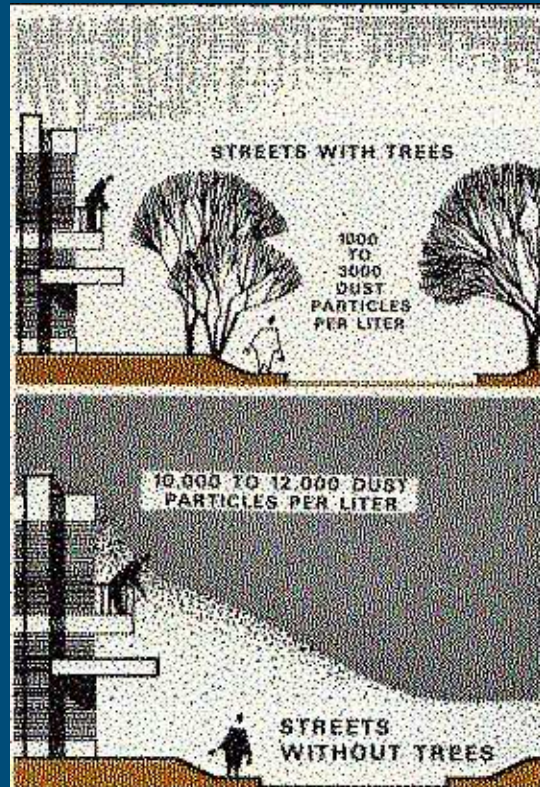
PLANT RESEARCH INTERNATIONAL  
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# Opzet

- Beplanting en luchtkwaliteit
- De processen
- De effecten lokaal
- De groene toepassing
- Hoe verder



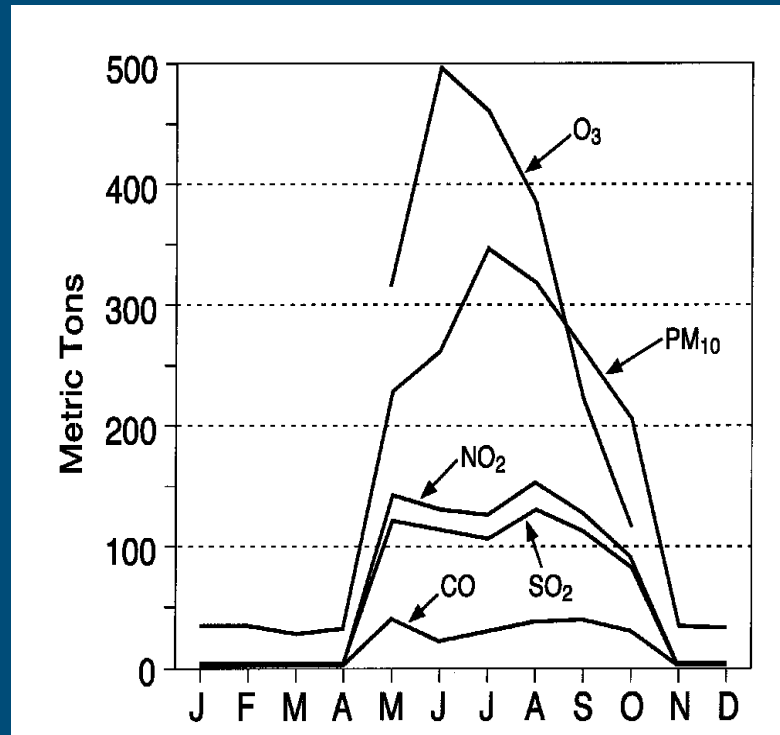
# Uit de historie!



*Robinette, G.O., 1972. Plants, People and Environmental Quality: A Study of Plants and their Environmental Functions. U.S. Department of the Interior, National Park Service, Washington D.C.*



# Groen als filter



*Air pollution reduction in the Chicago area in 1991. Particulate removal assumes 50% resuspension back to the air .*



# Economische waardering van filterfunctie

% afname achtergrondconcentratie

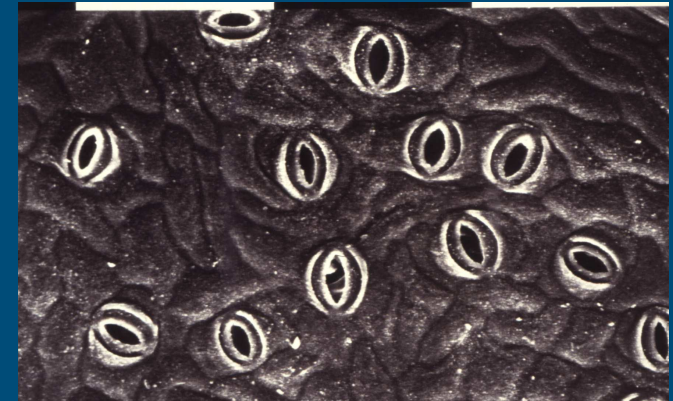
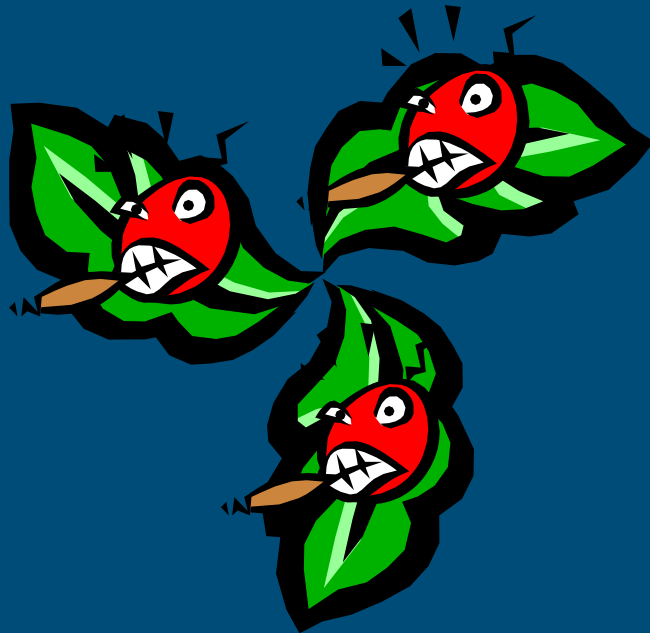
Deeltjes 0.4 – 2.0 %

Gassen (NO<sub>x</sub>, O<sub>3</sub>, SO<sub>2</sub>) 0.3 – 0.5 %

| City                    | Pounds of pollutants removed annually by trees | Annual value of trees with respect to air pollution |
|-------------------------|--|---|
| Washington, DC          | 878,000  | \$2.1 million                                       |
| Atlanta, GA Metro Area  | 19,000,000                                     | \$47 million  |
| Portland, OR Metro Area | 2,000,000                                      | \$4.8 million                                       |
| Denver, CO Metro Area   | 1,100,000                                      | \$2.6 million                                       |



# Absorptie

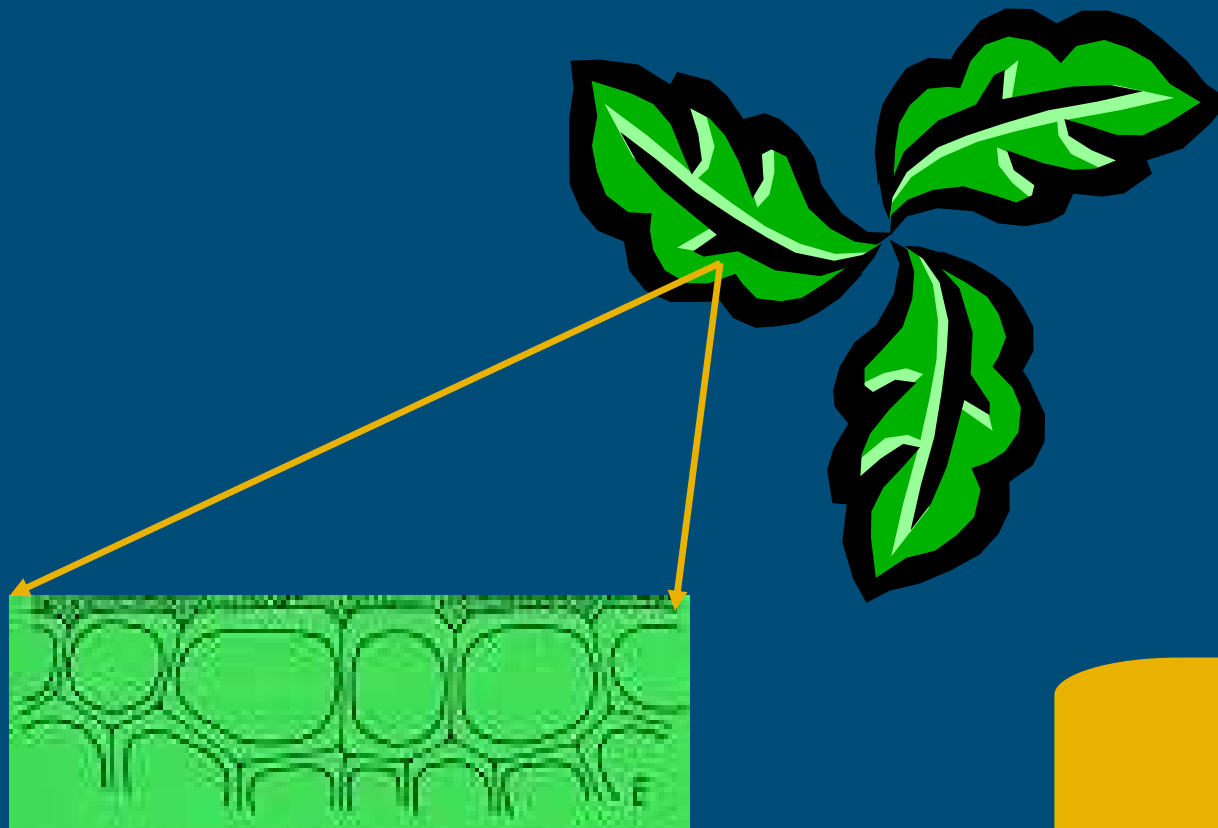


$\text{NO}_x$ ,  $\text{O}_3$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ , VOS

**Loofbomen > naaldbomen**



# Adsorptie

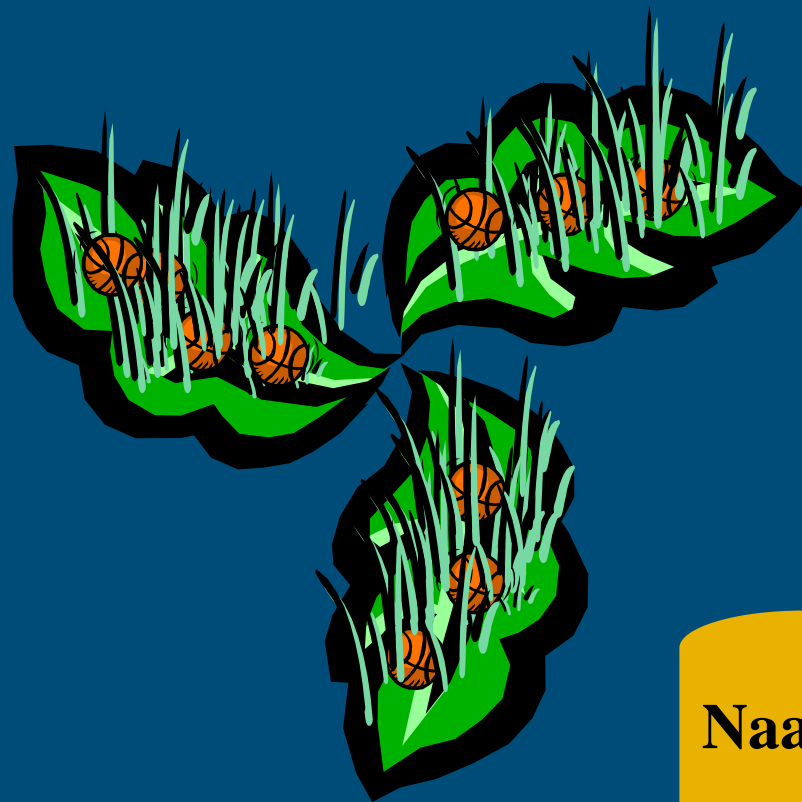


VOS

**Naaldbomen**



# Impactie van fijn stof

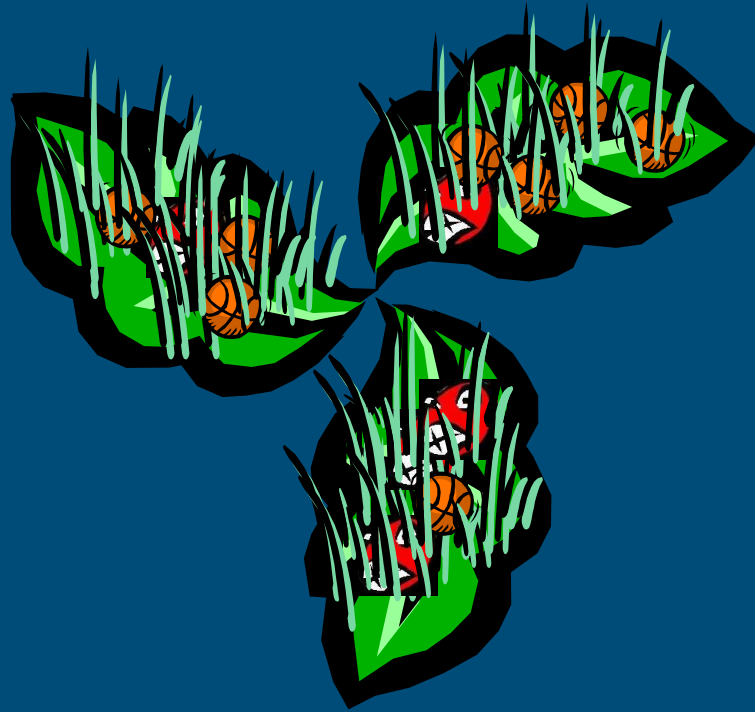


**Naaldbomen > loofbomen**





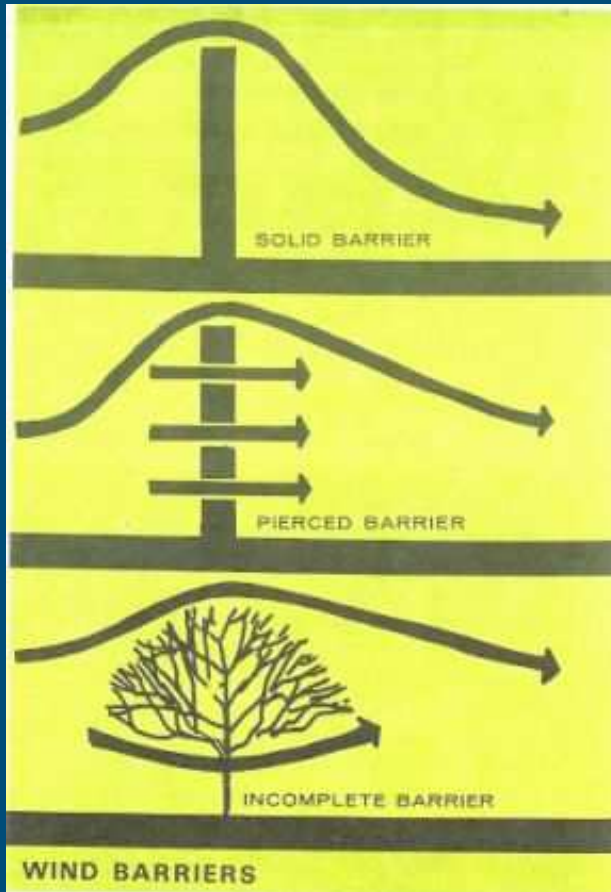
# Combinatie van eigenschappen?



**Verschillende soorten  
met verschillende  
eigenschappen**



# Element beïnvloedt de wind



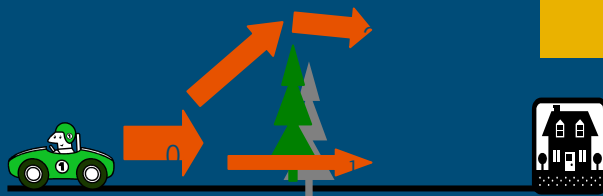
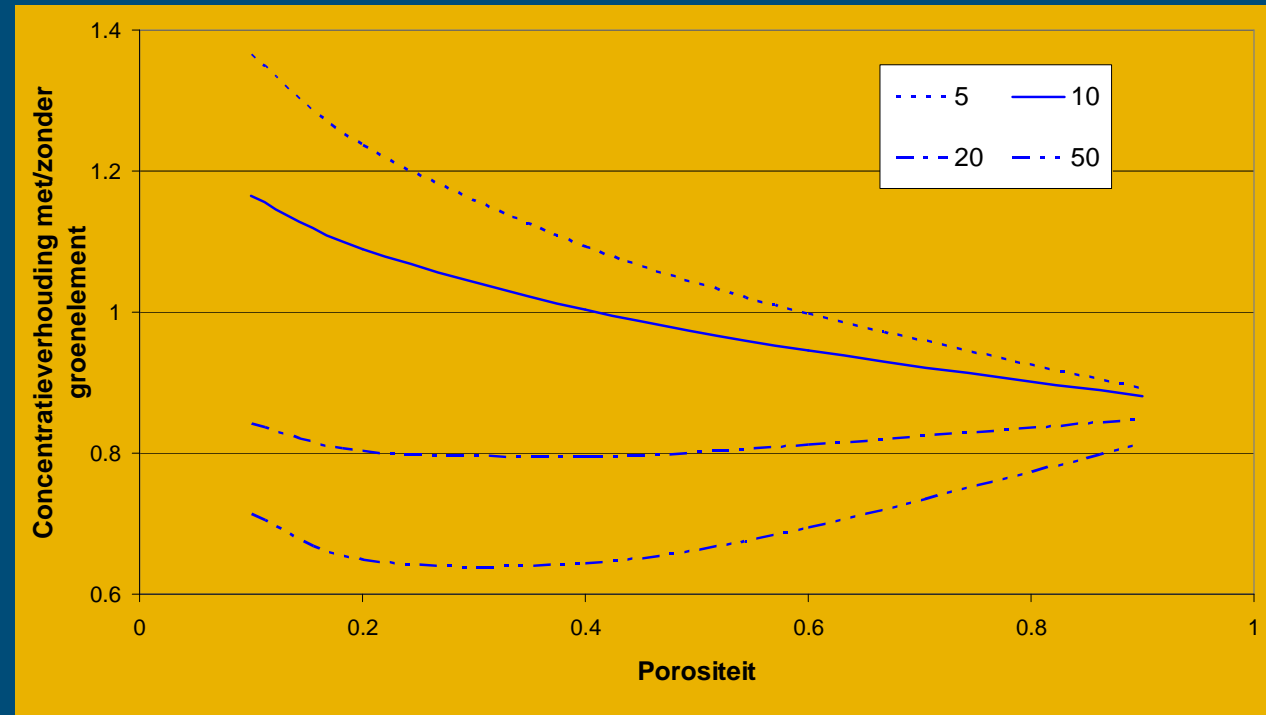
**Bos of windsingel**

**Optische porositeit**

**Blad op alle niveaus**



# Opname van fijn stof dichtbij de bron



*Wesseling, Duyzer, Tonneijck, van Dijk, 2004. Effecten van groenelementen op NO<sub>2</sub> en PM<sub>10</sub> concentraties in de buitenlucht. TNO Rapport R 2004/383, Apeldoorn.*



# Bulkvangstefficiency fijn stof

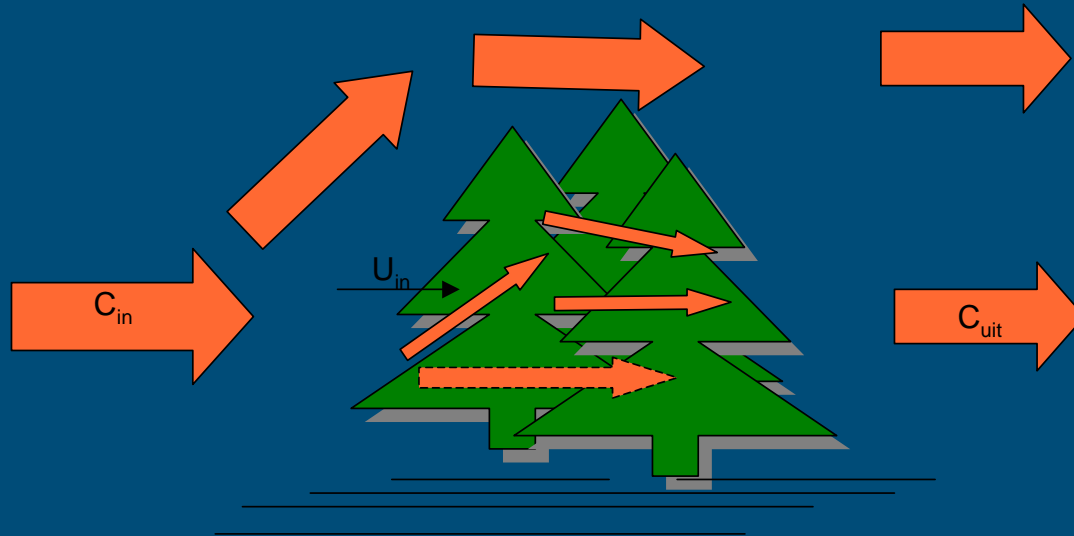
- PM10: maximaal 15 - 20 %
- PM5: maximaal 3 - 5 %



*Wesseling, Duyzer, Tonneijck, van Dijk, 2004. Effecten van groenelementen op  $NO_2$  en  $PM_{10}$  concentraties in de buitenlucht. TNO Rapport R-2004/383, Apeldoorn.*



# Opname van NO<sub>2</sub>

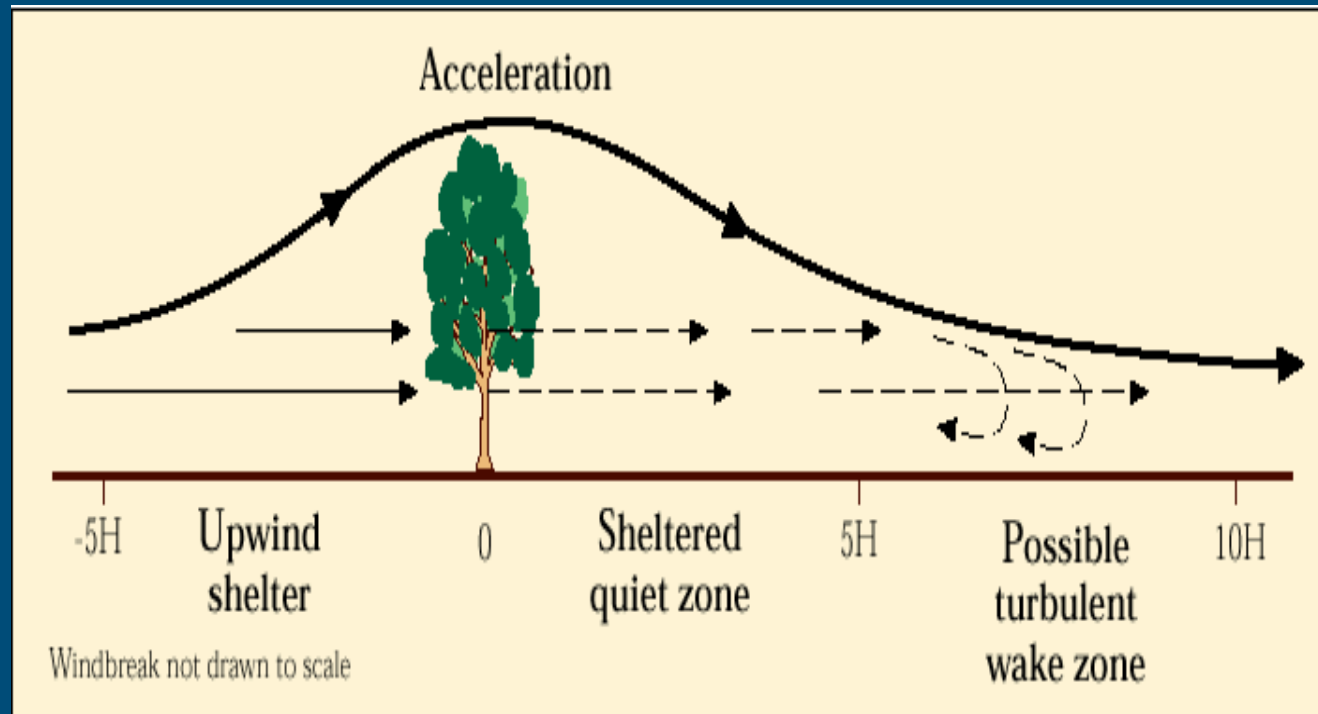


Maximale concentratieverlaging 10 %

*Wesseling, Duyzer, Tonneijck, van Dijk, 2004. Effecten van groenelementen op  $NO_2$  en  $PM_{10}$  concentraties in de buitenlucht. TNO Rapport R-2004/383, Apeldoorn.*



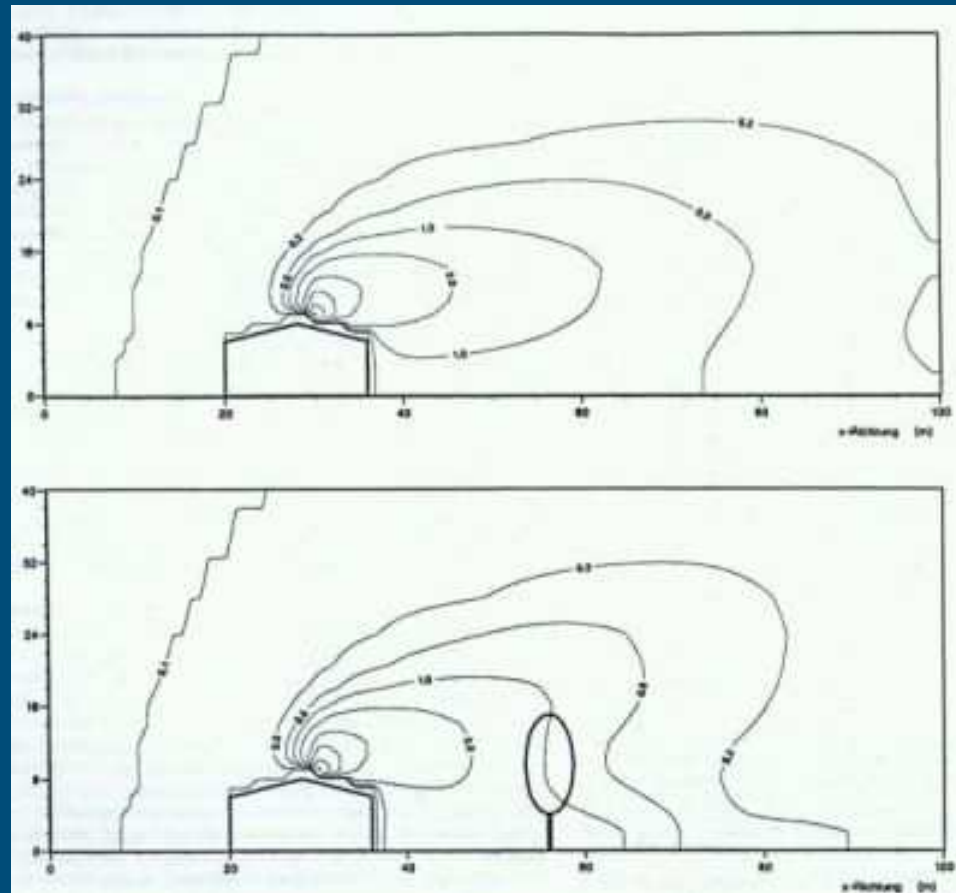
# Toepassing van het groene systeem!



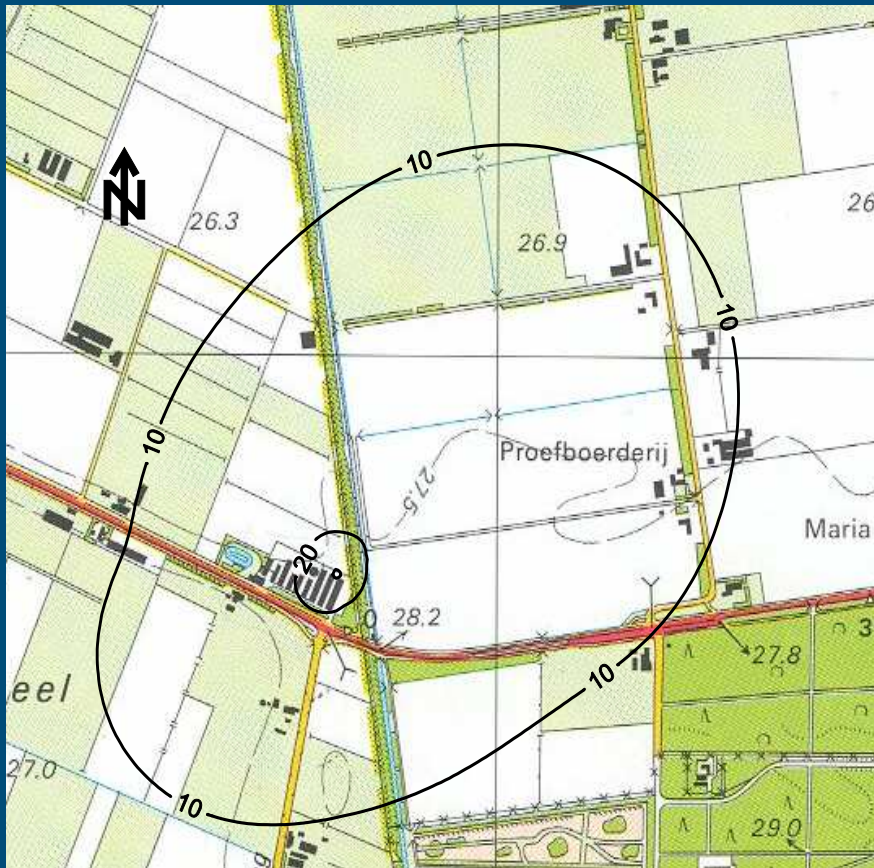
*Design Principles for Farm Forestry. A Guide to assist farmers to decide where to place trees and farm plantations on farms. Rural Industries Research and Development Corporation, 1997*



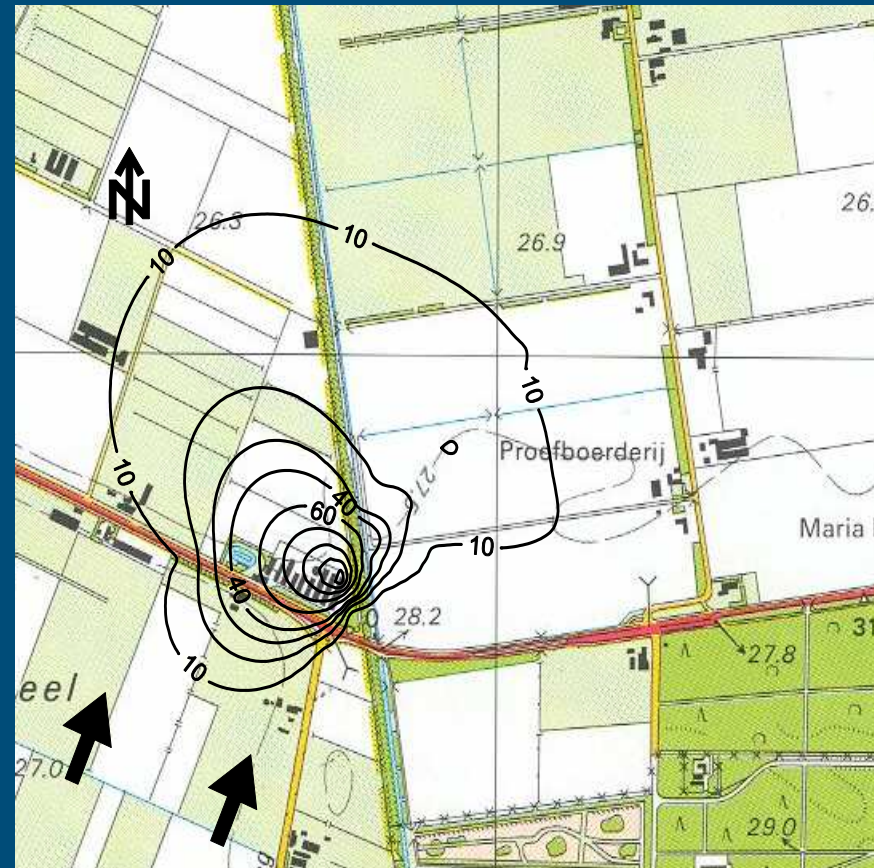
# Groen en verspreiding van ammoniak uit de stal



# Groen en verspreiding van ammoniak uit de stal



Zonder groen



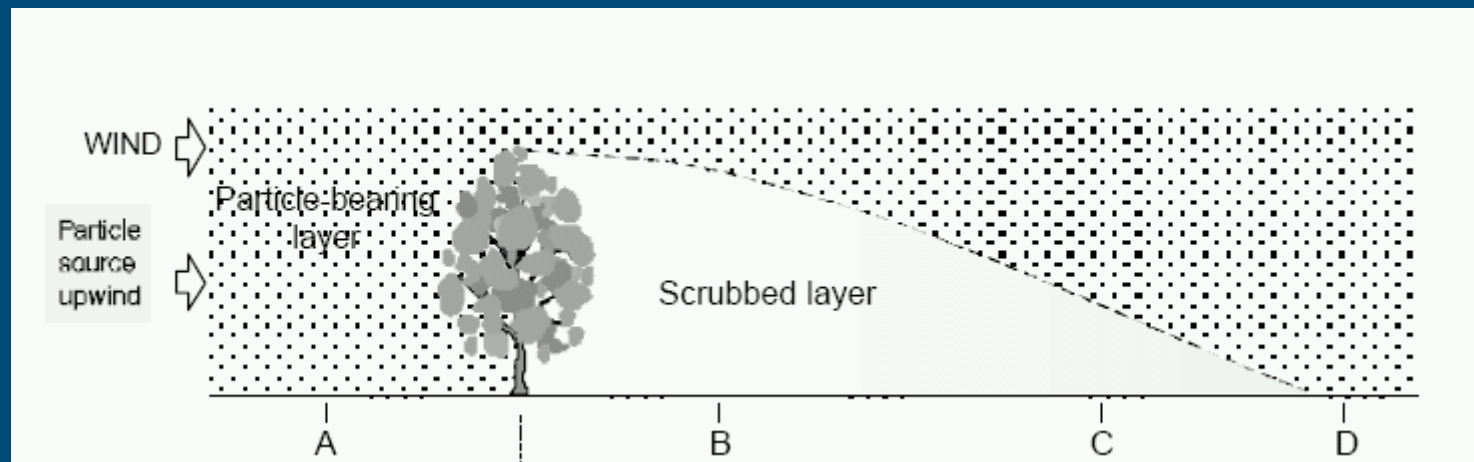
Met groen





# Groen tegen bestrijdingsmiddelen

‘When placed close to a sprayed field, a shrub buffer area with an along-wind length of a few hundred meters can reduce deposition to a downwind receptor by **20% to 50%**’



# Effectiviteit van de groene toepassing afhankelijk van

- Soorten in relatie tot componenten
  - Fijn stof: naaldbomen
  - Gasvormig: loofbomen
- Structuur
  - Optische porositeit
  - Lijnbeplanting
- Lokatie
  - Bij de bron
  - Bij de receptor
  - Bulk



# Hoe verder?

- Waardering van milieufuncties
- (Multifunctionele) toepassing
- Groene functies in de planvorming



# Dank voor uw aandacht!

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