



# MANNER-NPK Nitrogen model

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# Organic manures

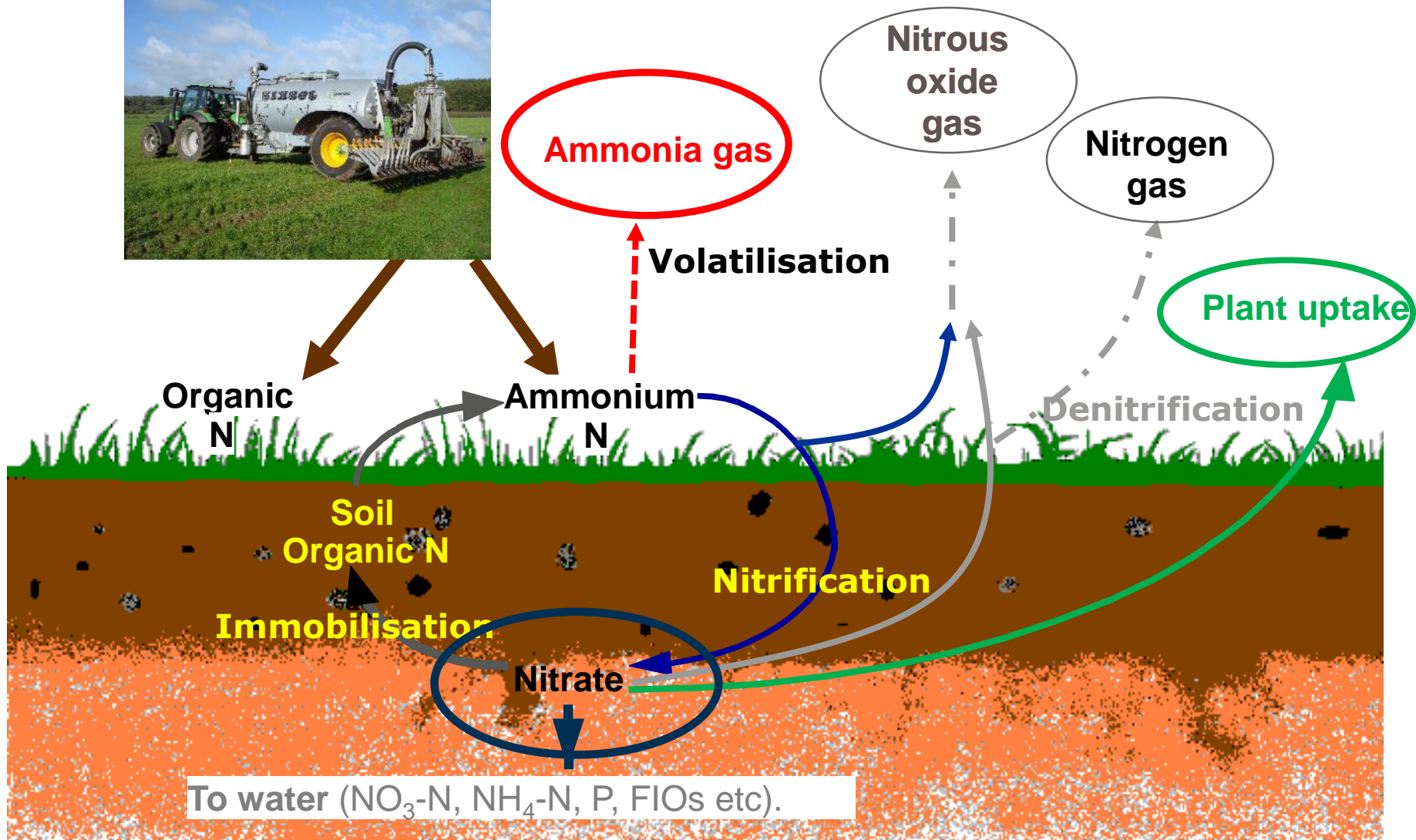
- Crop nutrients
- Organic matter



- Nitrate leaching
- Ammonia losses



# Organic materials - N supply & losses



# Large amount of research

- *Inform policy*
  - Nitrate Regulations (closed periods etc.)
- *Inform farmers*
  - Make best use of manure nutrients
- Understanding factors affecting N losses
- Quantifying crop available N supply
- *Management strategies to minimise nutrient losses and maximise nutrient value*

# Key steps in making the most of manure nutrients

**MANNER**  
-NPK

1. Know the nutrient content
2. Predict crop available nitrogen supply
3. Minimise nitrogen losses
4. Spread accurately and evenly
5. Build into farm nutrient management plan

# MANNER-NPK decision support tool

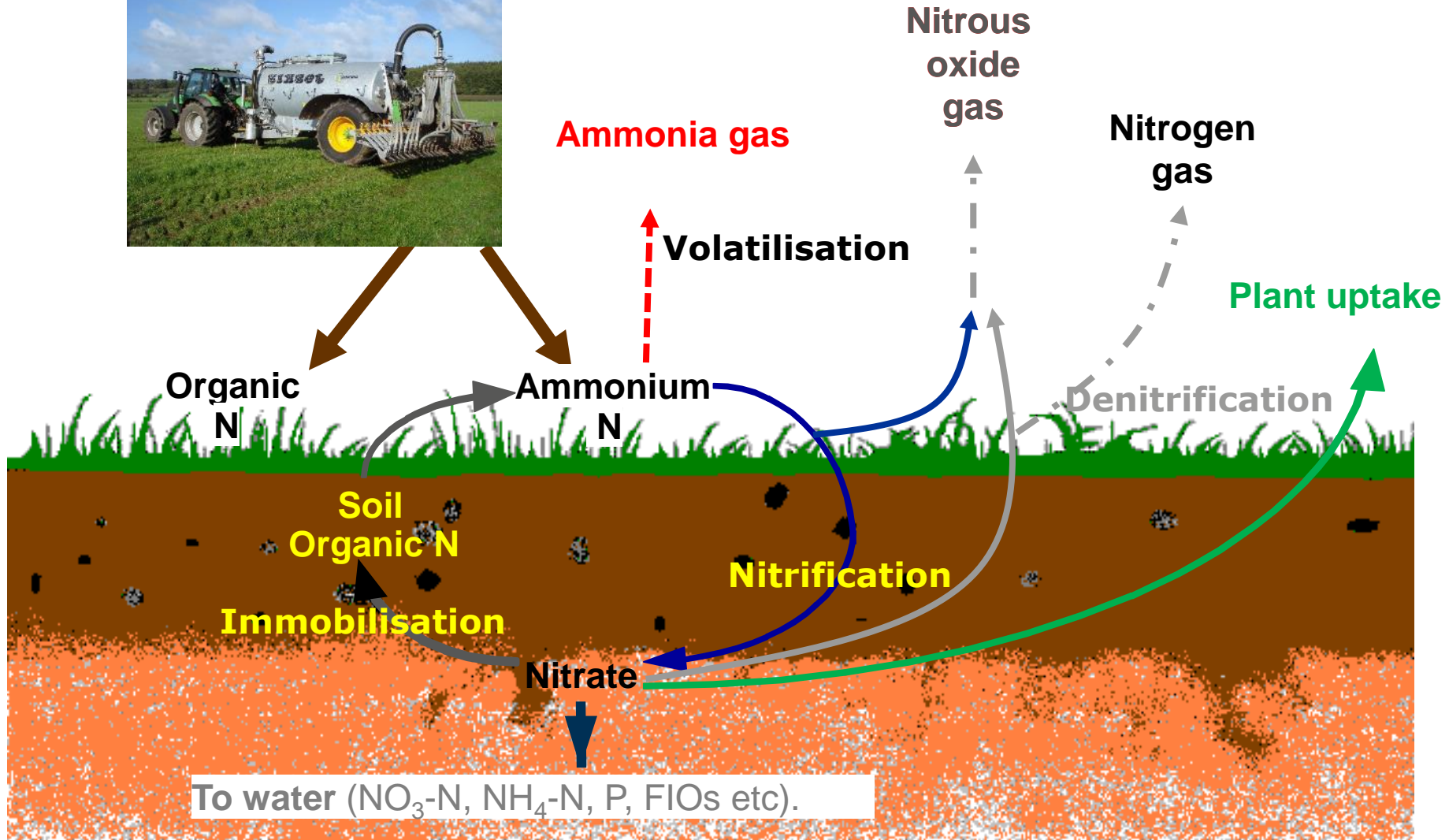
- MANure Nutrient Evaluation Routine
- Estimate crop available nutrient supply from applications of organic materials
  - Nitrogen           MANNER N model
  - Phosphate        50-60% availability
  - Potash             90% availability

*Download from*

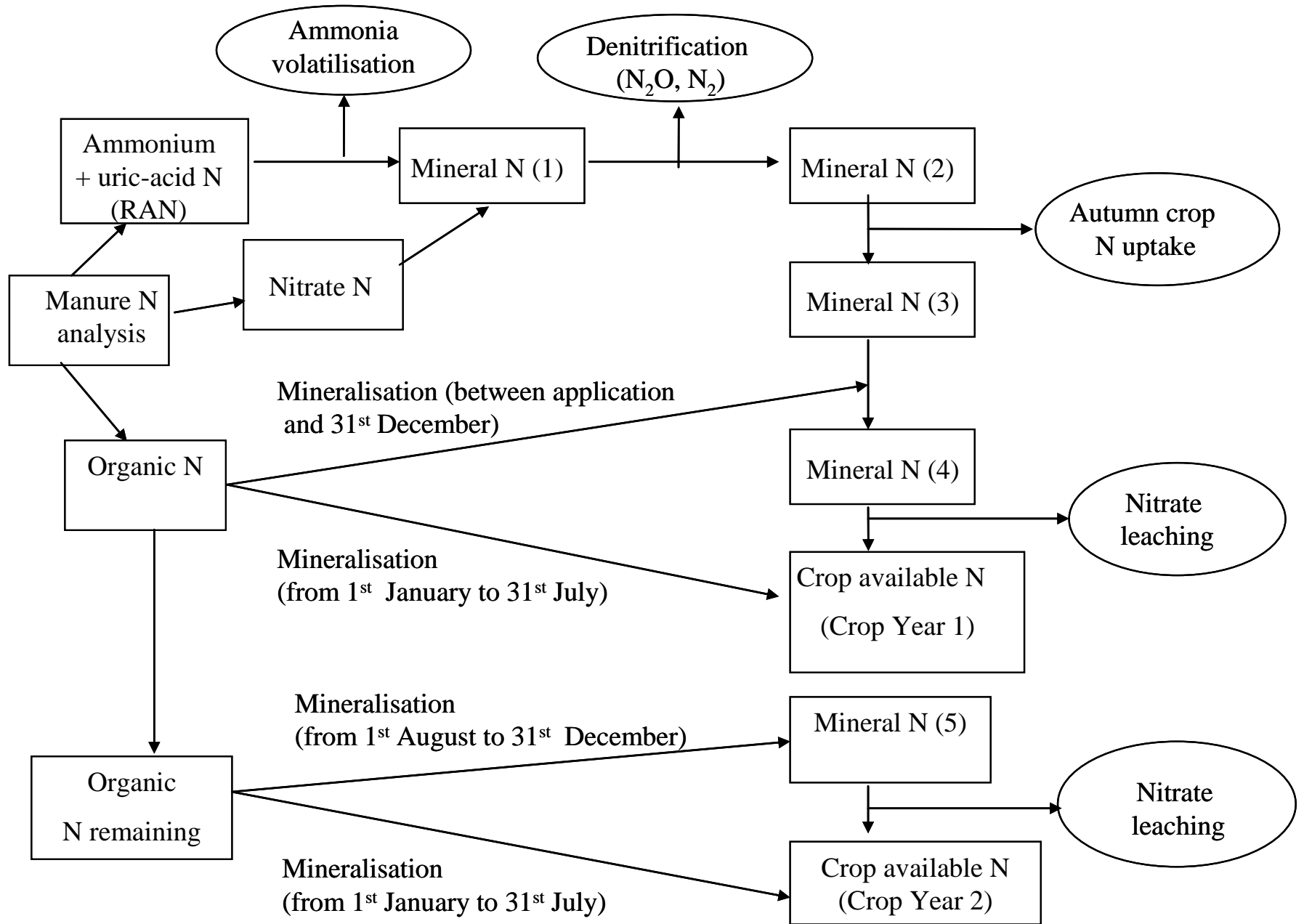
[www.planet4farmers.co.uk/manner](http://www.planet4farmers.co.uk/manner)



# Organic materials - N supply & losses

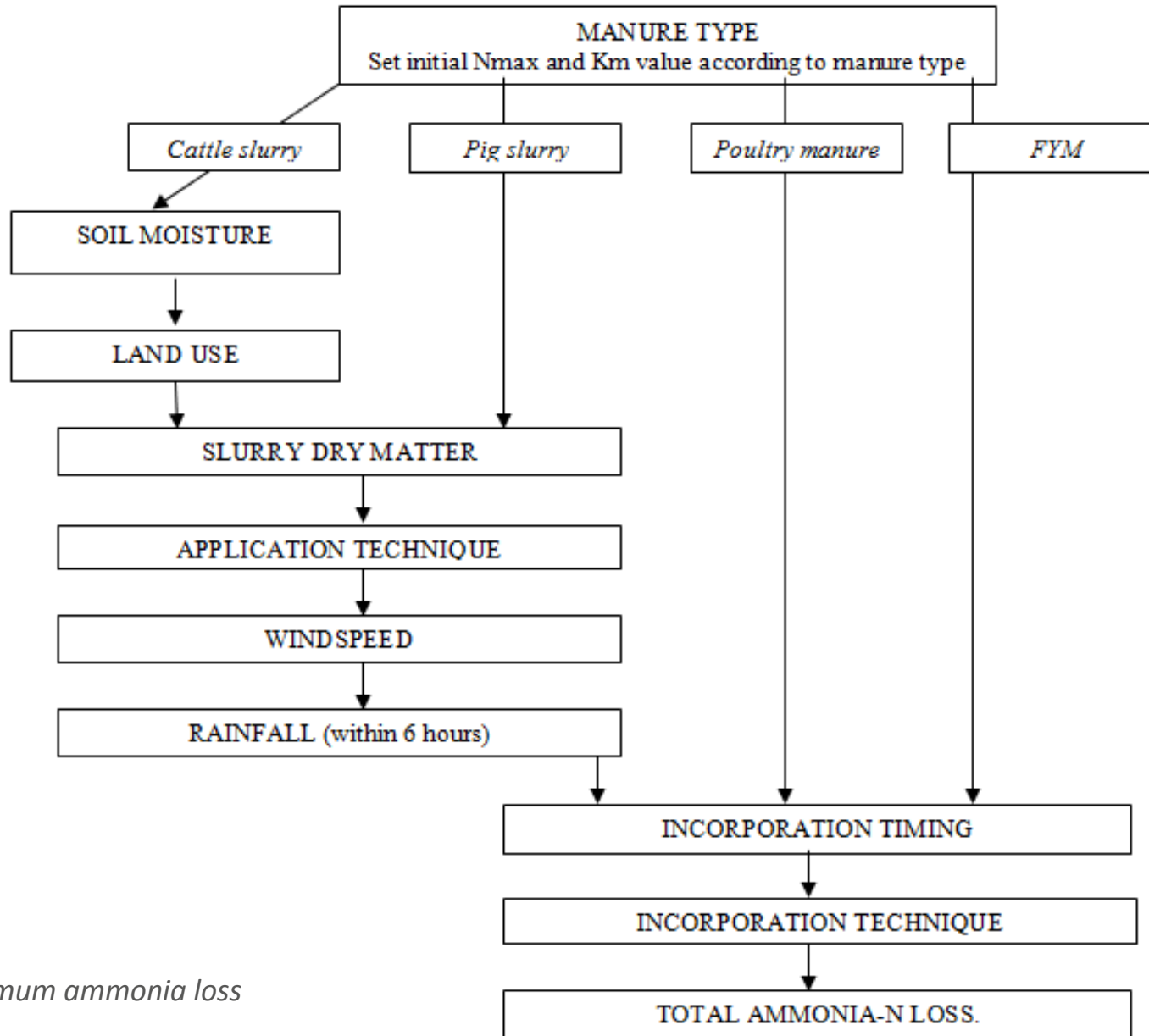


# MANNER conceptual model showing nitrogen pathways and transformations



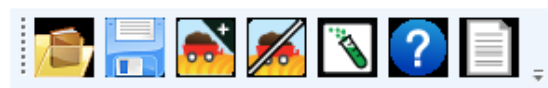


## Decision support rules for the MANNER ammonia loss module



$N_{max}$  = maximum ammonia loss

$K_m$  = time when half of  $N_{max}$  has been lost



Farm Details

Farm name:

Address:

Town:

County:

Postcode:  ⓘ

Country:  ▾

Average annual rainfall (mm): 1339 ⓘ

Field Details

Field name:

Crop type:  ⓘ ▾

Topsoil texture:  ▾

Subsoil texture:  ▾

Field in NVZ:  ▾

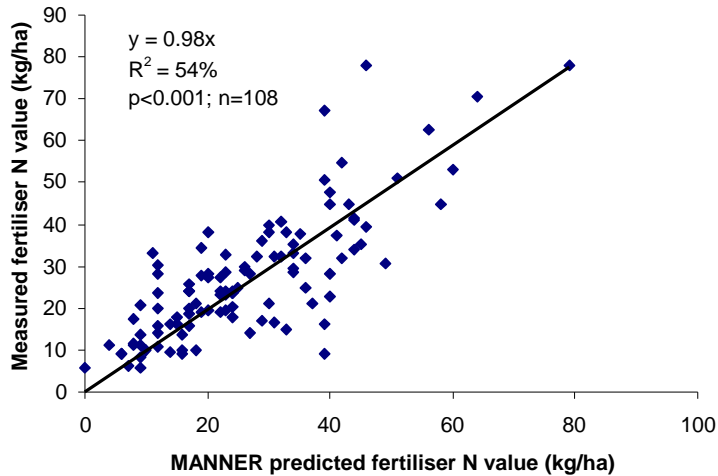
Comments:



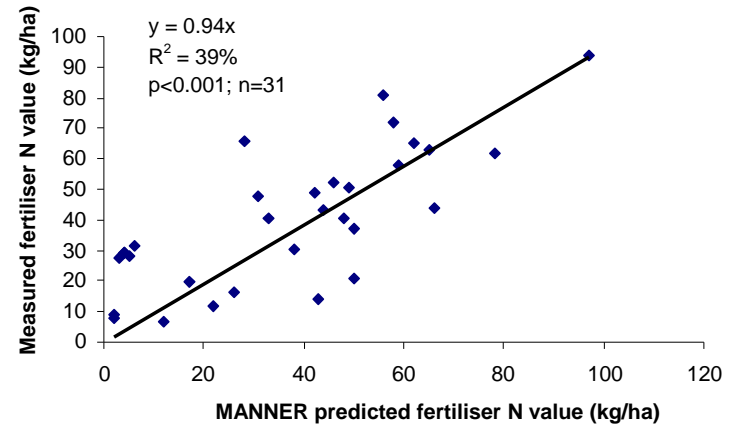
# Validation of MANNER-NPK

## Crop available N supply

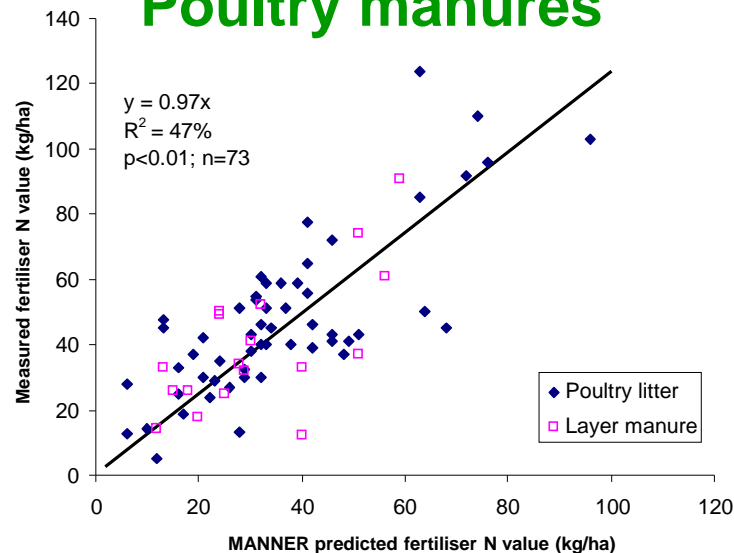
### Cattle manures



### Pig manures



### Poultry manures



# MANNER-NPK

- First released in 2000
  - Updated in 2004, 2010 & 2013



- *Future updates - web-based, mobile app*



# Knowledge transfer



# *Thank you*

## Acknowledgements

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