Development of a Sustainable Nutrient Management Decision Support System for Ireland

Overview

Research is currently underway to develop a sustainable nutrient management (SNM) decision support system (DSS) that will allow farmers to:

(i) optimise spreading when storage is not a limiting factor (built on existing research into maximising N utilisation)
(ii) spread in the 'safest' possible location on their farm when storage is limiting (forecast using a soil classification for each parcel of land)
(iii) spread at times that are meteorologically appropriate (i.e. when a transport vector between source and target is not very likely to be present).

Current efforts are focusing on:

(i) integrating the model components
(ii) sourcing spatial data required for site specific implementation
(iii) further developing the soil water deficit model at the heart of the SNM-DSS
(iv) obtaining user input into the system design
(v) testing the quality of systems forecasts with respect to the occurrence of the transport vector.

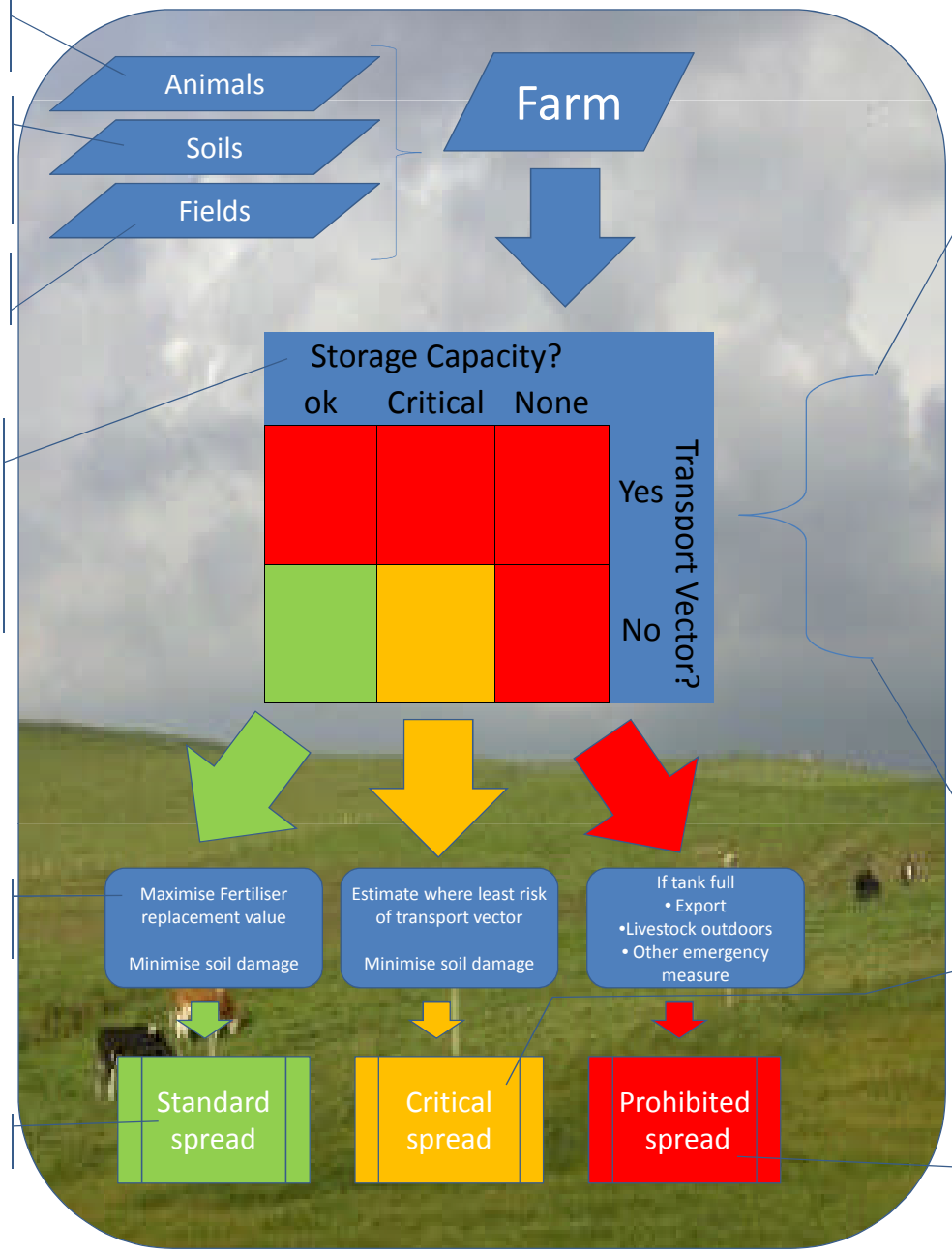
Statement of objective for SNM-DSS

An advisory system[1] that a farmer and/or agricultural advisor can use in order to:

(i) maximise fertiliser replacement value of the farm's slurry resource;
(ii) minimise potential for unsafe[2] slurry spreading in the event that storage capacity is near to being exceeded
(iii) indicate when export of slurry is required for safe utilisation[3]

Where:

1. The system is always subservient to national legislation (e.g. SI 101 of 2009)
2. Unsafe refers to conditions when a transport vector may arise assuming a 'source – vector – target' model of diffuse pollution.
3. If point source pollution will arise due to flooding storage tanks and diffuse pollution will arise due to the occurrence of a transport vector after spreading, the only safe option is to remove slurry from the farms for either: (i) spreading at an alternative location; or (ii) use in a gasification process.



Animal Identification & Movement System

Classified into 3 categories:
(1) Well drained
(2) Moderately drained
(3) Poorly drained

Land Parcel Identification System

Estimated using
• SI 101 / 2009 methods
• AIMS data
• Weather data

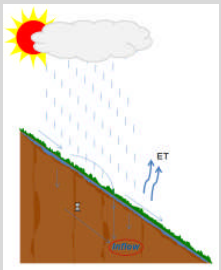
Farmer correction allowed

Includes a weather forecast

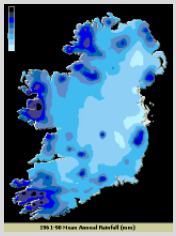
Nutrient Uptake Model

Aim to achieve 40% nutrient efficiency

Evaluated using SMD model



Observed and Forecast NWP 40 km grid



Only permitted if field with no transport vector forecast

Cannot advise spreading that will cause pollution

The project team →

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