

A large, stylized white graphic of a person holding a globe, set against a light gray circular background. The figure is composed of simple, rounded shapes, with the head and torso forming the upper part and the legs forming the lower part. The globe is represented by a series of curved, overlapping shapes that suggest a globe's curvature.

Healthy soils

SECURE Grand Challenge, University of Glasgow

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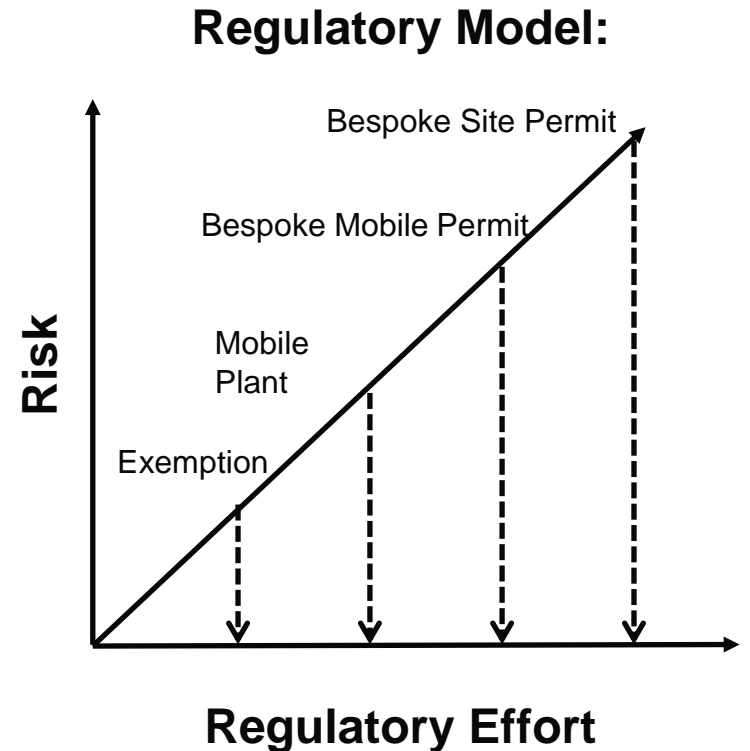
Healthy soils

- Healthy soils are vital to a sustainable environment
- Quality depends on complex interacting factors including inorganic and organic solids, structure, and a diverse and abundant micro- and macro-fauna
- Recycled materials benefit soils, but may also introduce physical and chemical contaminants

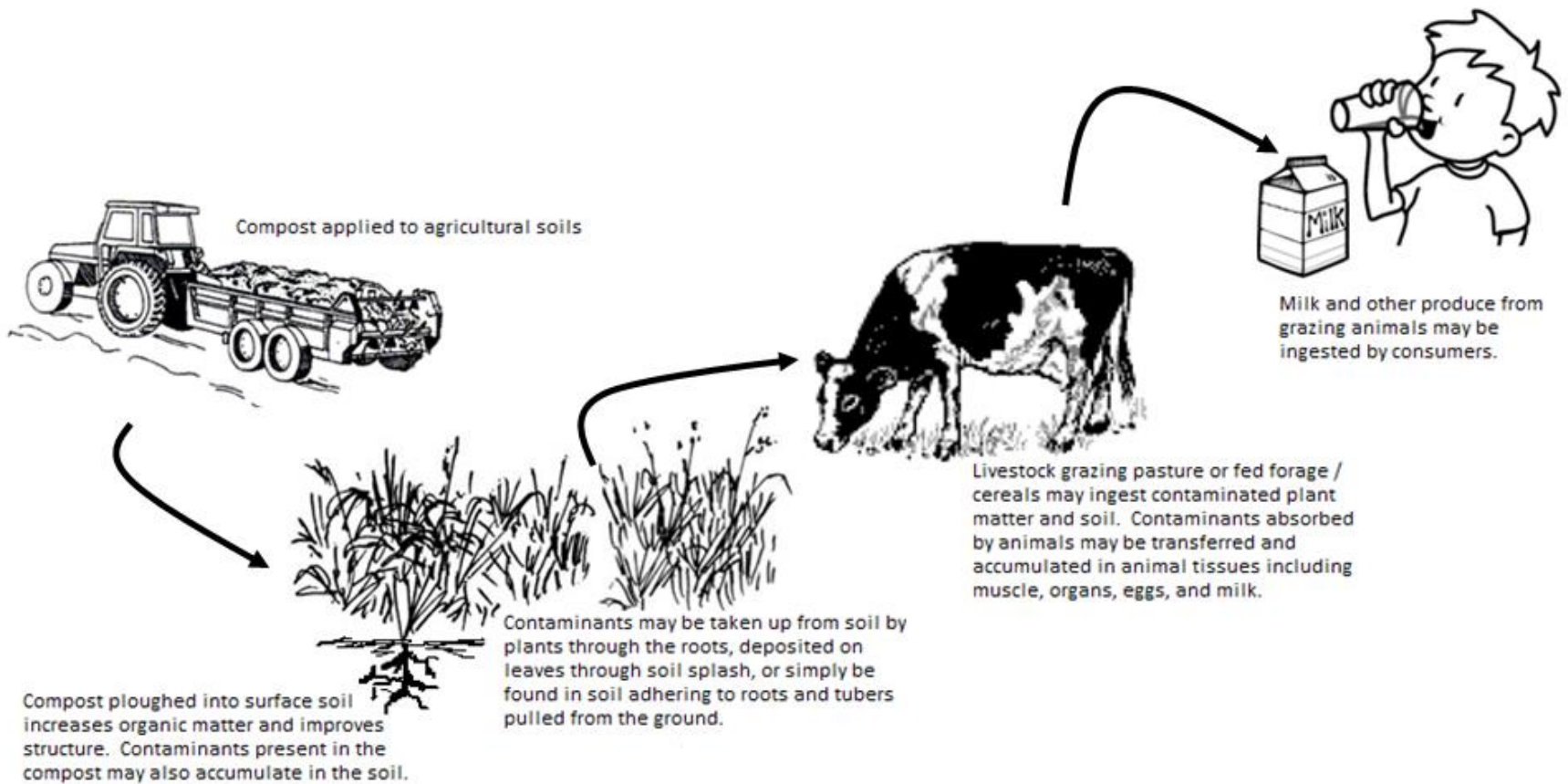


Recovery to land

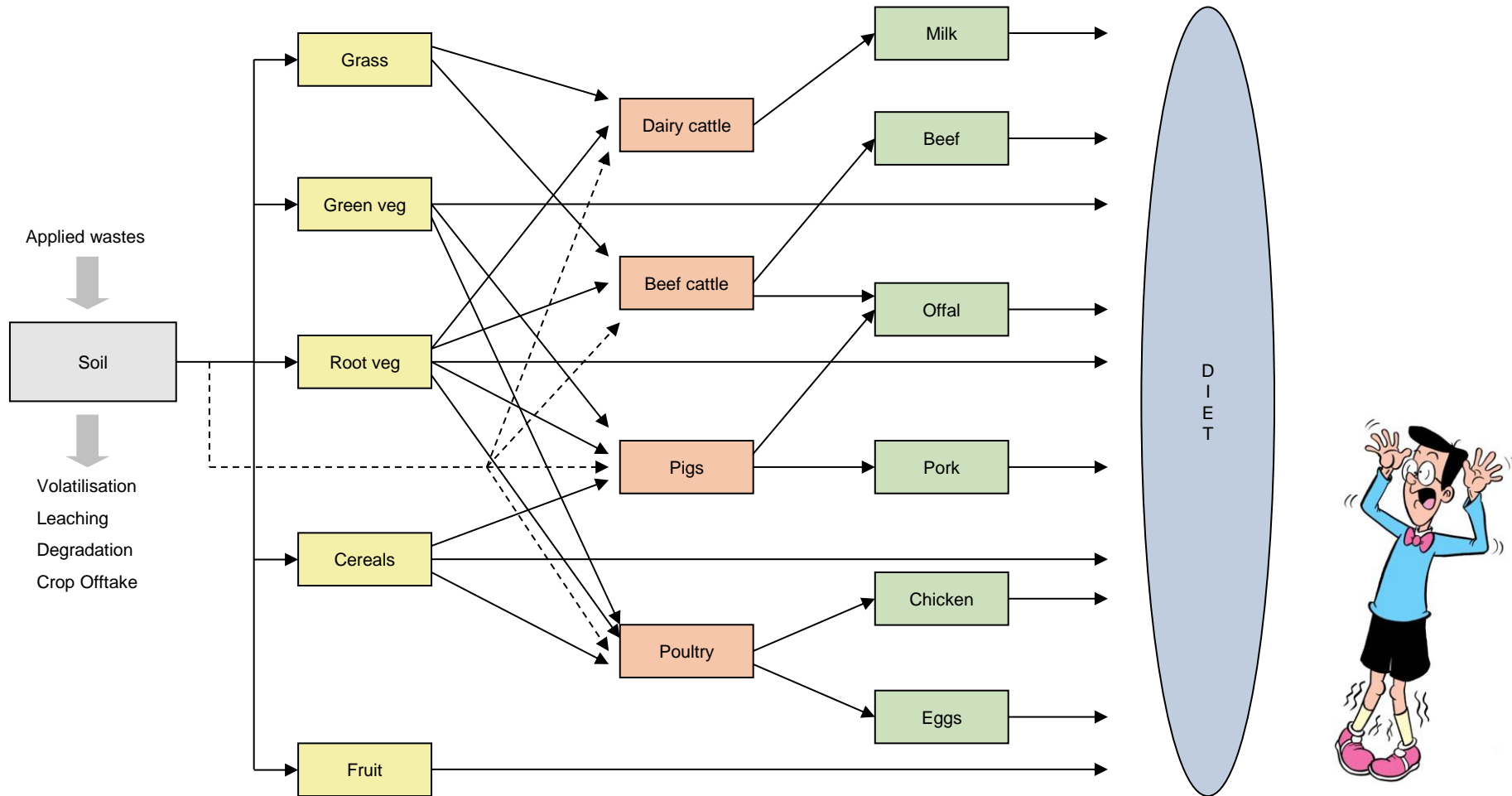
- Recovery of waste-derived materials
 - Key source of nutrients & soil improvers
 - Reduces cost to industry & land managers
 - Increases resource efficiency
- Regulatory approach
 - Relevant Objectives (WFD Art. 13)
 - We want recovery without harm
- Facts and figures
 - 10 Mt of biosolids, composts, digestates and other wastes spread each year
 - Applied to 2% of farmed area each year (150 – 250k ha)
 - We have issued 300+ permits and process 2,500 deployments per year



Protecting human health



Screening tools for health risks



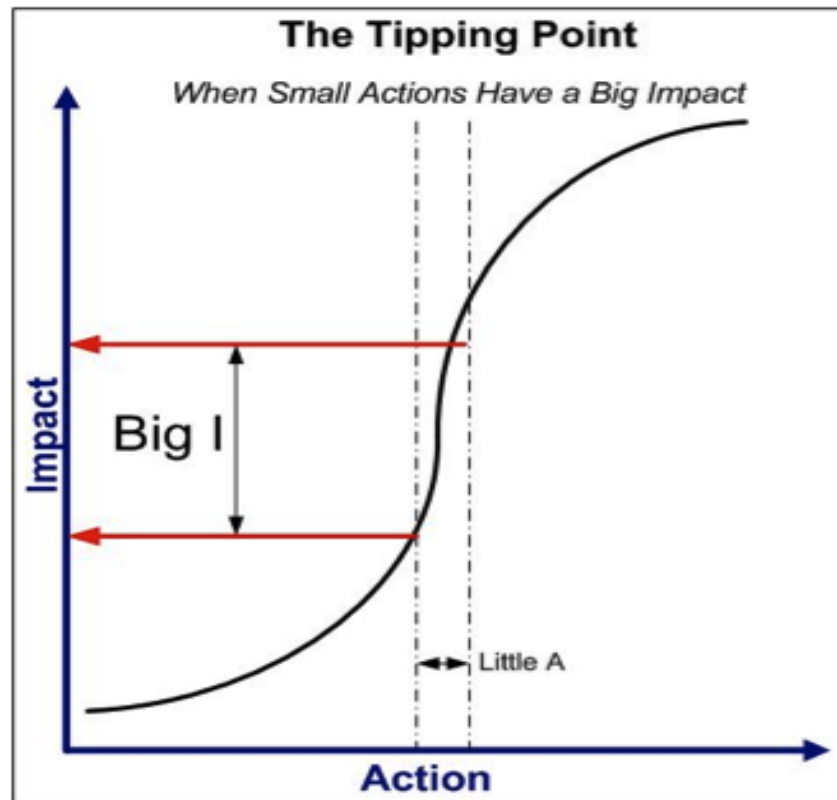
Our dilemma

... in regulation is to balance the potential aggregated risk from individual farms, while taking a reasonable and proportional site-specific response. On their own such farms contribute very little to risk at a national level. E.g., the amount of food that one medium-sized farm contributes to the diet of national consumers is infinitesimally small. However, the concern is that soils, once contaminated, remain so for decades and over time the amount and extent of contamination will spread. Therefore, the basis for risk assessment is often to consider a worst-case where all exposure comes from similarly polluted soils.



The challenge

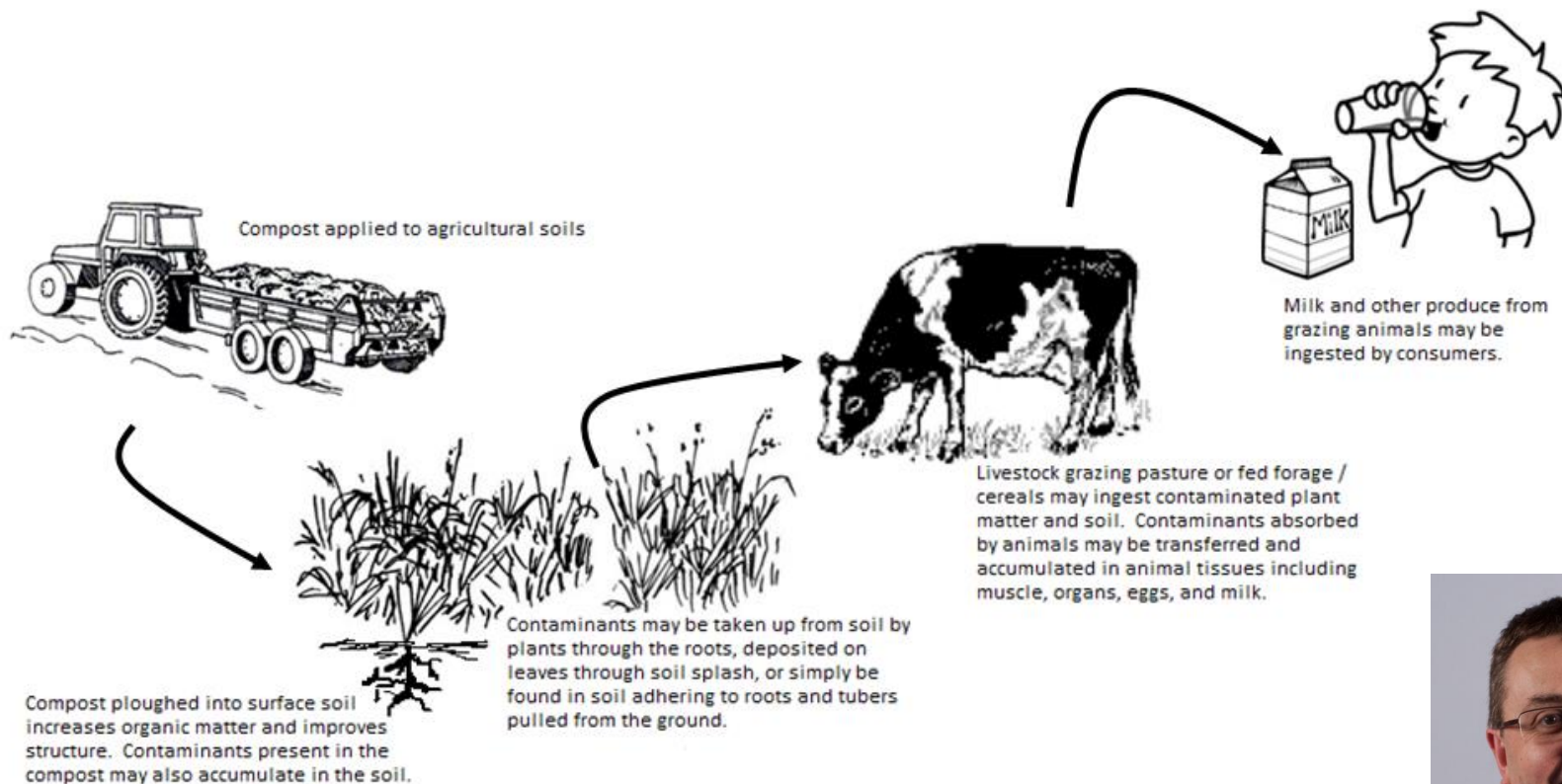
Is there any mathematical way to demonstrate and account for the progressive and aggregated effect of individual farms at a bigger (regional or national scale) in site-specific decisions and on the available landbank? How can we better evaluate the effect of individual decisions on the management of the landbank and the creeping effects of long-term environmental deterioration over time? Can we define a tipping point? Can we predict where we are on any change – response curve?



Available Datasets

Soils	Contamination – G-BASE (BGS), National Soil Inventory (Cranfield Soil and Agrifood Institute), GEMAS (BGS, European Datasets) Properties – LandIS, SOILSERIES, HORIZON (Cranfield Soil and Agrifood Institute)
Land use	Customer and Land Database (CLAD) – Rural Payments Agency British Survey of Fertiliser Practice (Reports and Datasets) – Defra Agriculture in the UK (Reports and Datasets) – Defra
Food consumption	National Diet and Nutrition Survey – Public Health England Living Costs and Food Survey – Office of National Statistics UK Food Balance Datasheets – Food and Agricultural Organization of United Nations
Spreading activity	Biosolids – Individual water companies register under Sludge Regulations Wastes – Environment Agency holds deployment information under EPR 2010

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