

## Appendix 3

### The impacts on human health and the environment (presentation)



# The impacts on human health & the environment arising for the spreading of sewage sludge to land


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Avonbridge Community Hall, Falkirk




The James  
**Hutton**  
Institute

## Project Overview



- The James Hutton Institute, together with RSK ADAS and Aqua Enviro, have been contracted by Scottish Government to:
  - **Undertake an impartial study** into potential negative impacts of sewage sludge on human health
  - **Update existing guidance** on how sewage sludges are used on land restoration sites,
  - Include guidance on how sewage sludges should be used on farm land
  - **Evidence-based recommendations for better practices**



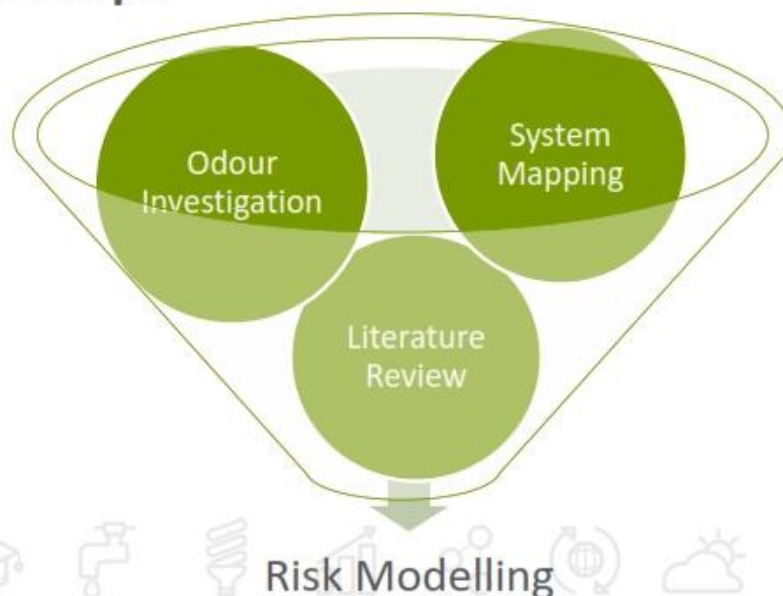
## Where you can help

### Evidence-based recommendations for better practices

- You can help us understand where issues have arisen and under what circumstances
- This helps develop recommendations for changes to best practice or (if essential) legislation
- Not all issues will be within scope of the project
- Beyond this, we can record concerns and ensure that they feature in our report to Scottish Government



## Project Scope



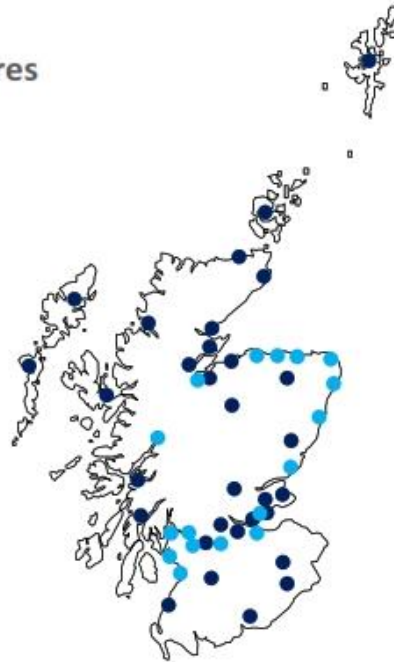
## System mapping

- Primary aim is to understand the amounts of different sewage sludges produced in Scotland
- Who and how these are handled
- Volumes spread to land (and where)

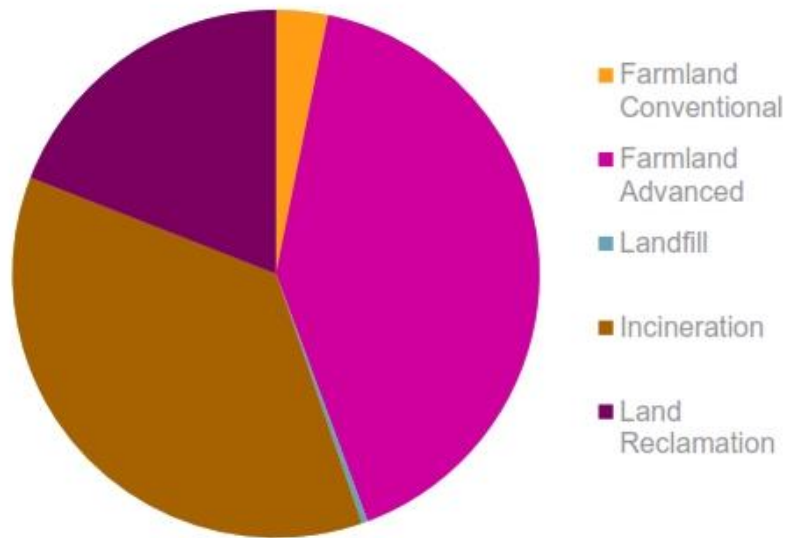


### Sludge Treatment Centres

Scottish Water 'core' sites  
Scottish Water 'PPP' sites



### Sludge markets in 2017 (tonnes dry solids)

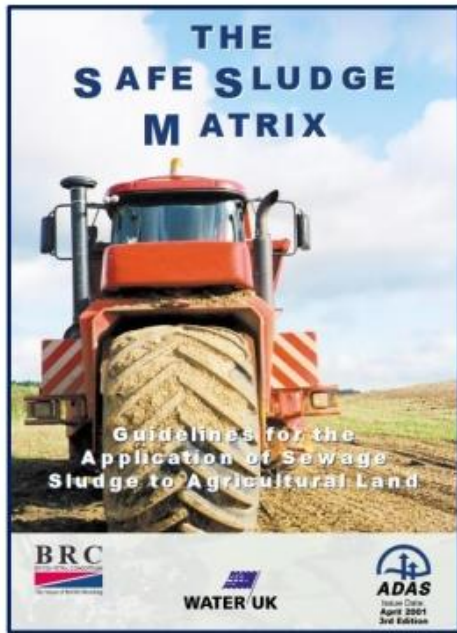


### Regulations and Codes of Practice



- Sludge Use In Agriculture Regulations (metals)
- Safe Sludge Matrix (microbial pathogens)
- PEPFAA and SNIFFER Codes (water and air pollution)
- Biosolids Assurance Scheme





| CROP GROUP                     | UNTREATED SLUDGES | CONVENTIONALLY TREATED SLUDGES             | ENHANCED TREATED SLUDGES |
|--------------------------------|-------------------|--|--------------------------|
| FRUIT                          | X                 | X  | ✓                        |
| SALADS                         | X                 | X<br>(20 month harvest interval applies)   | ✓                        |
| VEGETABLES                     | X                 | X<br>(12 month harvest interval applies)   | ✓                        |
| HORTICULTURE                   | X                 | X  | ✓                        |
| COMBINABLE & ANIMAL FEED CROPS | X                 | ✓  | ✓                        |
| GRASS & FORAGE                 | X                 | X<br>(Deep injected or ploughed down only) | ✓                        |
| - GRAZED                       | X                 | ✓  | ✓                        |
| - HARVESTED                    | X                 | ✓<br>(No grazing in season of application) | ✓                        |

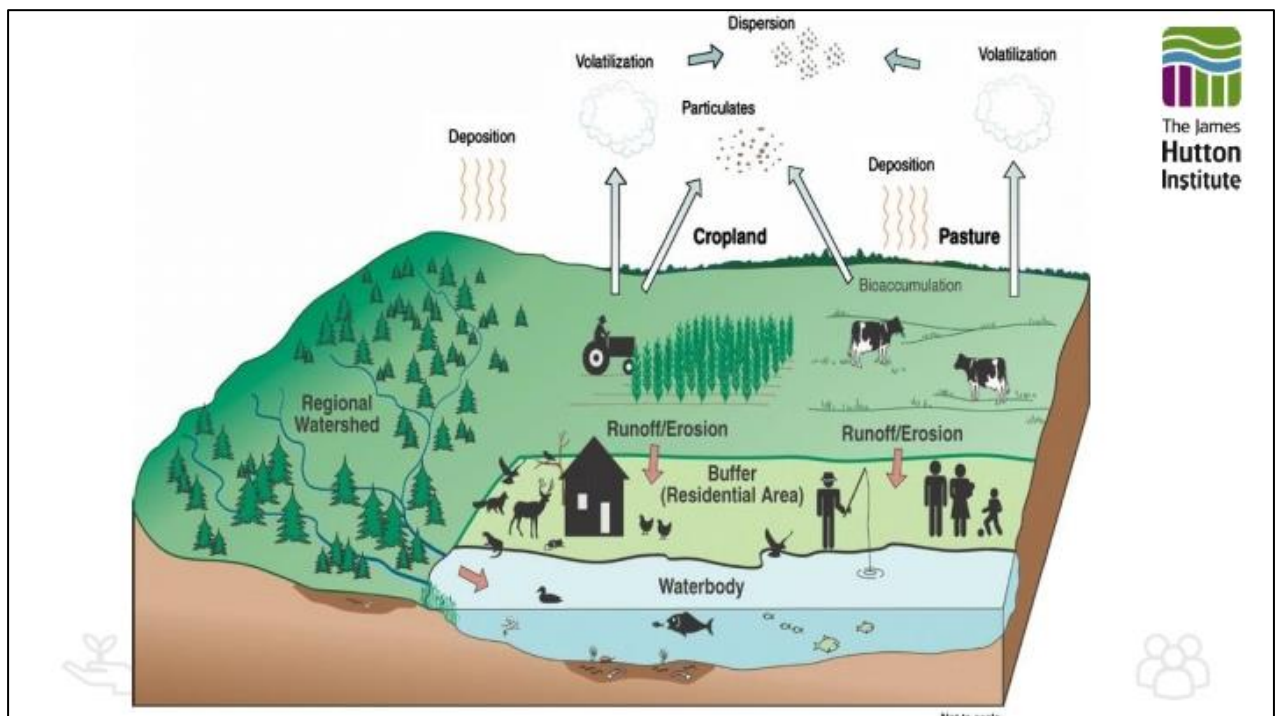
| Treatment type      | What it means for treated sludge quality      |
|---------------------|---|
| Conventional        | 99% pathogen destruction                      |
| Enhanced / Advanced | 99.9999% pathogen reduction + Zero Salmonella |

## Odour Measurements



# Risk Modelling/Assessment

- Risk Assessment estimates **potential** for something to happen
- The approach tends to err on side of caution
- Risk Assessment flags up where further investigation may be needed...
- ...or what measures should be taken to reduce risks
- It cannot tell us that harm is actually occurring



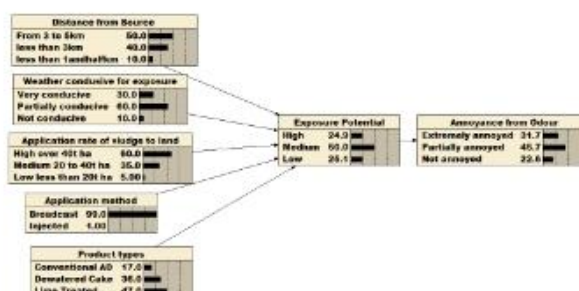
## Approaches (I)

- Commentary
  - Information either very poor, incomplete or missing
  - Based on literature review and expert judgement
- Microplastics



## Approaches (II)

- Bayesian networks



- Computer models that aid decision making
- Used where data have large uncertainties, making fully quantitative estimates of risk less meaningful
- Mixture of 'hard' data, judgement and opinion
- Explores interaction between different factors
- Odours



## Approaches (III)

- Fugacity modelling
  - Based around chemical partitioning
  - If a chemical is placed in an oil:water mixture, does it partition mainly to oil or water?
  - This tells us something about how the chemical might move in the environment
  - Lots of assumptions... Tends to over-estimate risk
  - 'Emerging' contaminants.... Pharmaceuticals, personal care products, etc.



Thank you

