

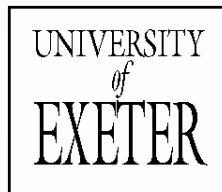
Rural Economies and Land Use (RELU) Programme

Sustainable and holistic food chains for recycling livestock waste to land

Dr. Dave Chadwick (IGER)

Prof. Louise Heathwaite (Lancaster University)

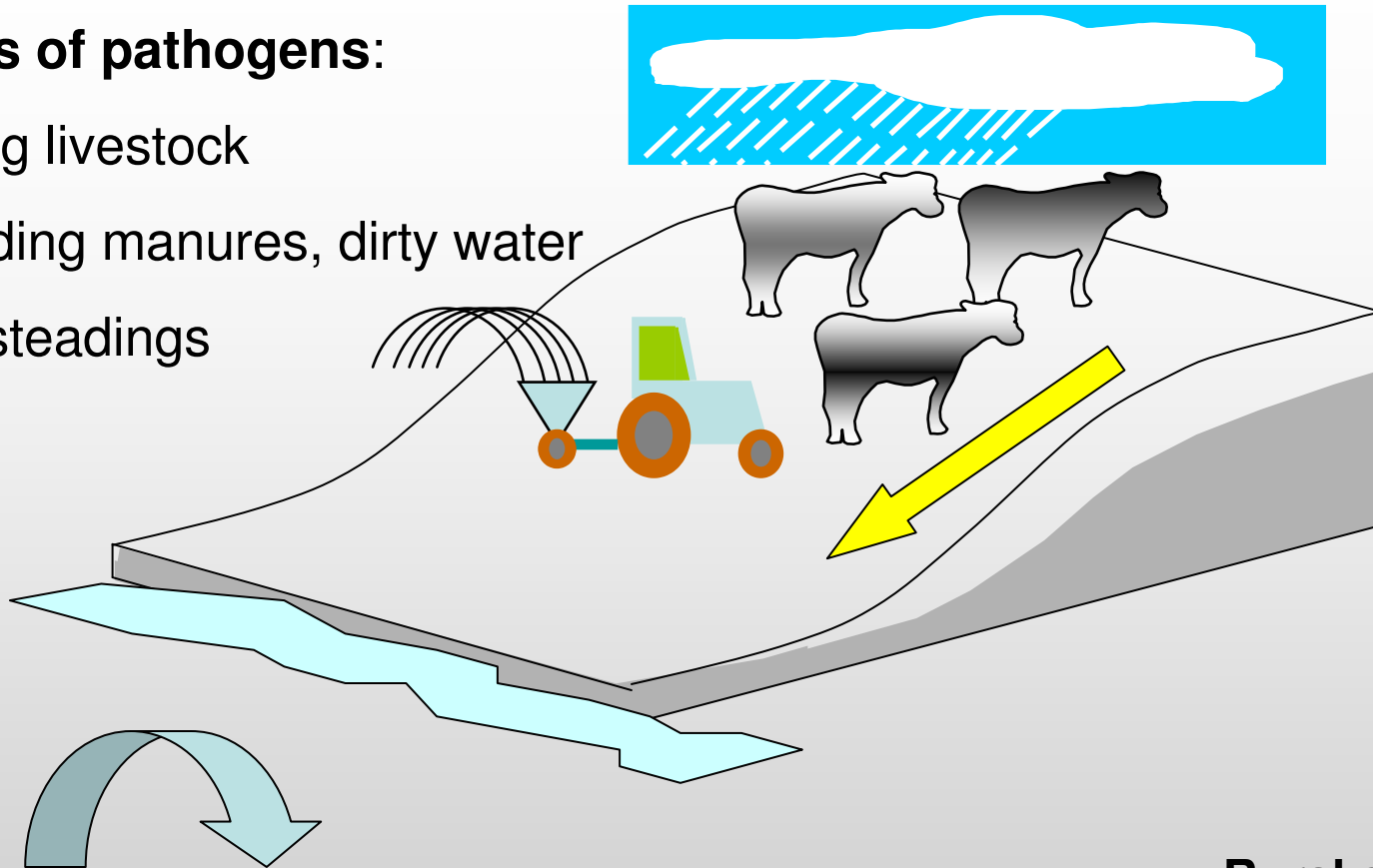
Prof. Michael Winter (University of Exeter)



BACKGROUND - pathogen transfers from livestock agriculture

Sources of pathogens:

- Grazing livestock
- Spreading manures, dirty water
- Farm steadings



Pathways:

- Drains
- Ditches
- Runoff
- Livestock in streams

Downstream impacts on:

Industries dependant on clean water

Shell fisheries



Tourism



Rural economies



AIMS

To determine the potential impact of introducing changes in management to control pathogen transfers from:

- grazing livestock
- manures (slurry, dirty water, solid manure)
- other waste streams (e.g. biosolids)

And determine the impact on:

- Farm economics
- Practicalities at the farm level

And 'knock-on' effects on:

- local communities
- Industries

Using a multi-scale approach from farm to regional level

APPROACHES I - Farm and Regional Scale

- Determine current perceptions of farmers, retailers, consumers & local 'downstream' industries (tourism, shell fisheries)
- Assess impacts of changes in practices at the farm level on costs (farm, other stakeholders, region)
- Undertake risk assessments of pathogen transfers to the food chain from selected farms under current livestock/manure management practices
- Undertake targeted monitoring on farms (up to 10) to establish relationships between livestock/manure management & FIO transfers
- Develop measure to encourage changes in management practices to reduce risk of pathogen transfers & determine impacts on effluent flows & FIO transfers to water

SPECIFIC OBJECTIVES I - Farm and Regional Scale

- Interview up to 100 farmers (decision making process; waste management practices)
- Establish focus groups (farmers/other stakeholders)
- Develop risk assessment for farms
- Targeted monitoring of FIO transfers (10 farms) + farm activity data
- Change management practices & assess changes in FIO transfer
- Assess costs, practicalities and applicability of pathogen control measures on farms and impacts on **local communities and industries**

APPROACHES II - Farm and Experimental Scale

- Review pathogen controls measures
- Conduct additional experiments to determine:
 - controls on pathogen survival on farmsteads, e.g. manure/dirty water stores/collection yards (*storage time, temperature, ammonia concentration, UV radiation, nutrient availability*)
 - factors controlling pathogen survival in soil following dung deposition/waste applications
 - mechanisms of pathogen transport

Results from these studies will be used for:

- on-farm risk assessments
- measuring the impact, costs and applicability of on-farm management practices

SPECIFIC OBJECTIVES II - Farm and Experimental Scale

- Review pathogen control measures (loads, mobilisation, delivery)
- Assess methods to reduce pathogen transfers to receiving waters from grazing animals & after spreading manure
- Elucidate factors controlling pathogen survival in manure stores and soils
- Investigate mechanisms of transfer from soil

PROJECT RESOURCES

TIME: 3 years, commencing November 2004

FUNDS: £398k funded by RELU programme

TEAM: IGER, Universities of Lancaster & Exeter + 3 RAs

IGER (North Wyke) – farm-scale processes and practices

Evaluation of field/farm-scale practices; sampling of effluent flows/transfers of FIOs (selected farms); controls on pathogen survival in manures stores, dung and soil; transport mechanisms in soils

University of Exeter – farmer/community/stakeholder perception/needs @ farm to regional scale

Farmer interviews; current perceptions on pathogen transfers, engaging stakeholder groups, facilitating farmer and stakeholder group discussions using citizens jury approach; economic impacts

Lancaster University – integrated risk assessment @ farm to regional scale

Evaluation of farm to catchment scale risk (current/future) management practices; development of field based risk assessment tool; source-transport-receptor modelling

FARM / FIELD

CATCHMENT / REGIONAL

