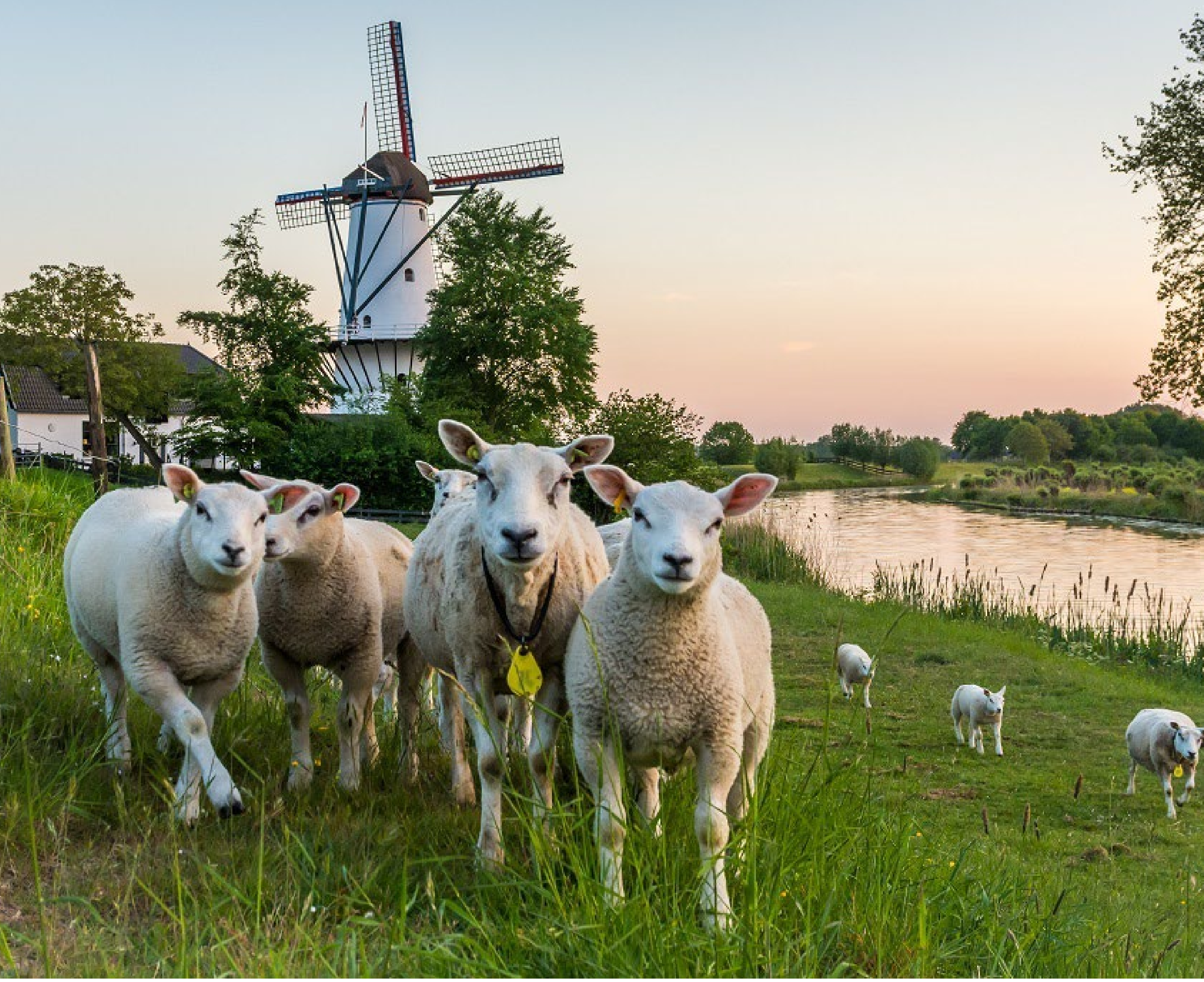
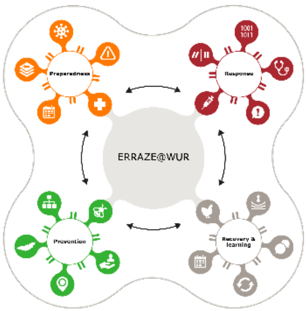


Paradigm Shifts for Global One Health

Greater resilience requires transformation and integration

Book of Abstracts



International symposium
23-25 April 2024
Wageningen, The Netherlands

WAGENINGEN UNIVERSITY & RESEARCH

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

NWO

MED-VET-NET ASSOCIATION

Colophon

Paradigm Shifts for Global One Health
Book of Abstracts

International Symposium
23-25 April 2024,
Wageningen, The Netherlands

Editors: Joukje Siebenga, Erika van Gennip, Roosmarie Vriens, Wageningen University & Research

DOI: 10.18174/655105

ERRAZE zoonotic framework - intervention & simulation model for disease outbreaks in the Netherlands involving wildlife, livestock and vectors.

Schmid BV 1), Boersma S 2), ten Bosch Q 1), Hartemink N 1,2), Stuck L 2), Oosterling T 1)

1) Wageningen University, Animal Science Group, Quantitative Veterinary Medicine
2) Wageningen Research, Biometris

Imulation modeling is a useful tool when faced with an outbreak with severe economic or zoonotic potential. It is one of the few ways in which governments can get quantitative feedback on the effectiveness of different proposed interventions (e.g., closing farms, restricting access to recreational areas, lockdowns), and can weigh that effectiveness against the negative effects that the intervention has on business and the population.
To build these simulation models, model capabilities need to be designed and coded, and data sources need to be collected and curated. These processes are best done prior to an outbreak as they can take considerable time. Within the larger ERRAZE Pandemic Preparedness framework of Wageningen University & Research, we focus on preparing a generic outbreak simulation model suitable for wildlife and livestock diseases.
To simulate outbreaks that can handle the scale of the Netherlands, with its ±190 million livestock animals and millions of wildlife animals and birds, we use SimInf, a stochastic metapopulation differential equation framework that uses the R language as an interface to compile parallel C code.
Here we present our efforts thus far: we have tailored SimInf to the Dutch setting with several design decisions that allow for (1) farms to communicate through transport, (2) farms and wildlife in the environment around farms to communicate through the shedding of virus particles or the local movement of vectors in a non-stochastic layer, (3) the diffusion of virus particles or vectors to neighboring grid cells and (4) the migration of wildlife between grid cells.
To test the simulation model, we are working on case studies such as Bluetongue virus and Swine Influenza, which include data layers such how the wind influences the dispersion of bluetongue virus by midges and how pigs are traded across the Netherlands.
In the coming years we will continue to consolidate, document, and extend this model, as well as work on generating anonymized data layers for trade, so that all components of the model can be open sourced.

Keywords: Outbreak Simulations, Intervention modelling, Netherlands livestock-wildlife interface, ERRAZE