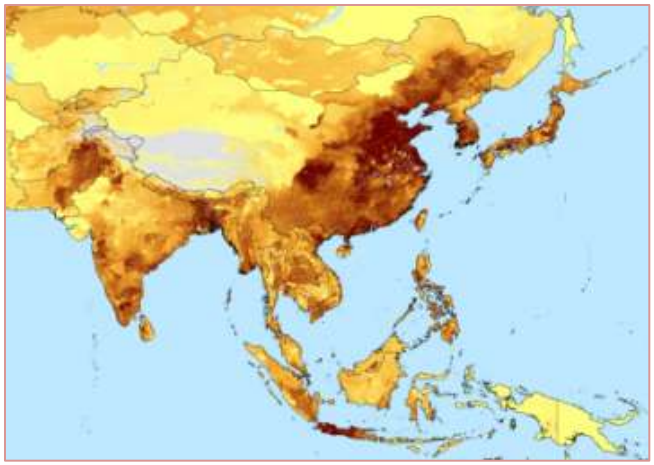
Livestock-Geo-Wiki

Manure management component

Timothy Robinson

Global Agenda of Action Focus Area workshop: Waste to worth (FA3)

Bangkok, 19 August 2013



ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR

Acknowledgements

- Jeroen Dijkman
- Pierre Gerber
- Steffen Fritz
- Philip Thornton
- Theun Vellinger
- Marius Gilbert
- Simon Hay

Overview

- Context – integrated approach
- Livestock-Geo-Wiki
- Livestock distributions and production systems
- Manure management and mapping
- Feedback methods
- Developments to date and future plans

The global livestock sector

- Demographic and social changes

➔Growth in demand for animal source foods

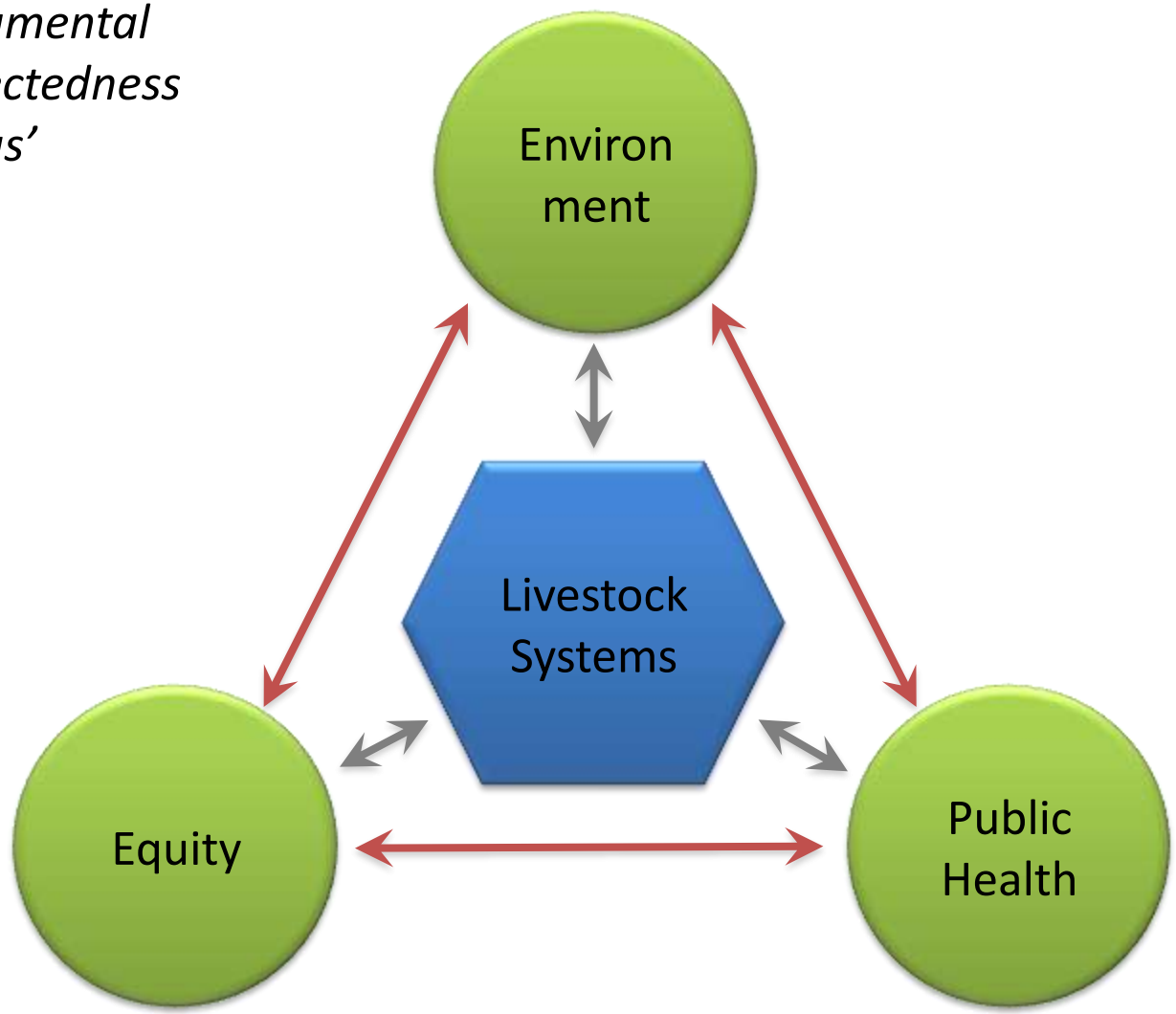
➔Structural changes in the livestock sector

➔Impinges on three global public goods associated with the sector:
  - Equity
  - Environment
  - Public health

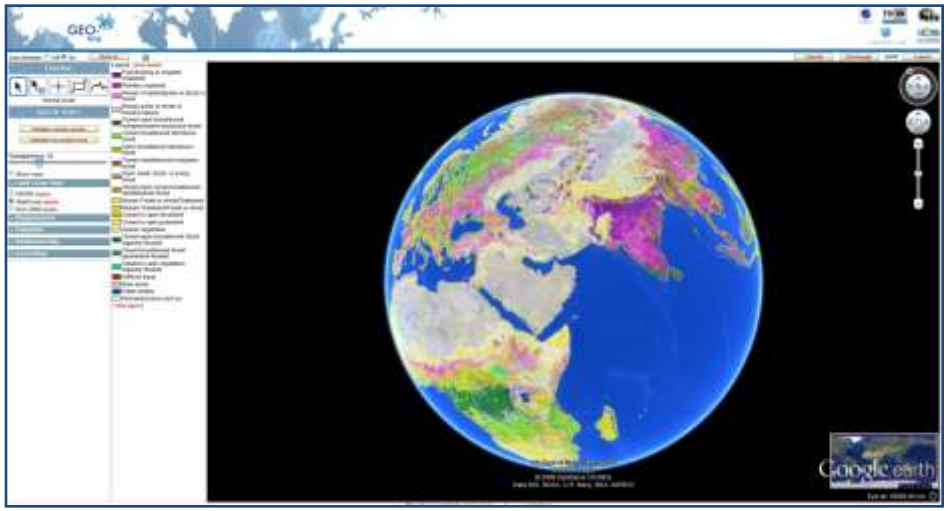
- These are interlinked, calling for an integrated approach to socially desirable livestock sector development
- This in turn calls for reliable data and information to guide sector development

The global livestock sector

'The fundamental interconnectedness of all things'



Livestock-Geo-Wiki



International Livestock Research Institute

Food and Agriculture Organisation of the UN

International Institute for Applied Systems Analysis

Université Libre de Bruxelles

Wageningen University

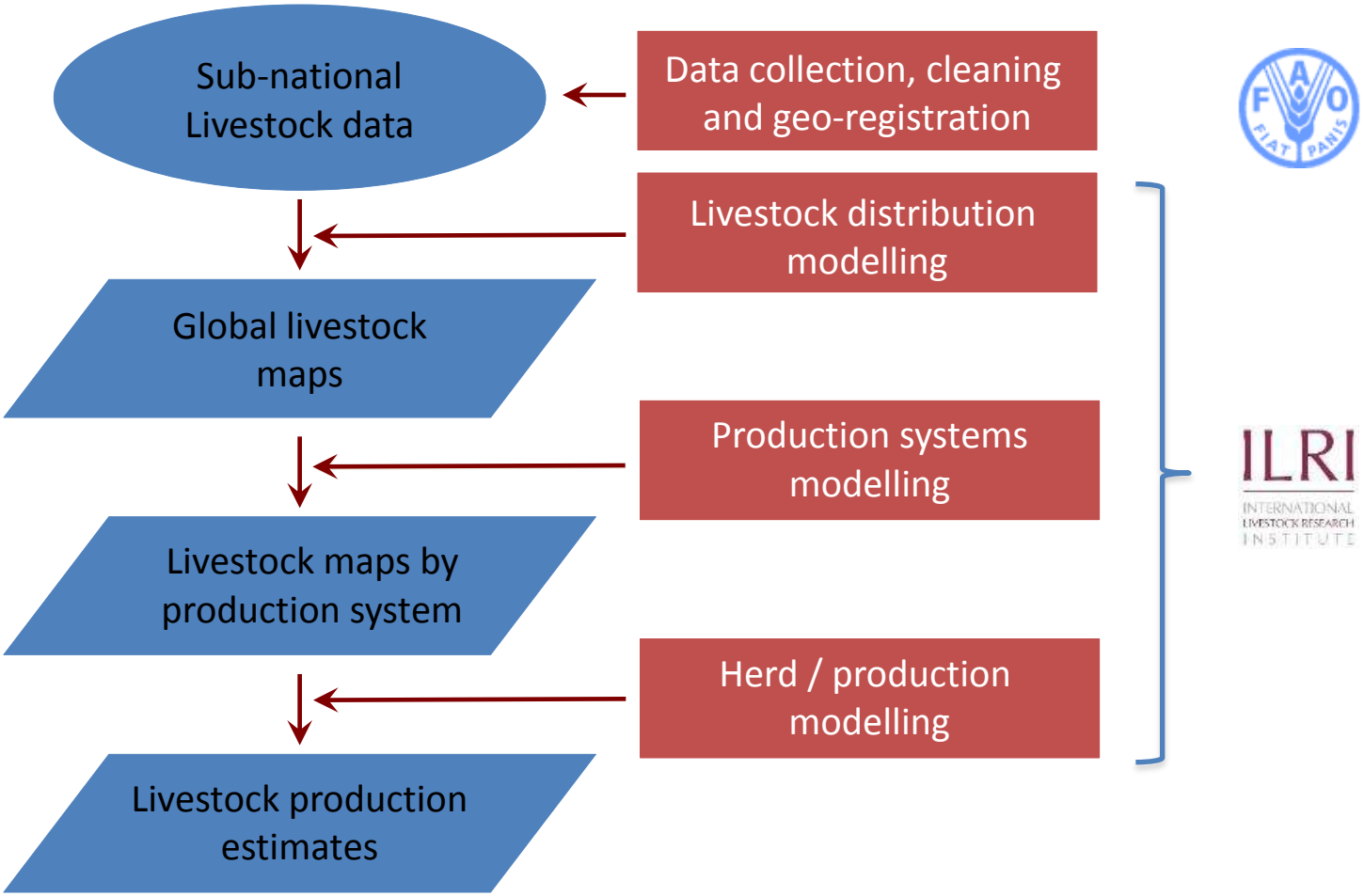
University of Oxford

- Raising awareness
  - Data visualisation
- Data dissemination
  - Open access
- Data validation
  - Crowdsourcing
  - Field studies (CGIAR)
- Impact assessment
  - Scaling up interventions
- Analytical tools
  - Production models
  - Lifecycle assessment (LCA)
  - Risk models

Livestock-Geo-Wiki

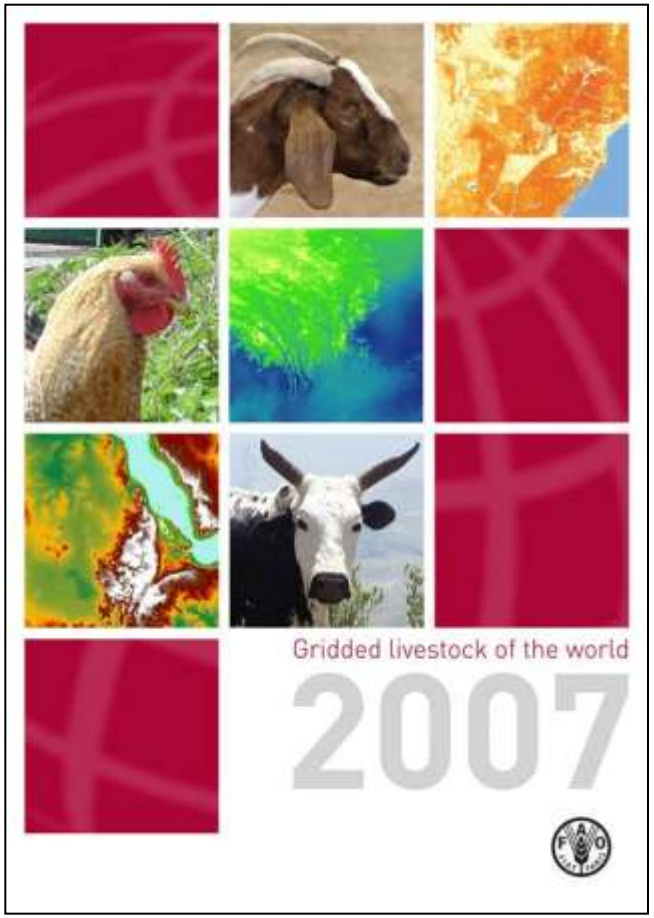
Primary modules	Principal data resources
Livestock systems and densities	• Livestock densities • Livestock production systems
Livestock production and economics	• Feed resources and rations • Livestock production • Demand for animal-source foods • Poverty and livestock ownership • Marketing and trade
Livestock environment	• Manure management • Greenhouse gas emissions • Land degradation • Carbon sequestration
Livestock and public health	• Disease distribution • Disease risk maps

Livestock distribution and production



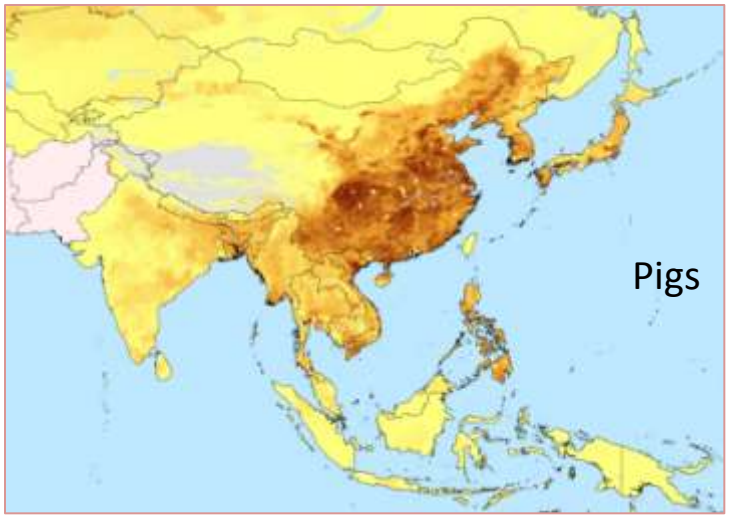
Livestock distributions (GLW 2007)

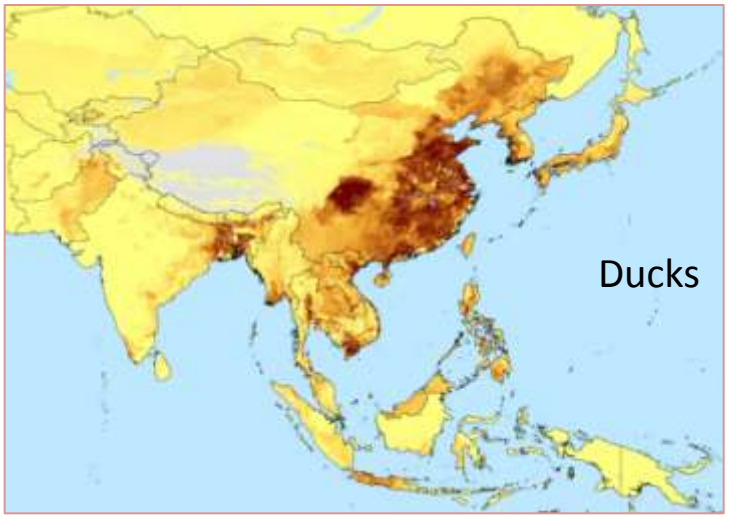
- Gridded Livestock of the World (GLW)
- Global coverage
- 5 km resolution GIS data
- All major livestock species
- Predicted densities, standardised to 2000 and 2005 (FAOSTAT)
- Freely available in graphic, GIS (ESRI) and Google Earth formats

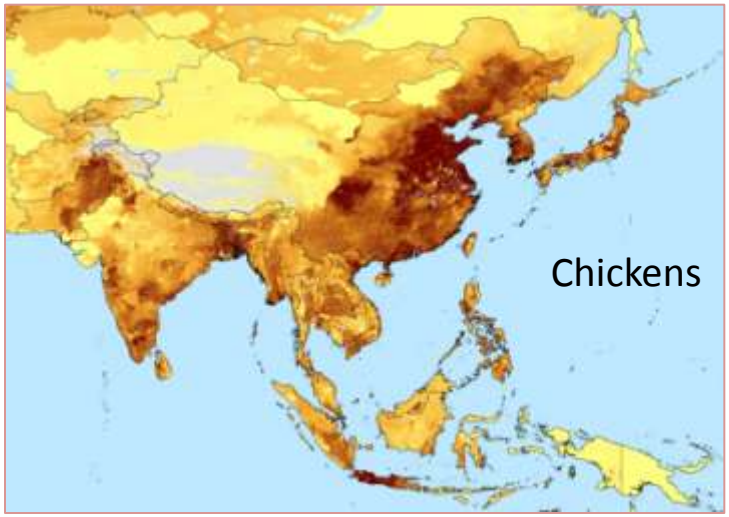


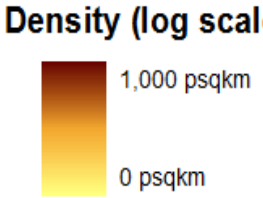
Wint and Robinson (2007)

Livestock distributions





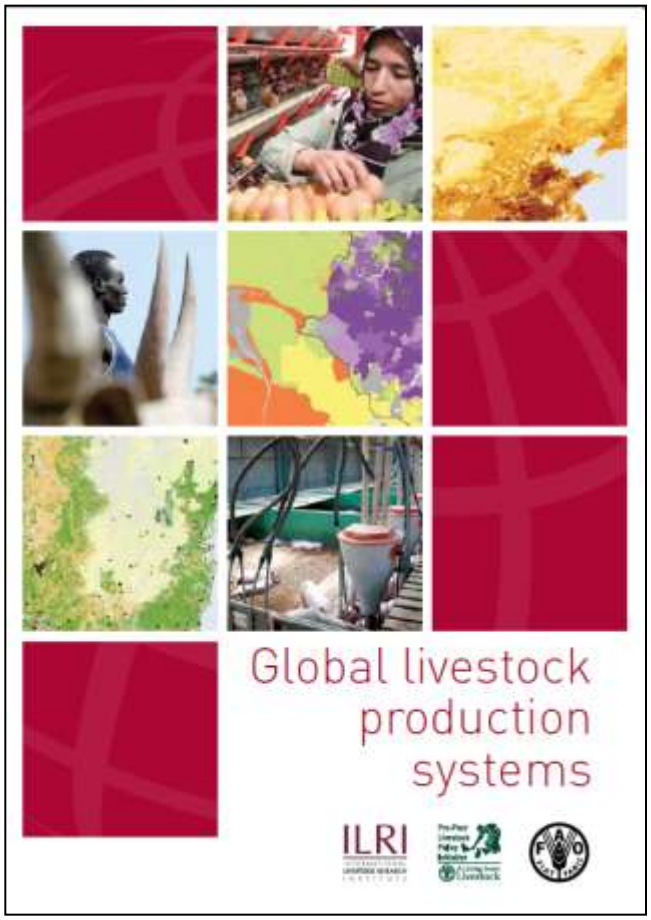




- Updated sub-national statistics
- 1km MODIS data (2001-2008)
- Standardised to FAOSTAT 2006
- New, improved modelling approach
- Accuracy estimates (internal)
- Cluster computing (SIB)

Source: Robinson, Gilbert et al. (2013)

Livestock production systems



Robinson et al. (2011)

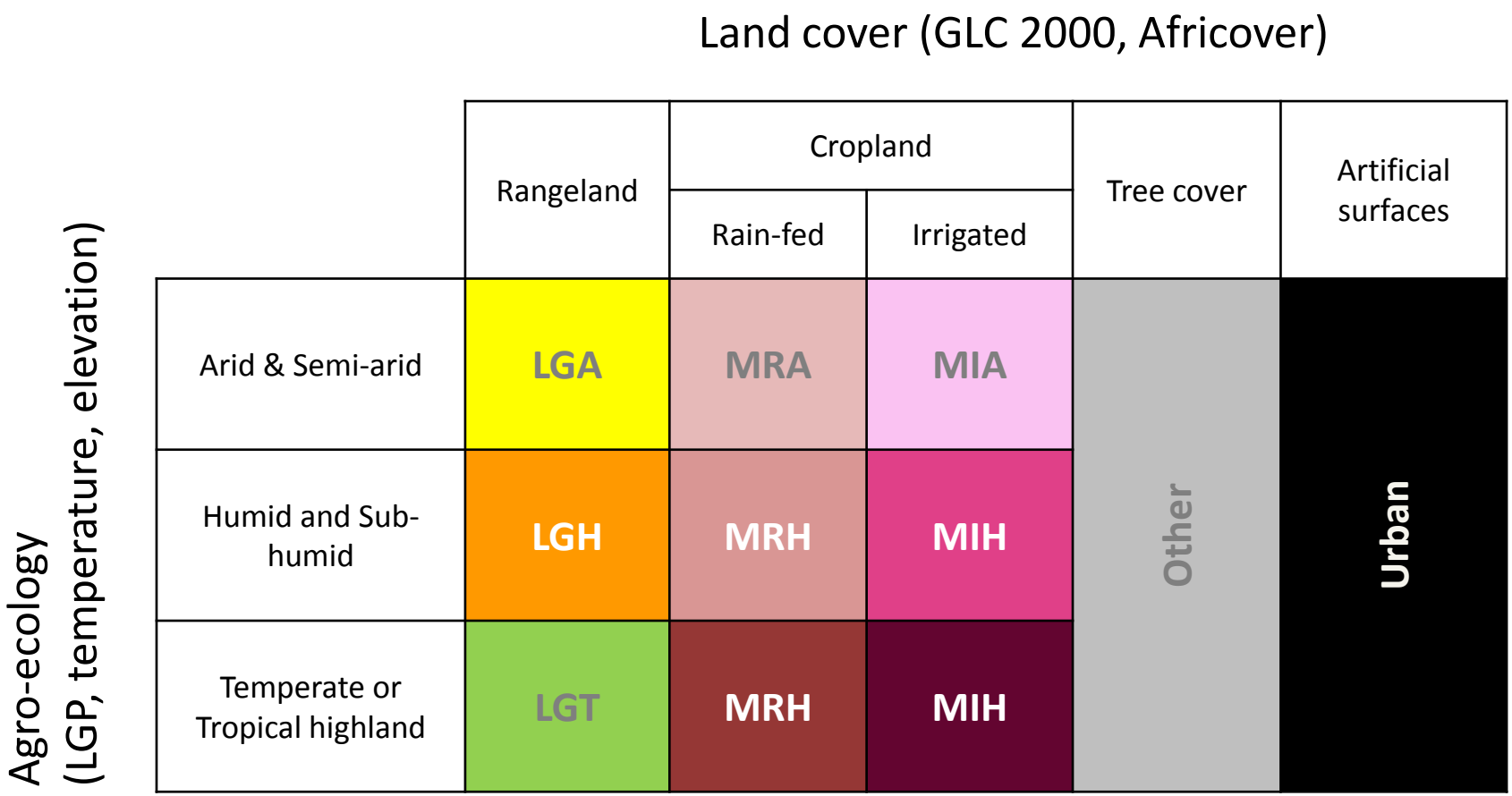
Ruminant systems:

- Based on land use and agro-ecological potential
- No actual livestock data

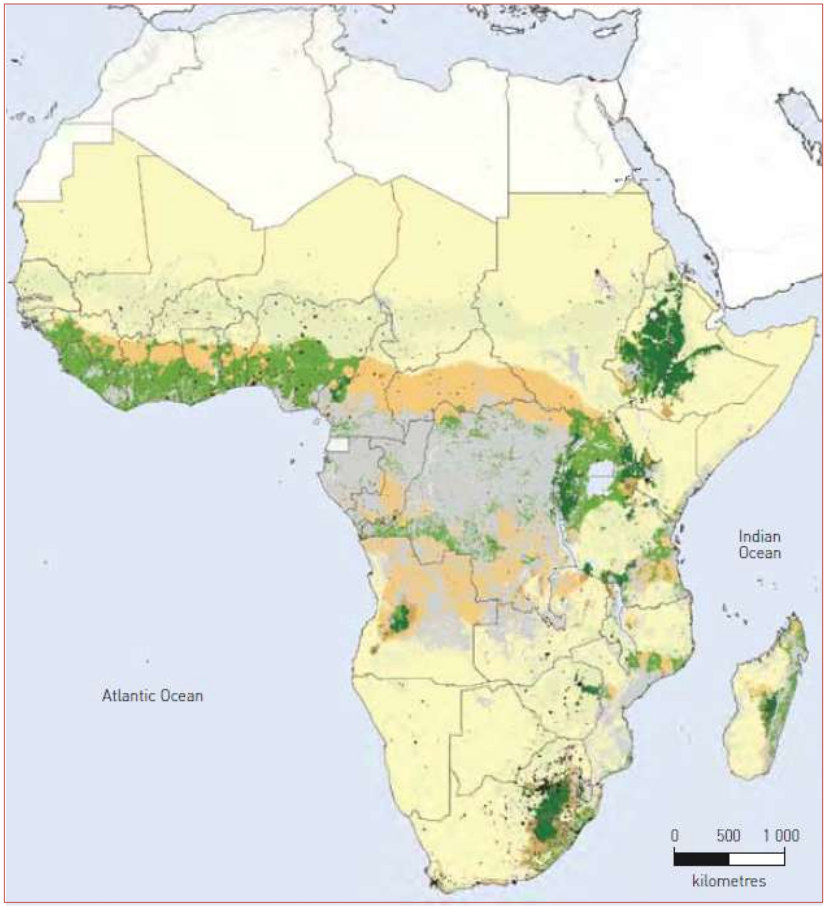
Monogastric systems:

- Based on scale and intensification
- Use livestock densities

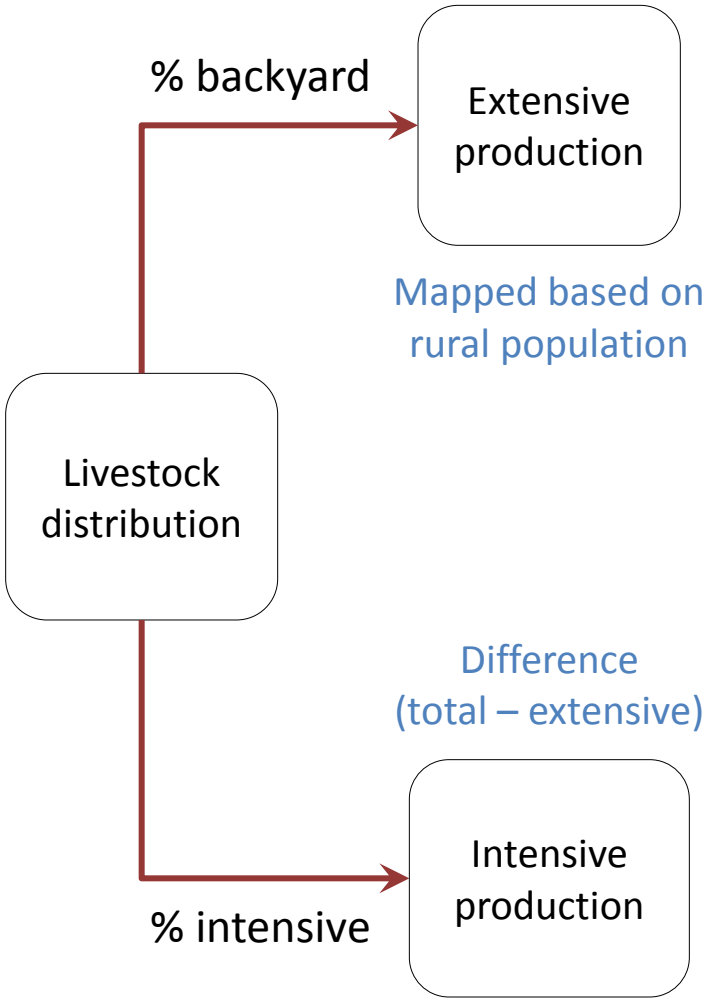
Ruminant production systems

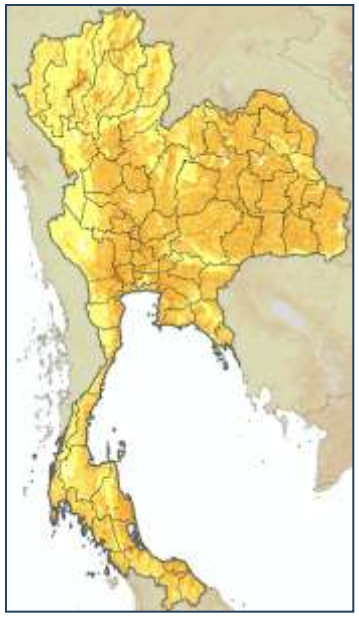


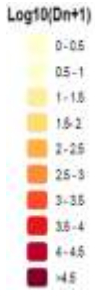
Ruminant production systems (v5)

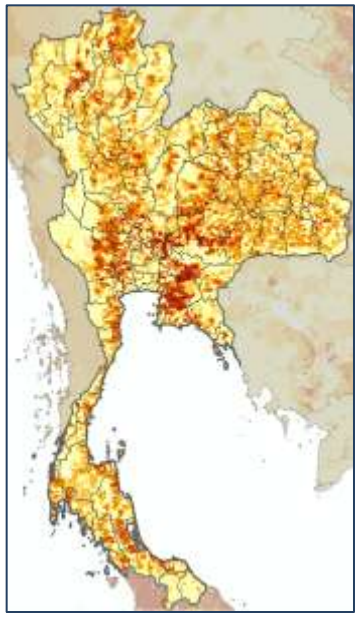


Monogastric production systems

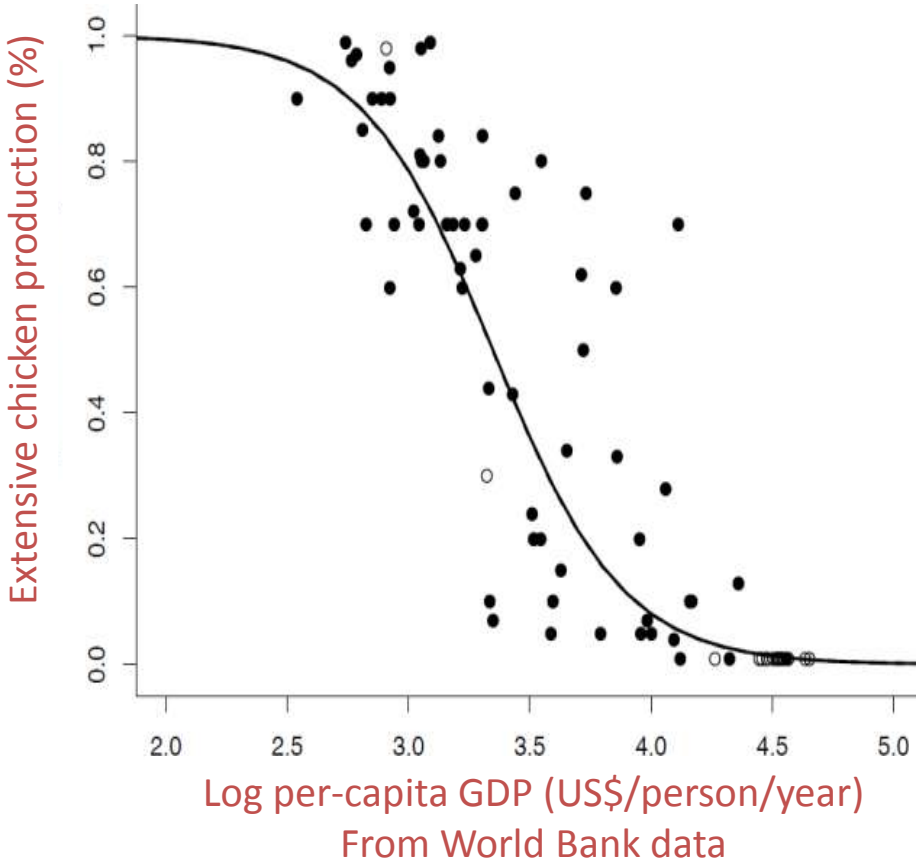




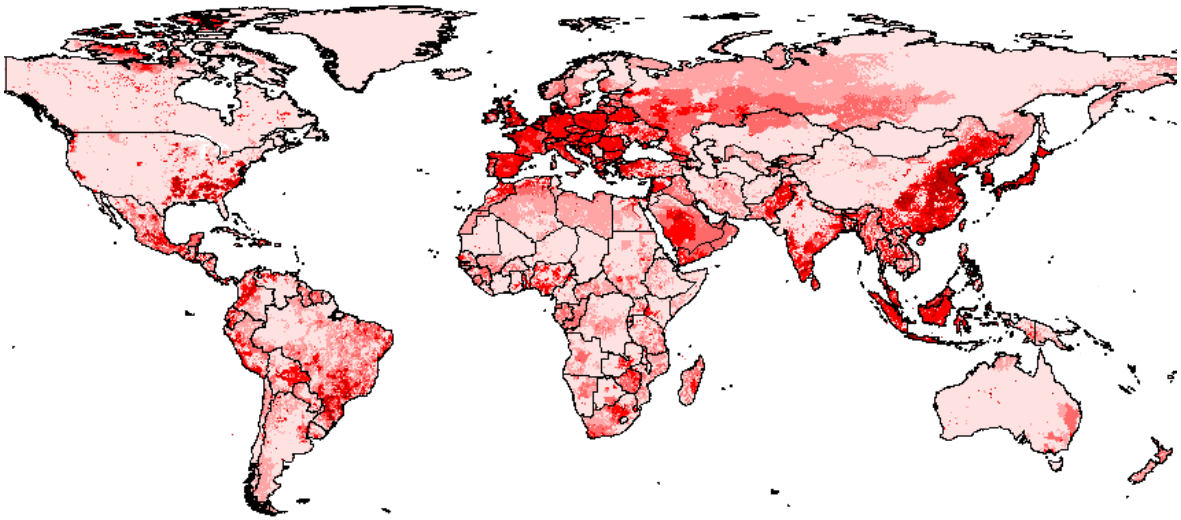




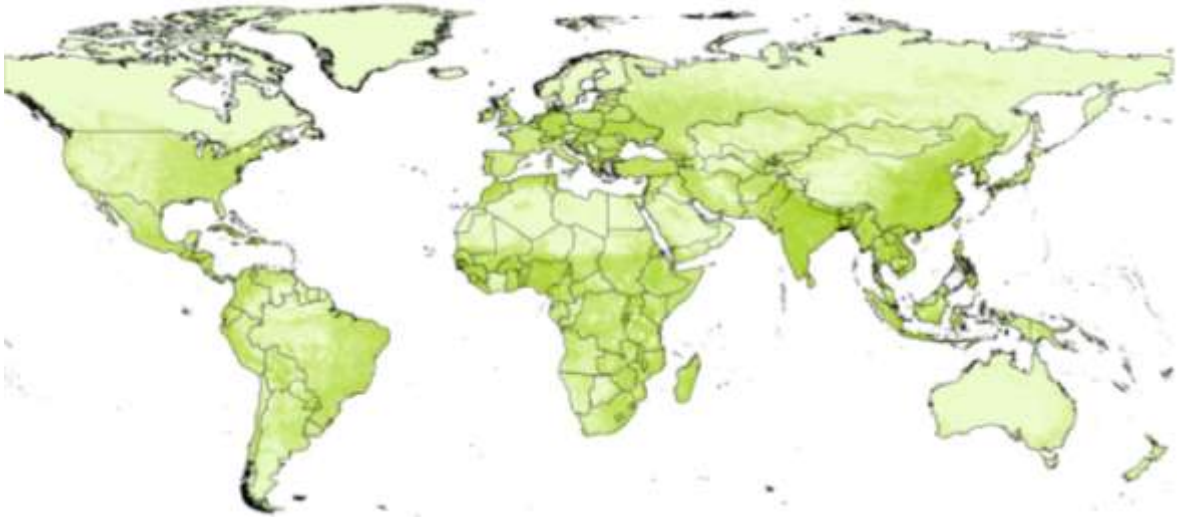
Chicken systems



Chicken systems

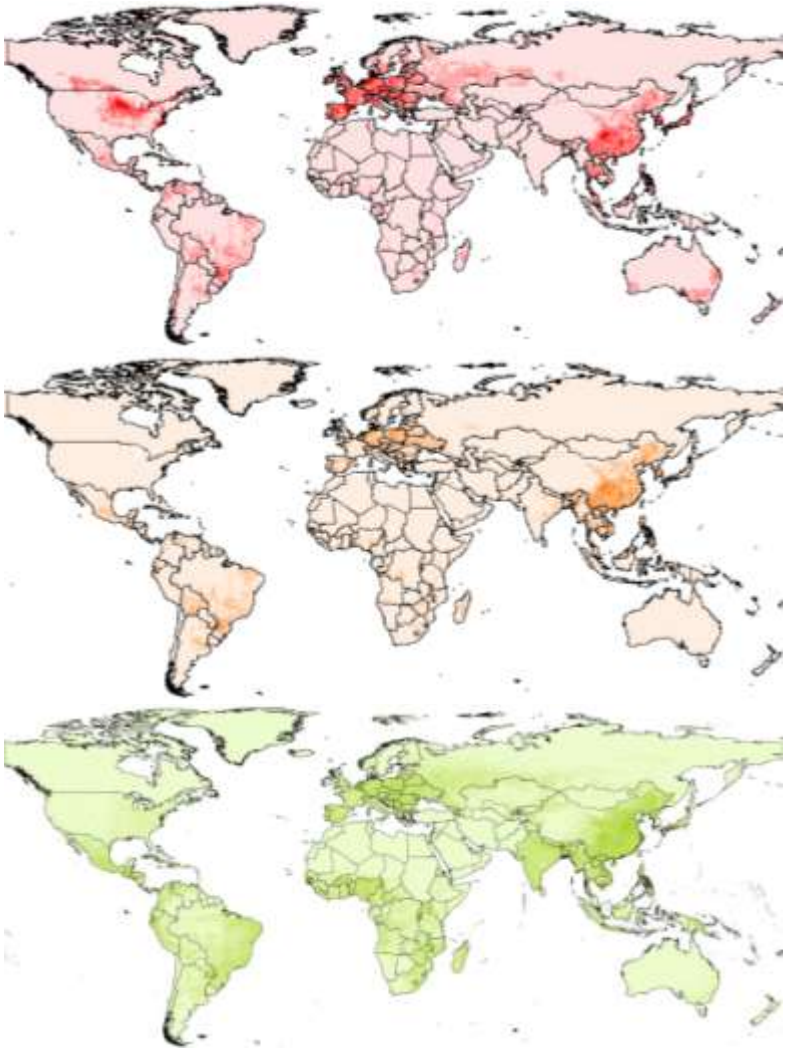


Intensive chicken production



Extensive chicken production

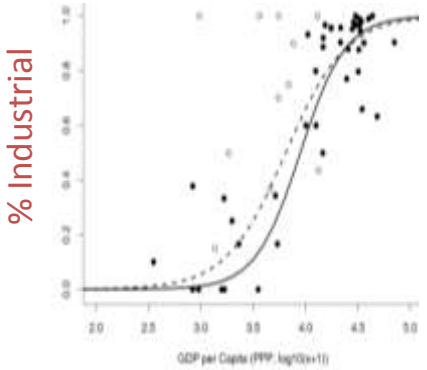
Pig systems

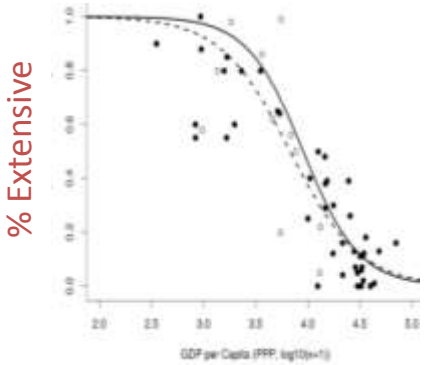


Industrial pig production

Semi-Intensive pig production

Extensive pig production





Livestock-Geo-Wiki

Primary modules	Principal data resources
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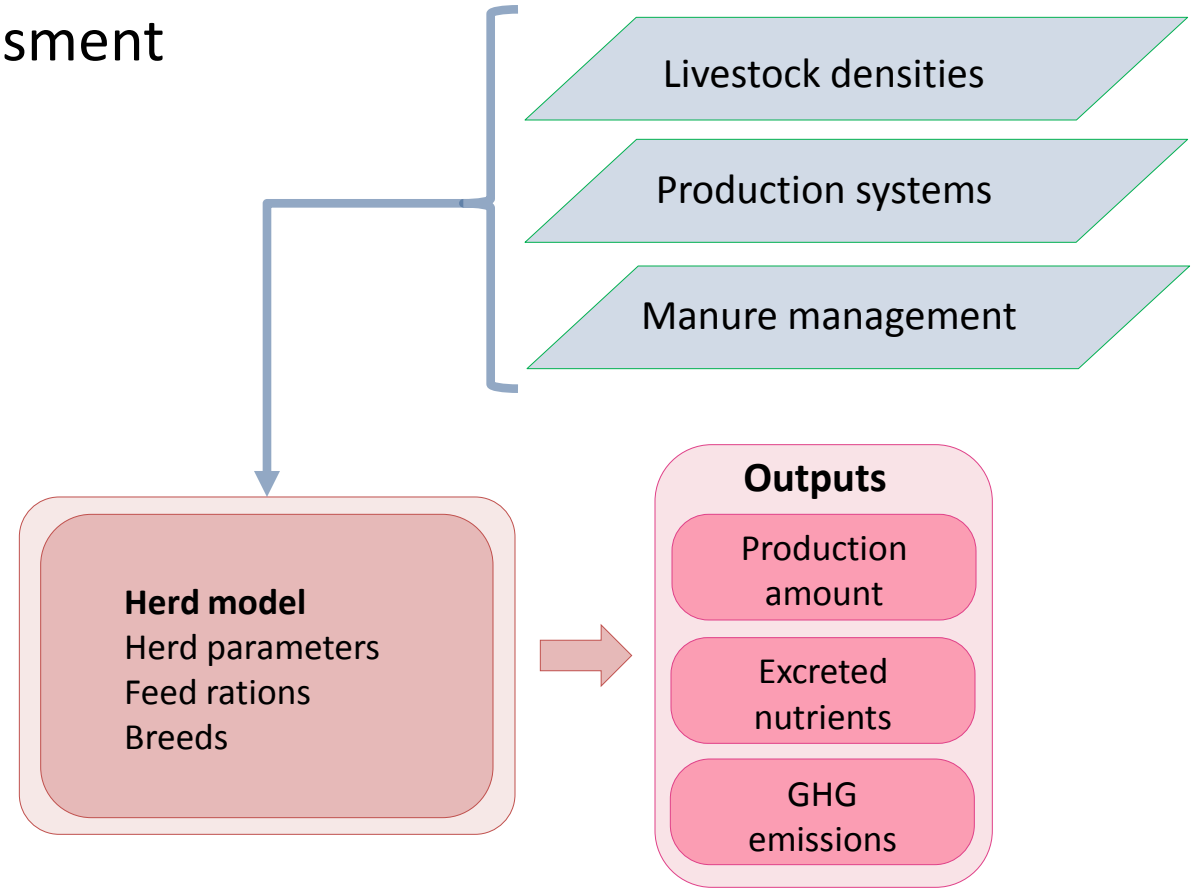
Livestock environment	• **Manure management** • Greenhouse gas emissions • Land degradation • Carbon sequestration
Livestock and public health	• Disease distribution • Disease risk maps

Estimating manure production

Lifecycle Assessment

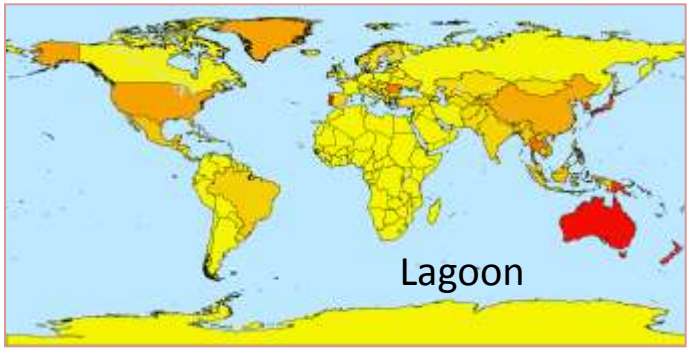


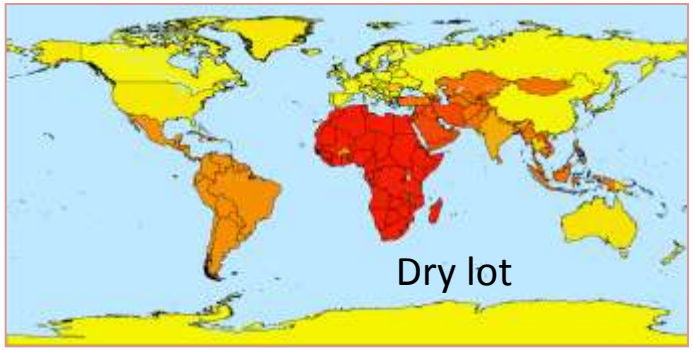
Manure management (pigs)

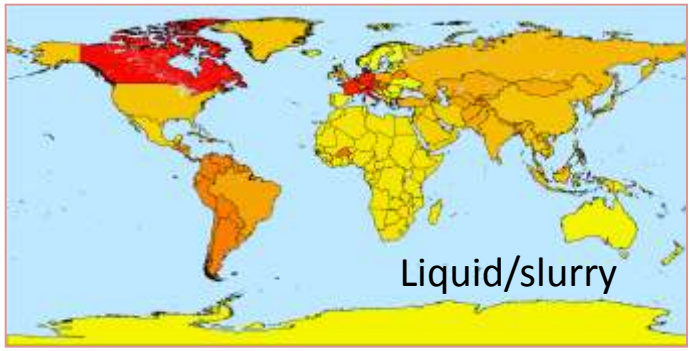
- Deposited on pasture
- Burned
- Lagoon
- Liquid/slurry
  - With or without crust
- Solid storage
- Dry lot
- Pit
  - for more or less than 1 month
- Daily spread
- Digester

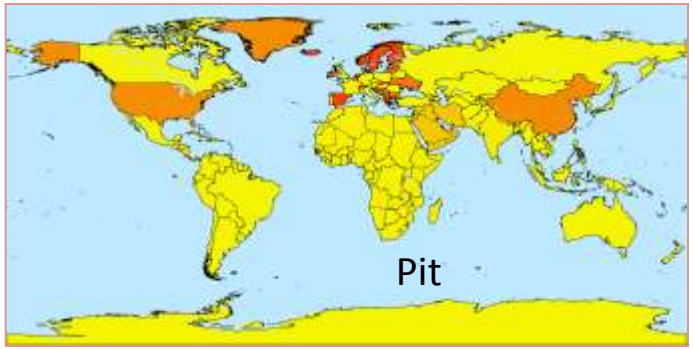
Manure management (int. pigs)

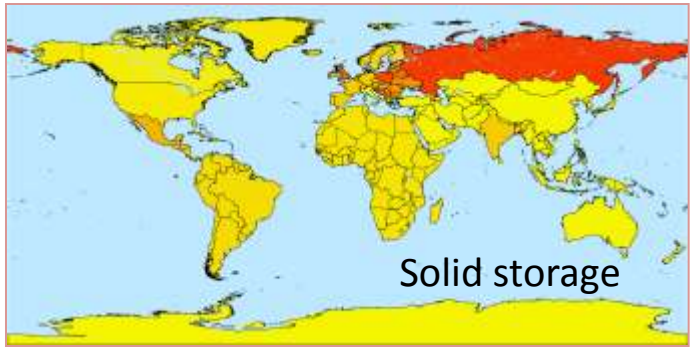
Proportion of manure managed in the five main systems



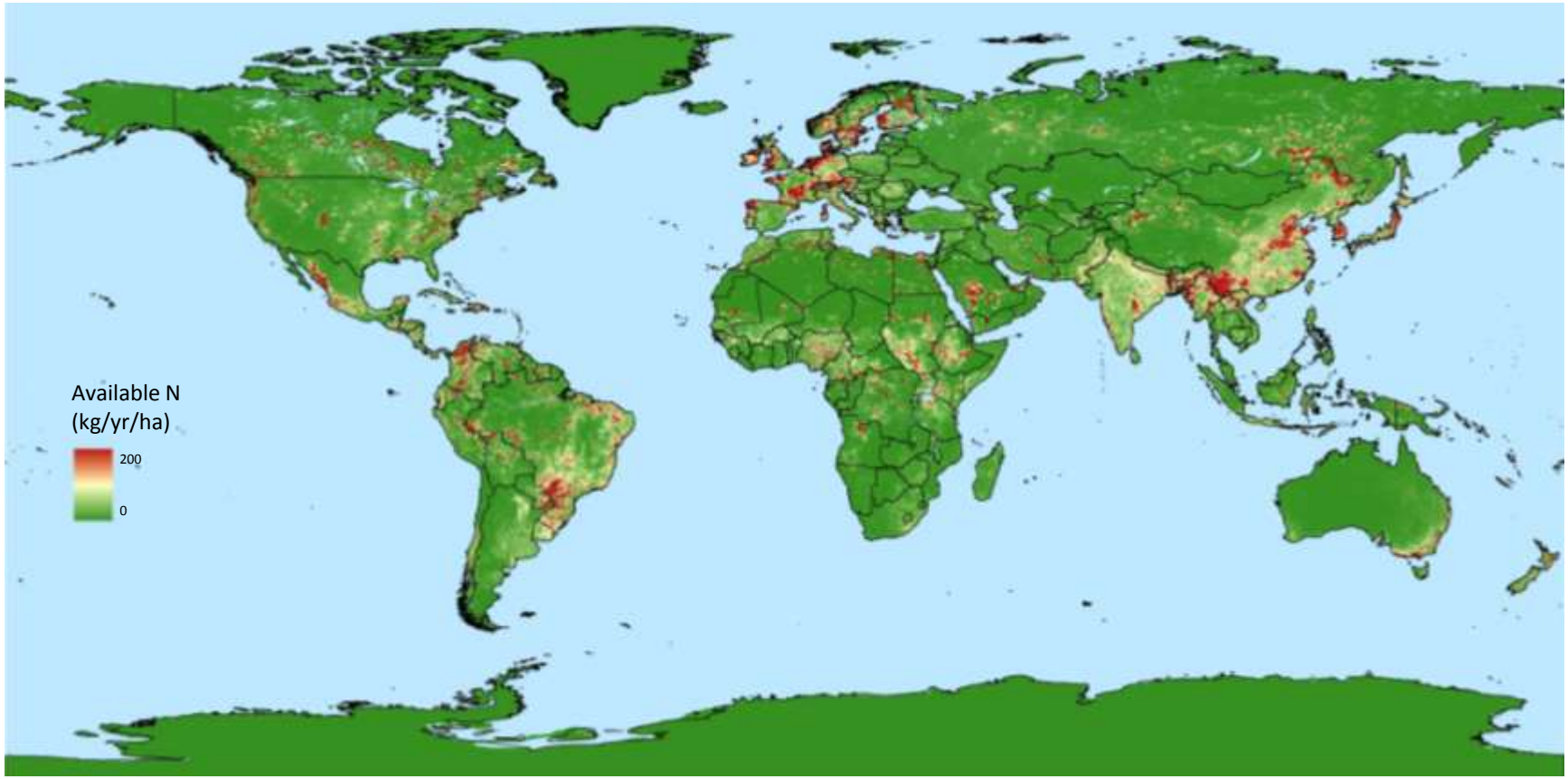








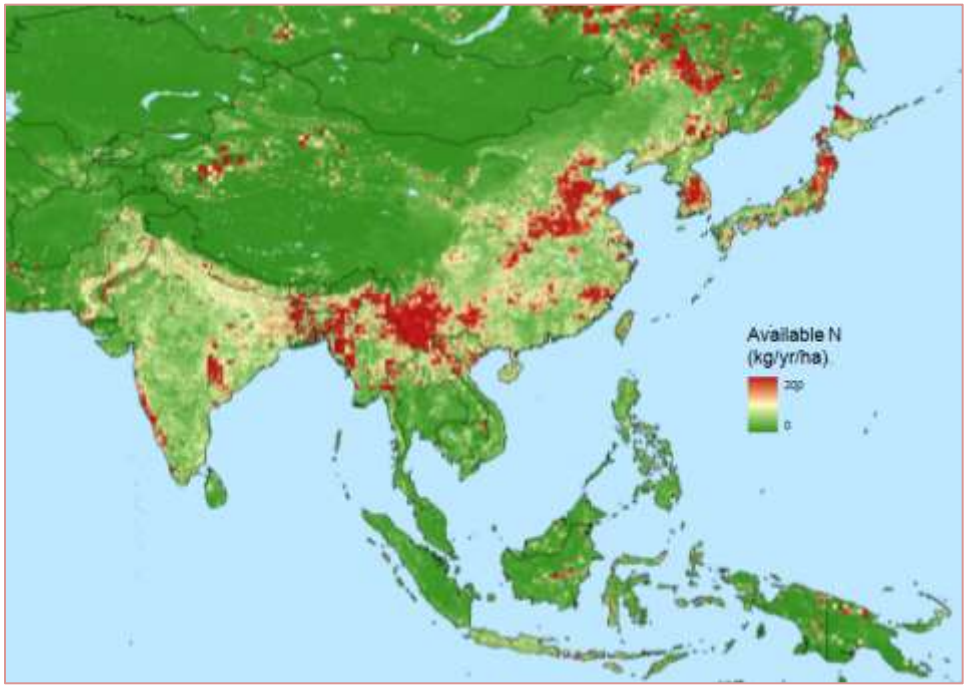
Available N (all livestock species)



Available N = total N produced - losses

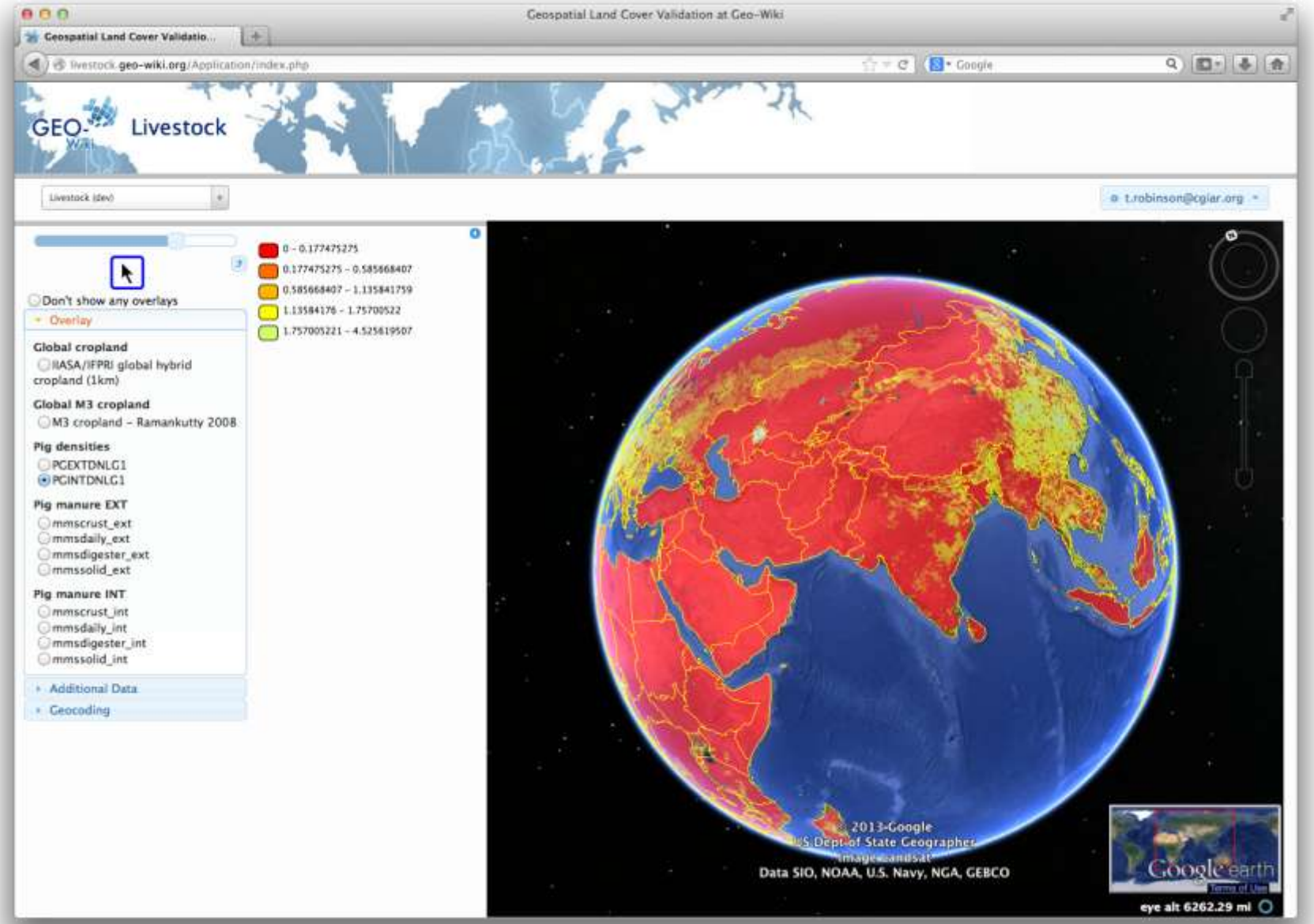
Available N (all livestock species)

Asia

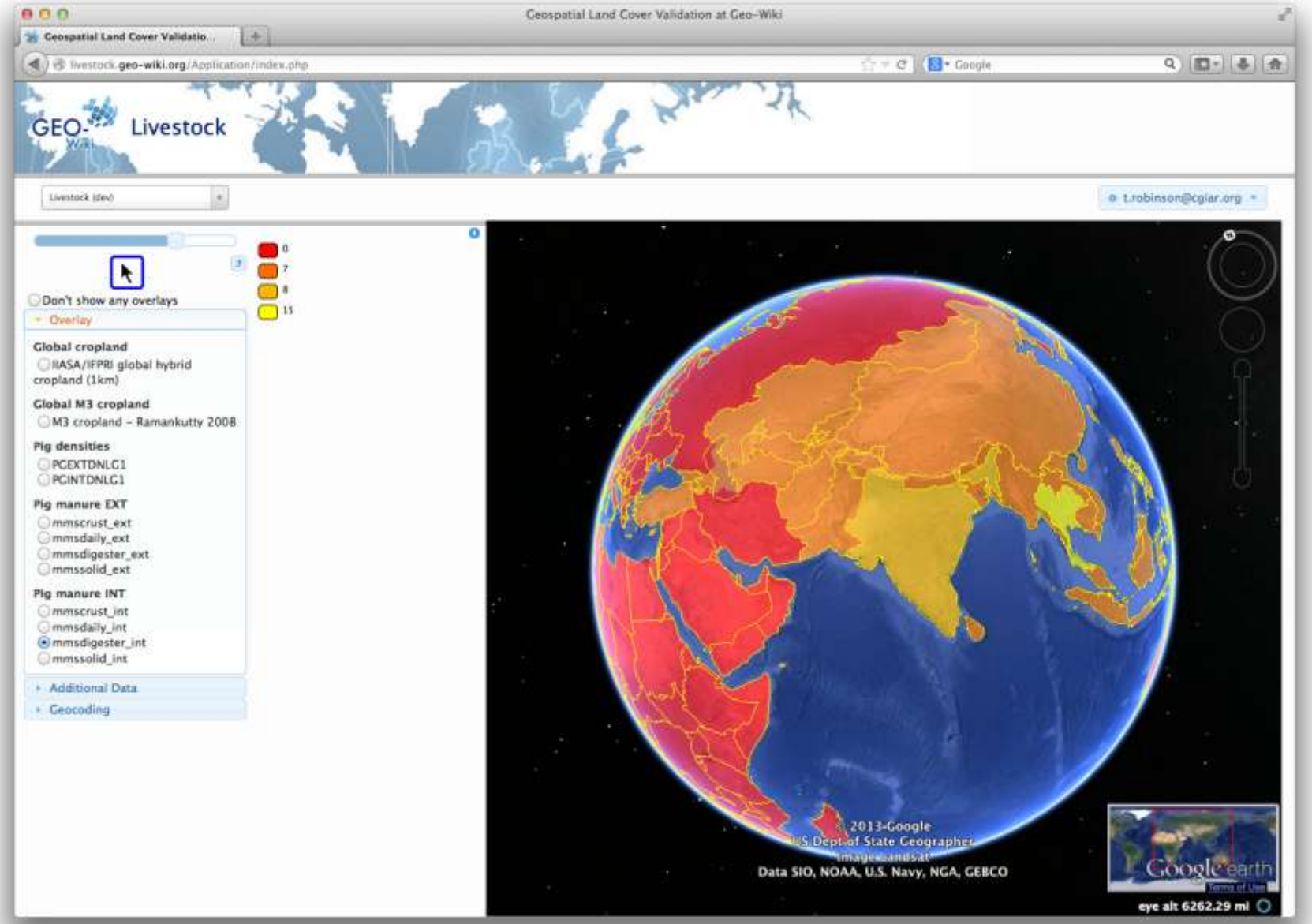


Latin America

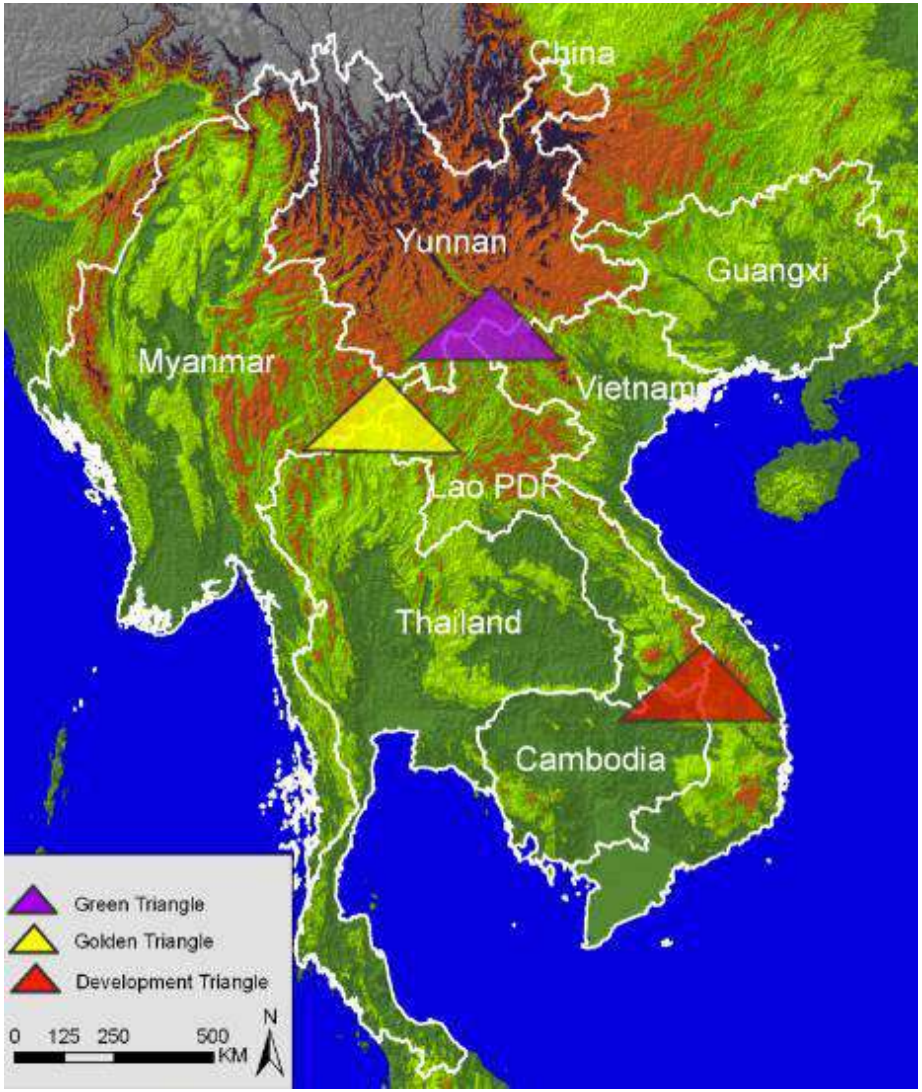
Livestock-Geo-Wiki



Livestock-Geo-Wiki



Livestock-Geo-Wiki: Feedback



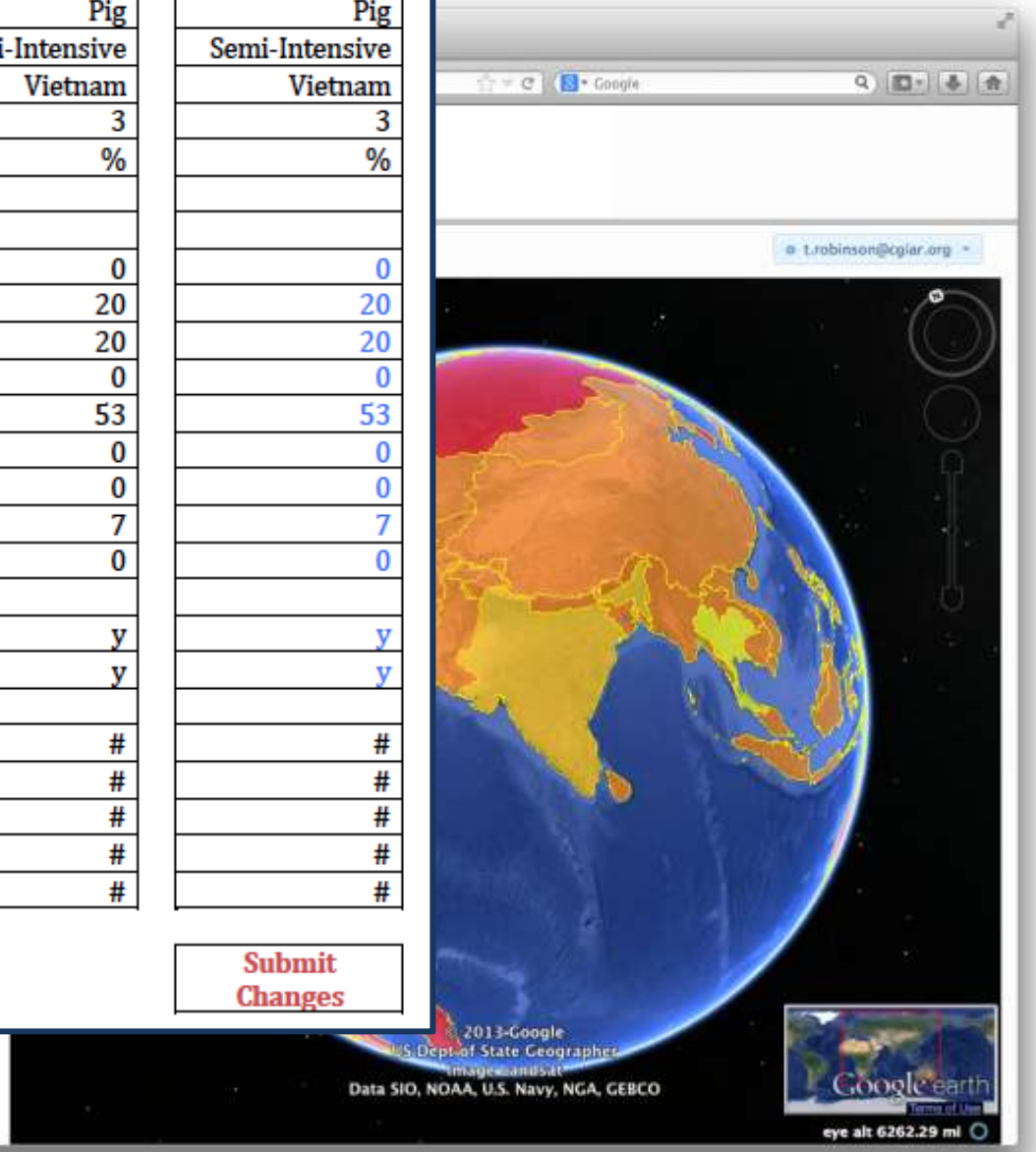
- Crowdsourcing (Howe 2006)
  - Livestock production system
  - Manure management practices by system
  - Maps and tabular coefficients
- Mobile phone apps
- Targeted competitions
- Links to field sites/studies
  - CGIAR Research Programmes (Humidtropics, CCAFS, Livestock and Fish)

Mobile phone app

Livestock-Geo-Wiki

	Database values	*Operator values*
Livestock type	Pig	Pig
Livestock production system	Semi-Intensive	Semi-Intensive
Location	Vietnam	Vietnam
Average density (per sq km)	3	3
Proportion in that system	%	%
Typical manure management method:		
Deposited on land/pasture	0	0
Burned	20	20
Lagoon	20	20
Liquid/slurry	0	0
Solid storage	53	53
Dry lot	0	0
Pit	0	0
Daily spread	7	7
Digester	0	0
Is the manure stored?	y	y
Is the manure applied?	y	y
GHG emissions from manure storage	#	#
Excretion of phosphorus	#	#
Excretion of nitrogen	#	#
Nitrogen lost	#	#
Nitrogen remaining	#	#

Submit Changes



Looking forward

- Build the Livestock-Geo-Wiki infrastructure (by end of 2013)
- Incorporate new livestock and systems maps (by end of 2013)
- Design and implement the manure management module for the pig sector (by end of 2013)
- Expand to cover all livestock species (by mid-2014)
- Establish link to CGIAR Research programme (CRP) field sites for ground-truthing (by end of 2014)
- Search for funding to develop other modules

Thank You !