

*African Drylands:
Spatial analysis and baseline data*

Tim Robinson

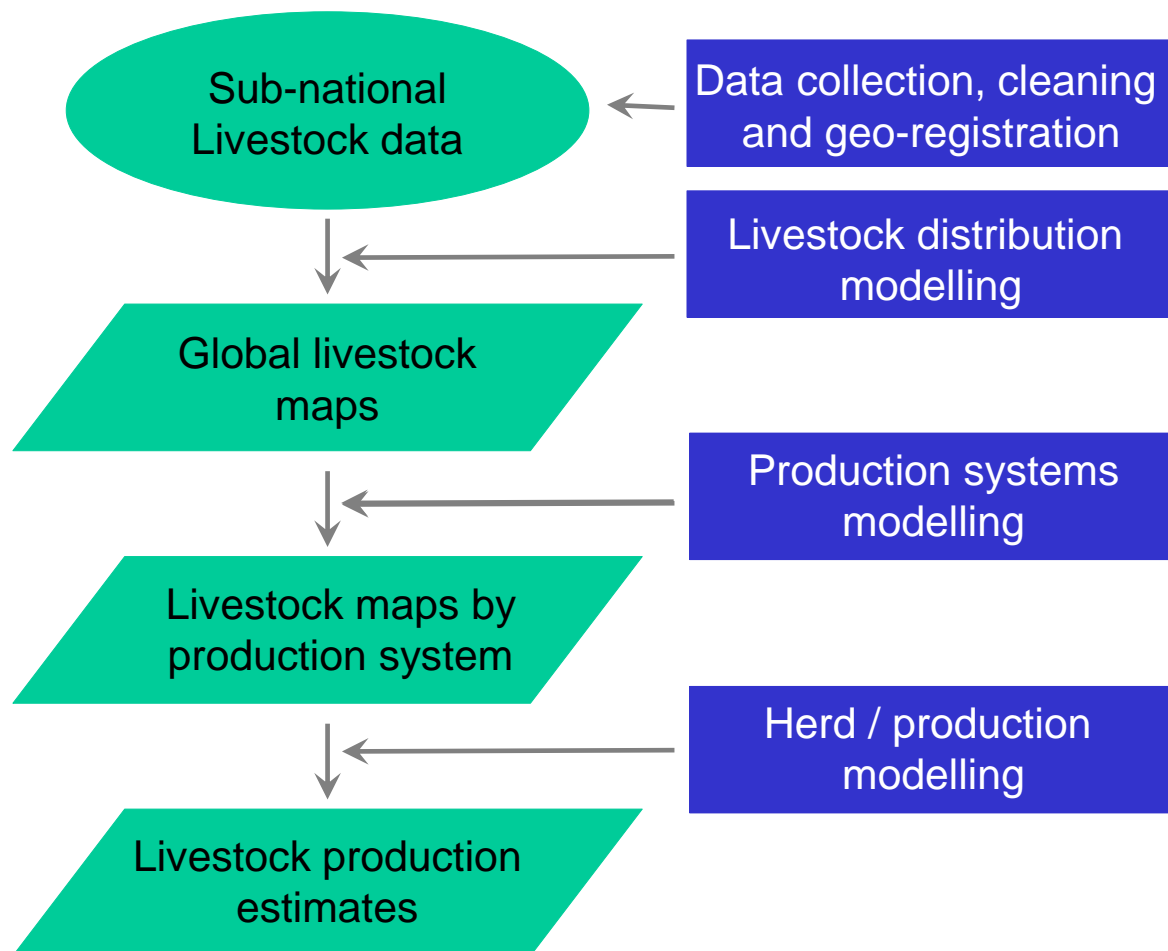
World Bank, Washington D.C.
29-30 January 2013

Overview



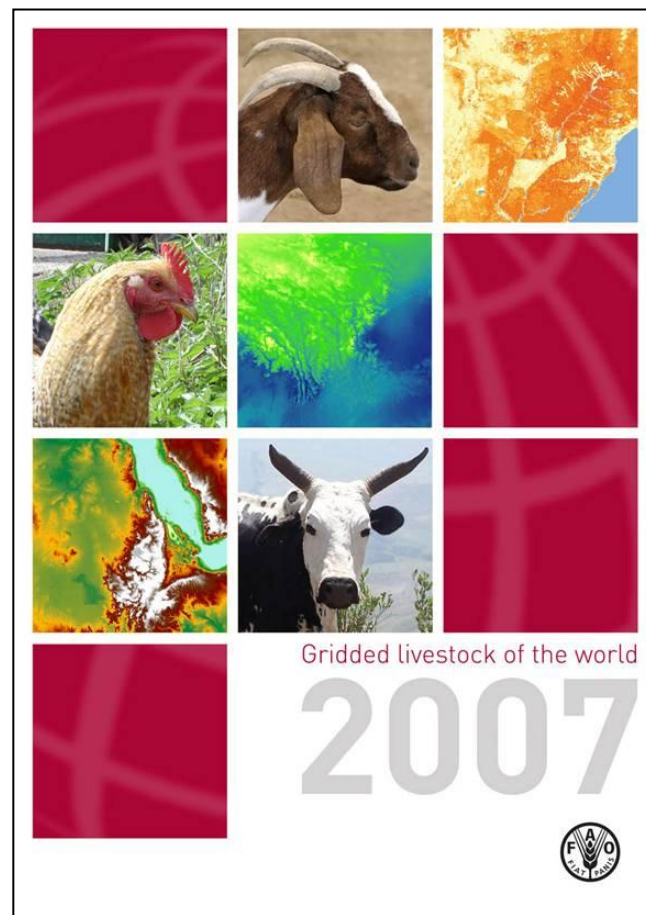
- Estimating livestock production
 - livestock distribution and abundance
 - livestock production systems
 - livestock production rates (by system)
- Mapping livestock densities
- Mapping (ruminant) production systems
- Example of spatial targetting and impact assessment
 - trypanosomosis control in the Horn of Africa
- Poverty mapping
- Mapping demand growth for animal-source foods

Livestock distribution and production



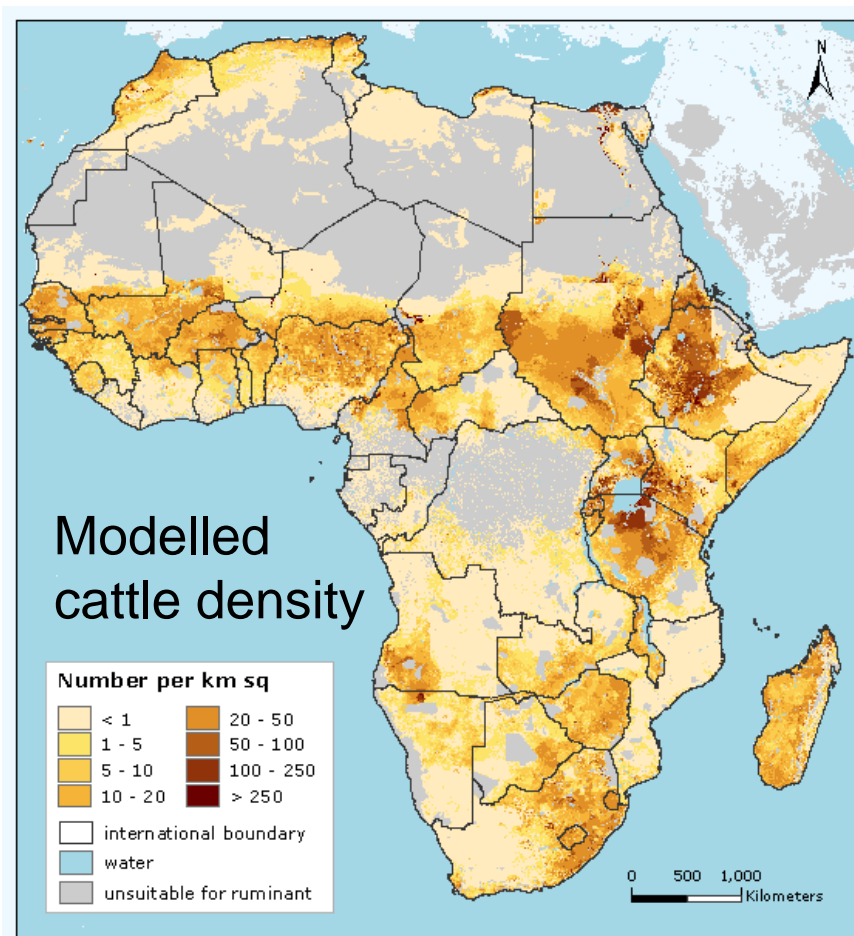
Livestock distributions (GLW 2007)

- 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



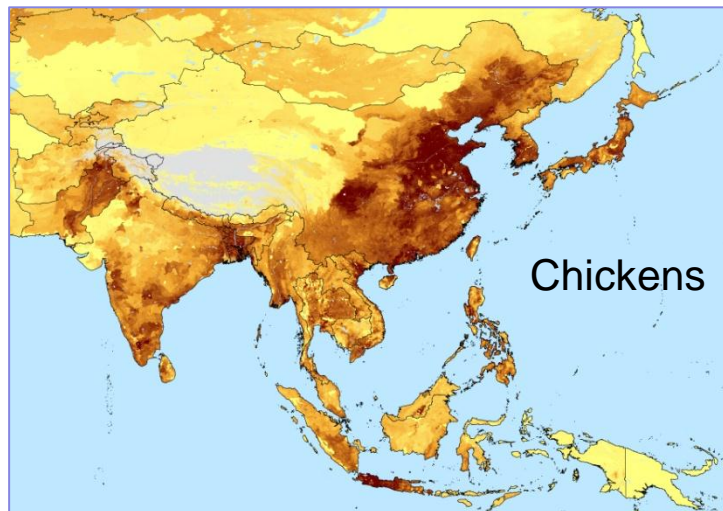
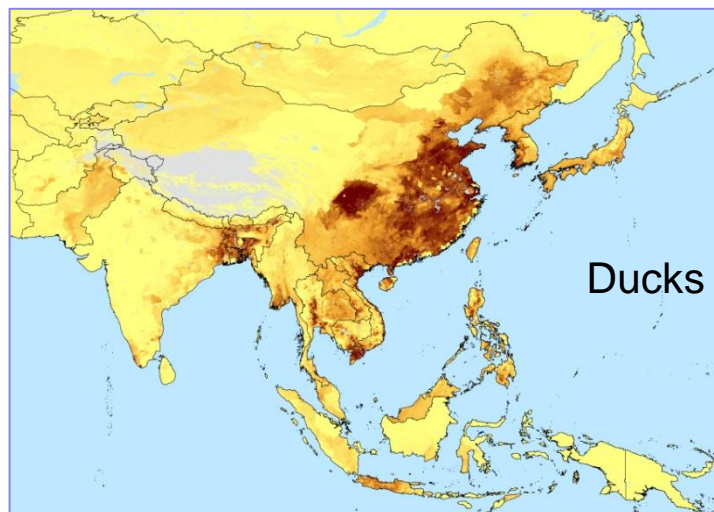
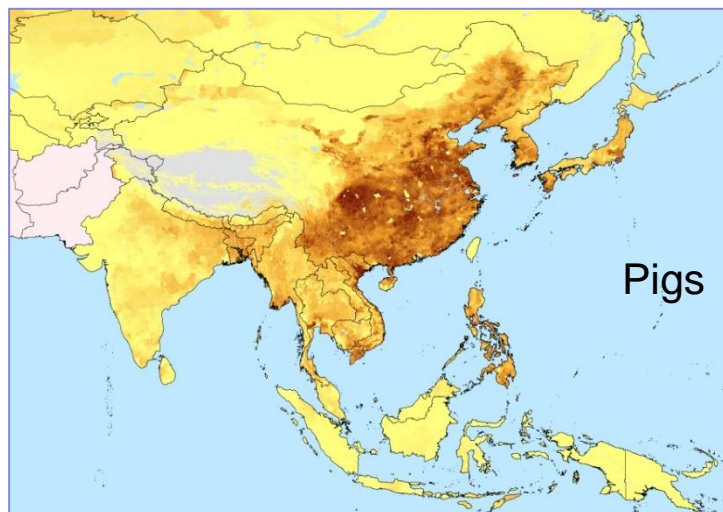
Wint and Robinson (2007)

Livestock distributions (GLW 2007)



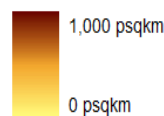
- Collect sub-national statistics
- Geo-register (link to shape file)
- Convert to densities, adjusted for area 'suitable' for livestock
- Compile predictor variables and stratification layers
- Derive statistical models of livestock densities for each stratum
- Apply models to predictor variables
- Adjust density maps to match official, time-standardised FAOSTAT totals

Livestock distributions (GLW 2013)



- Updated sub-national statistics
- Predictor variables: 1km MODIS data
- New, improved modelling approach
- Standardised to FAOSTAT 2006
- Done for monogastric species in Asia
- Ready to do ruminant species in Africa

Density (log scale)



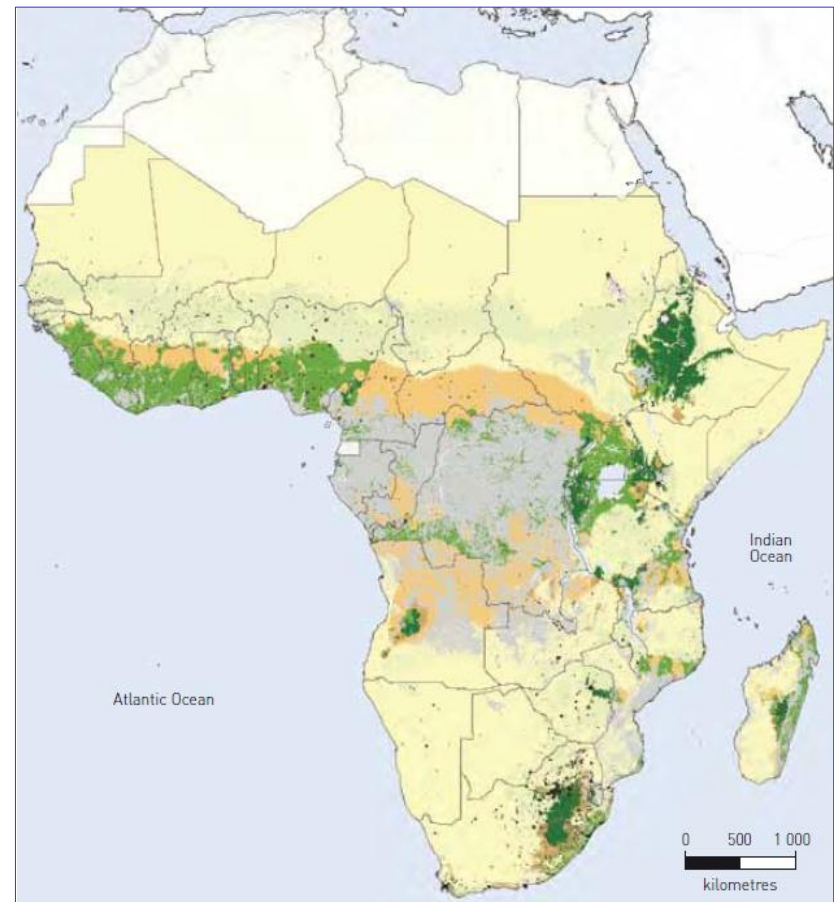
Source: Robinson, Gilbert et al. (2013)

Ruminant production systems

Land cover (GLC 2000)

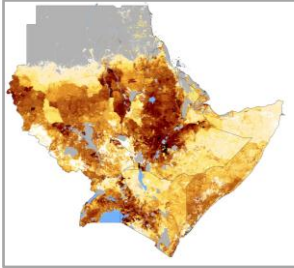
Agro-ecology (LGP, temperature, elevation)	Rangeland	Cropland		Tree cover	Artificial surfaces
		Rain-fed	Irrigated		
		Arid & Semi-arid	LGA		
Humid and Sub-humid	LGH	MRH	MIH		
Temperate or Tropical highland	LGT	MRH	MIH		

Ruminant production systems (v5)

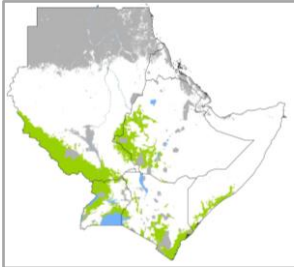


Spatial targetting & impact assessment

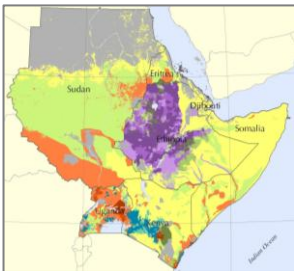
Cattle density



Tsetse distribution



Production systems



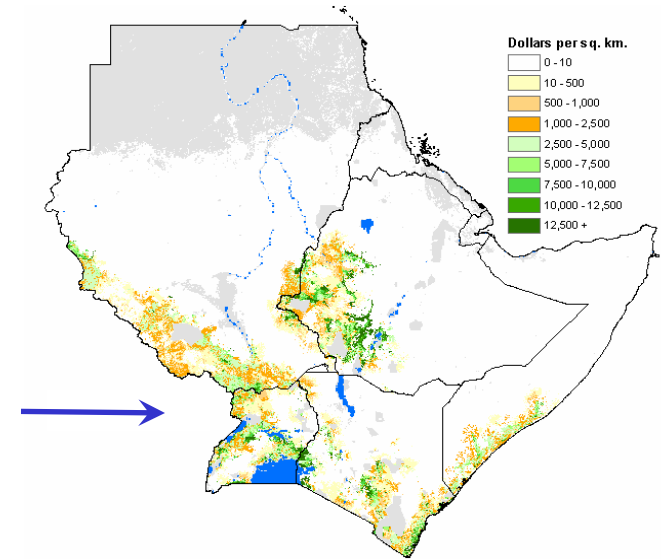
Herd model

Burden of disease
Herd growth and spread
Value of production

Economic benefits per animal (US\$)

Cattle production system	Pastoral	Agro-pastoral	Mixed farming (general)	Mixed farming (Ethiopia)
Low oxen	63	82	90	102
Medium oxen	–	98	122	135
High oxen	–	118	152	161
High dairy	–	142	148	–

Economic benefits over 20 years of trypanosomosis removal

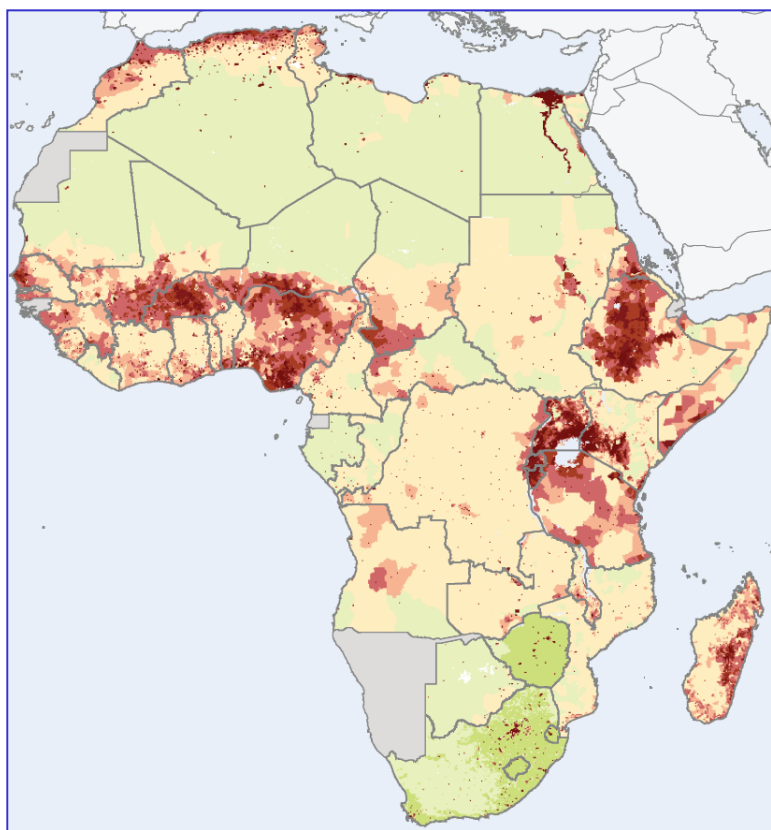


Source : Shaw et al. (in press)

Livestock to 2030 – demand growth

REGION	Beef		Milk		Mutton		Pork		Poultry		Eggs	
	Abs.	Prop.	Abs.	Prop.	Abs.	Prop.	Abs.	Prop.	Abs.	Prop.	Abs.	Prop.
East Asia and Pacific	8,798	130%	23,765	132%	1,669	58%	28,075	63%	22,522	143%	10,188	45%
<i>China</i>	6,888	132%	15,936	143%	1,537	56%	22,050	54%	14,609	121%	6,810	34%
Eastern Europe and C. Asia	290	11%	4,364	15%	204	40%	112	5%	2,310	108%	684	28%
Latin America and Caribbean	7,302	58%	39,818	72%	239	54%	4,405	100%	14,434	126%	3,246	78%
Middle East and N. Africa	1,929	112%	17,913	111%	1,287	103%	9	52%	6,296	243%	1,799	148%
South Asia	3,367	84%	118,942	126%	1,722	115%	950	160%	11,491	725%	5,947	294%
<i>India</i>	1,338	51%	79,330	119%	588	85%	921	160%	8,865	844%	4,251	280%
Sub-Saharan Africa	3,768	113%	20,939	107%	1,883	137%	1,106	155%	3,235	170%	1,727	155%

Livestock to 2030 – demand growth



- Mapped growth in demand for beef in Africa: 2000 to 2030
- New data have a baseline of 2006 and revised projections to 2030 and 2050

Consumption (kg/sqkm)

