

Integrated crop livestock systems: A key to sustainable intensification in Africa

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Key messages

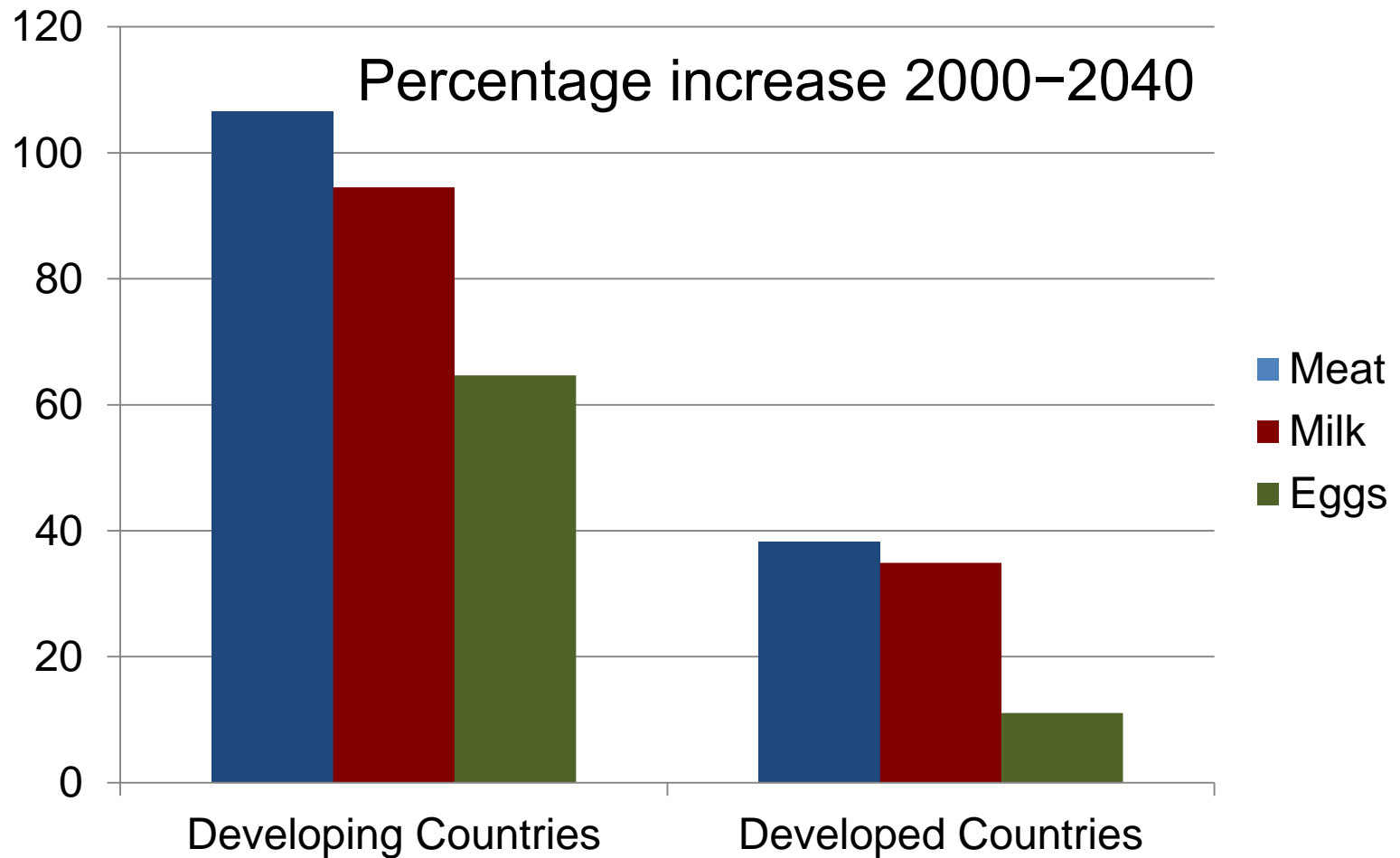
Crop livestock systems are important for feeding the world . . . also impact on environment, health and equity

They will change rapidly in coming decades
– policies and institutions are essential

Opportunities

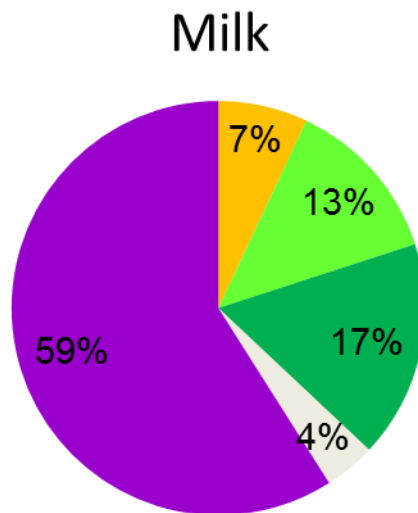
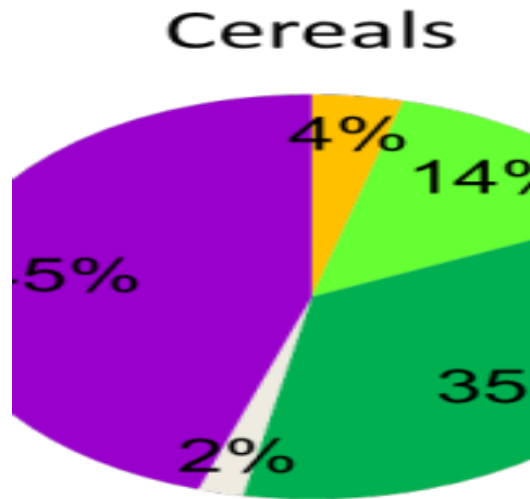
- Don't de-couple crop and livestock intensification
- Address the biomass challenge
- Improve livestock production efficiency to mitigate environmental harm

Livestock demand is highest in developing countries

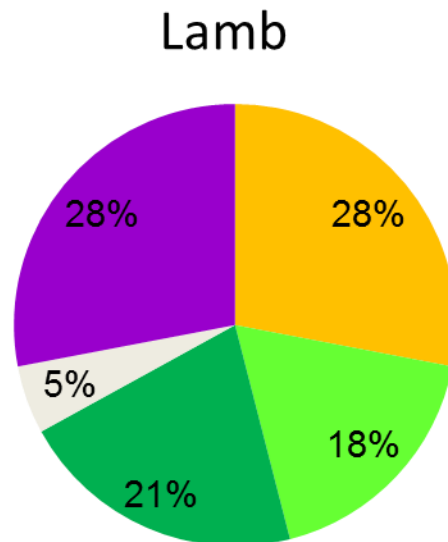
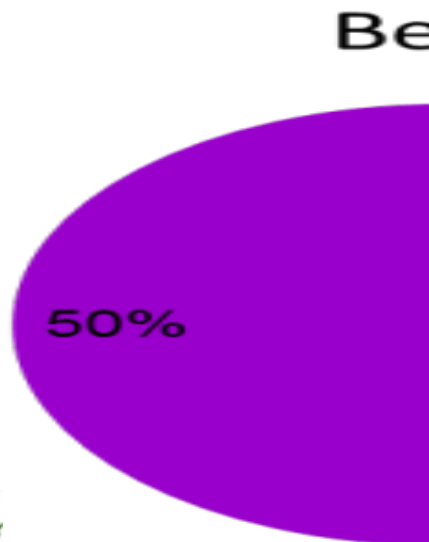


Source: IFPRI-ILRI IMPACT model results

Developing countries lead in global food production



Most global food comes from crop-and-livestock smallholders in developing countries



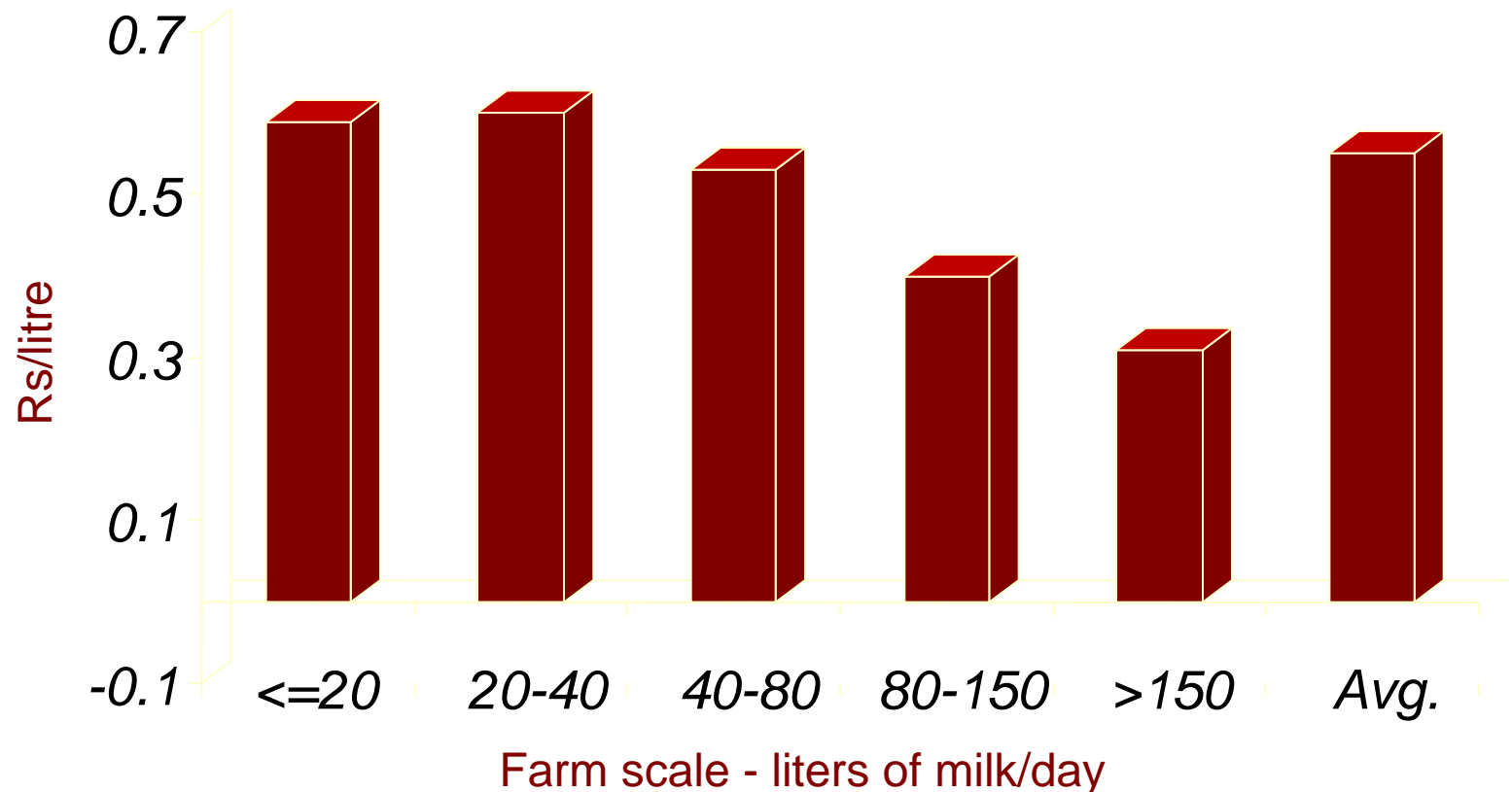
- agro-pastoral
- mixed extensive
- mixed intensive
- other
- developed countries

Source: Herrero et al. 2009

Smallholder market participation

Studies in India, Bangladesh and Brazil indicate:

- Some smallholder ruminant producers can compete, and are likely to do so for foreseeable future
- Major factor for smallholders remaining competitive is opportunity cost of labour (including lack of off-farm opportunities)

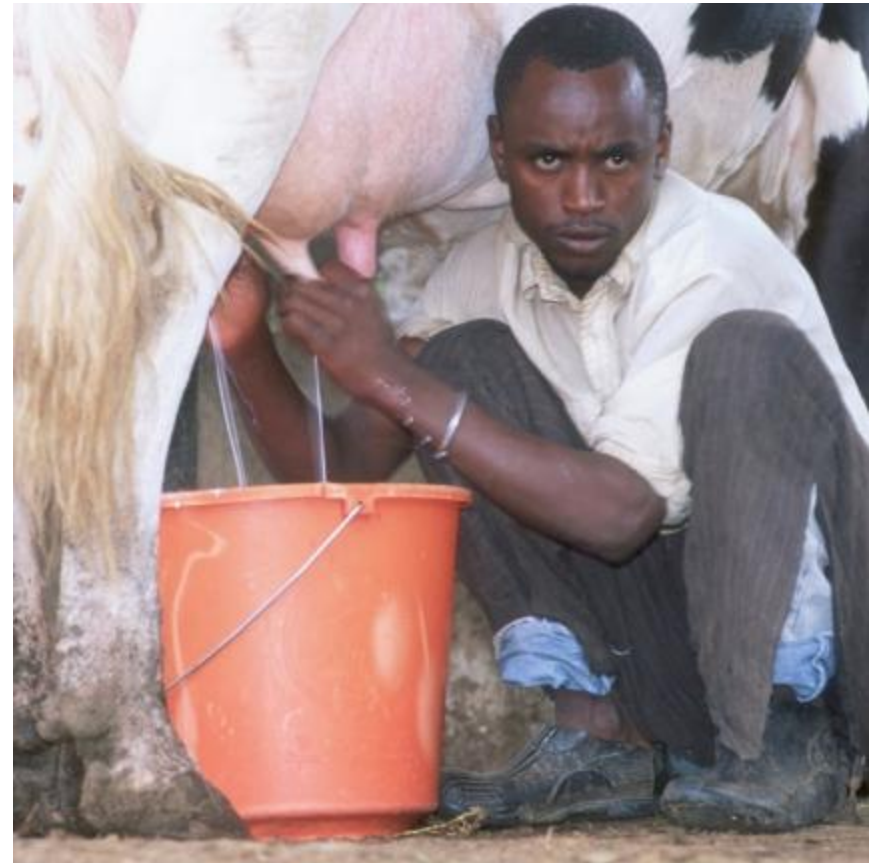


Source: Sharma et al., 2003

Smallholder livestock keepers are competitive

East African dairy

- In Kenya, 1 million smallholders keep the largest dairy herd in Africa (larger than South Africa)
- The lowest-cost milk producers globally are found in Uganda
- Small-scale Kenyan dairy producers get above-normal profits of 19-28% in addition to non-market benefits (finance, insurance, manure, traction) of a further 16-21%



Soil fertility: 23% of nitrogen
for crop production from manure



Animal traction important for crop production especially in sub-Saharan Africa

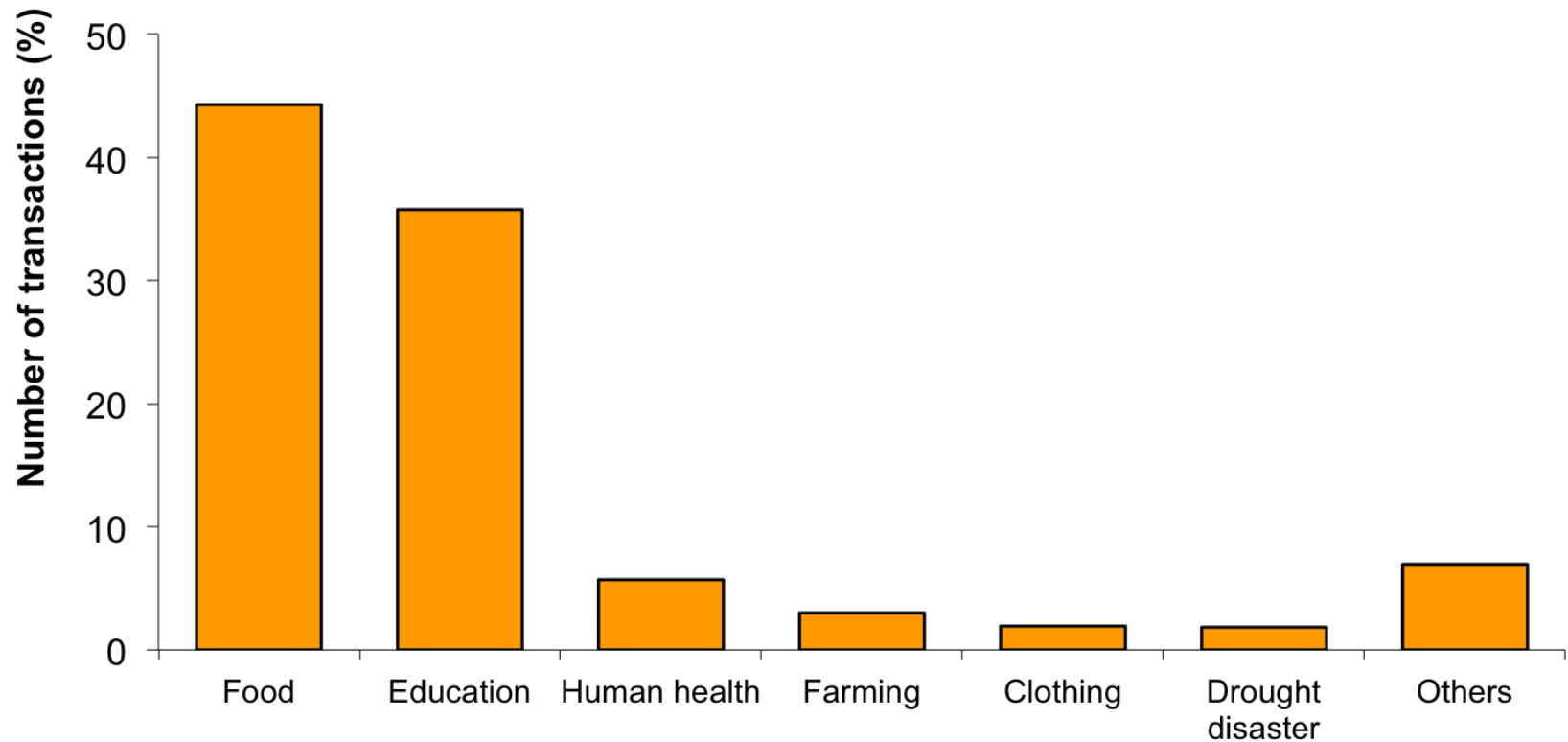


Income: Investment of cash from animal sales in other enterprises



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Science with a human face

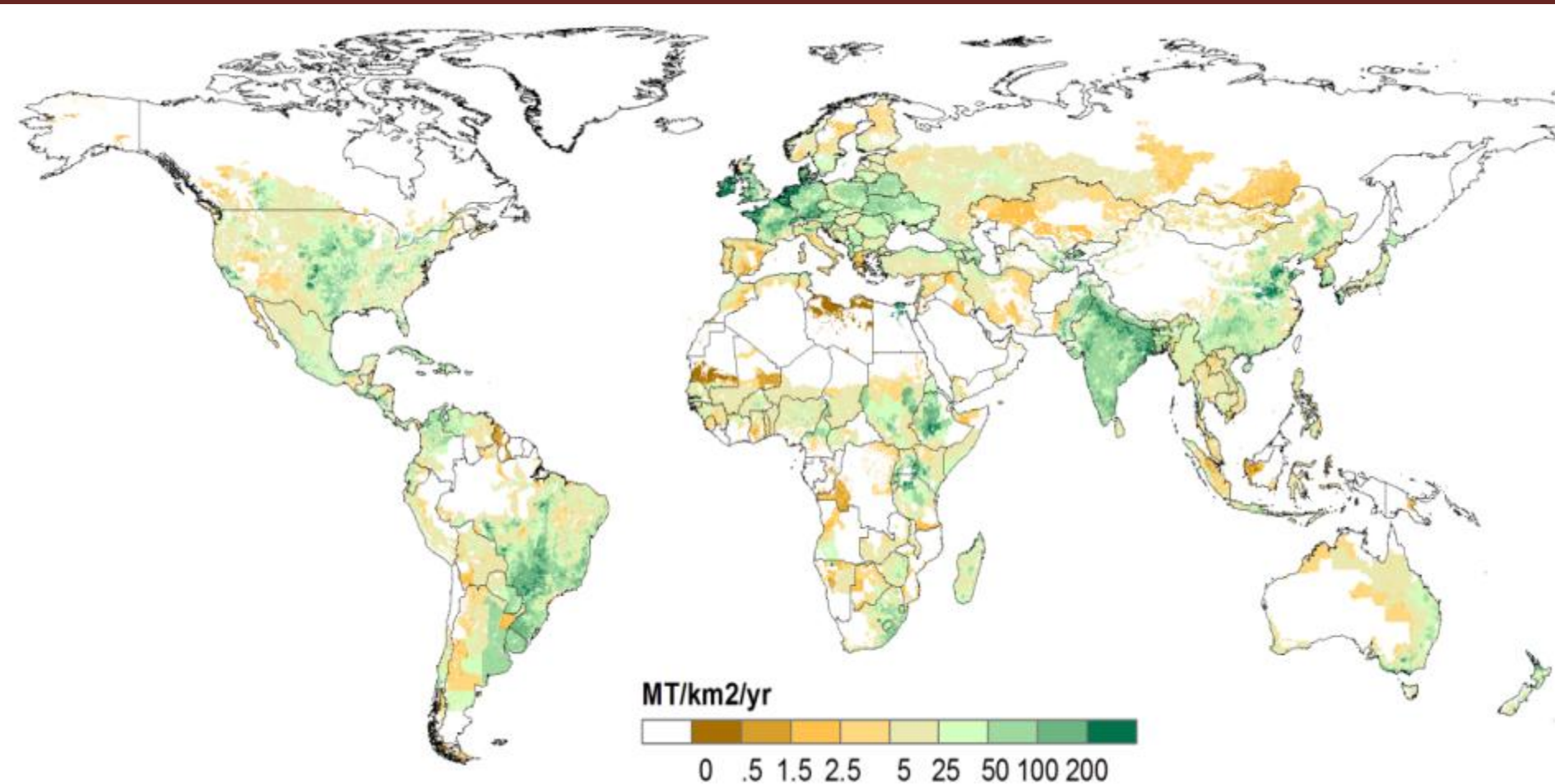


Source: Homann et al., 2007

Crop residues ~ 70% of ruminant diets



The importance of grazed biomass for livestock



Grass represents 50% of the biomass consumed by livestock

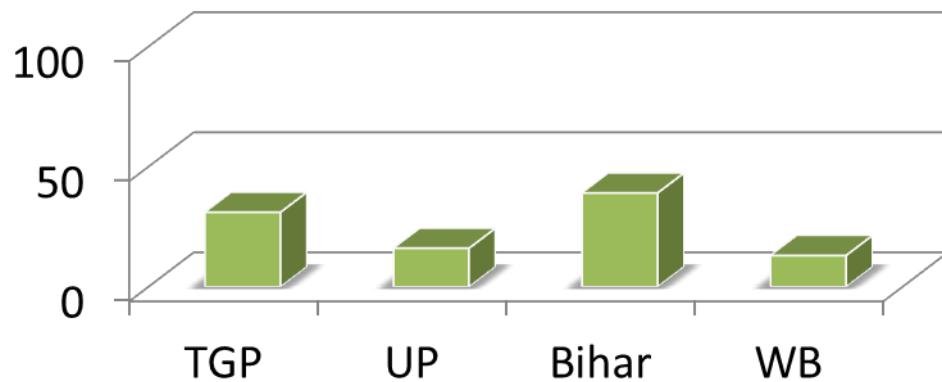
Putting 'sustainable' back in 'sustainable intensification'

Intensification of both crop and livestock enterprises is important in mixed systems – decoupling has implications for sustainability.

- Often livestock get left behind
- Intensification of crop production can pay dividends for livestock and provide more leeway for enhanced NRM – a key is biomass production
- Intensification of livestock production means less GHG per litre of milk and more milk per drop of water

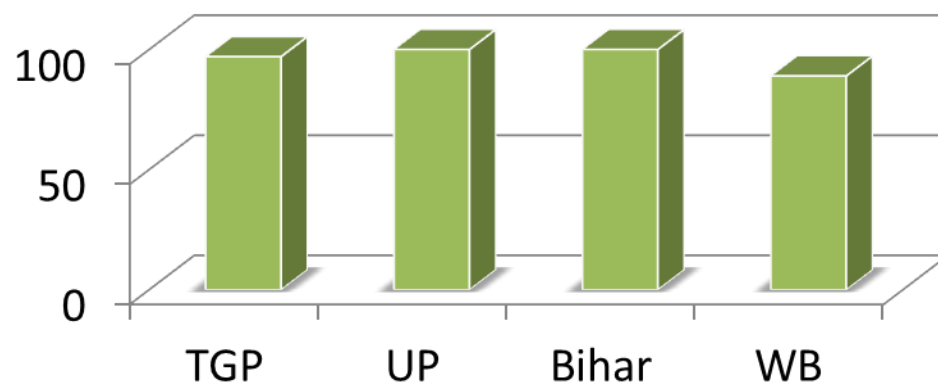
Don't de-couple crop and livestock intensification

compound feed use



% of households
using inputs in
states in India
at different levels
of intensification

fertilizer use



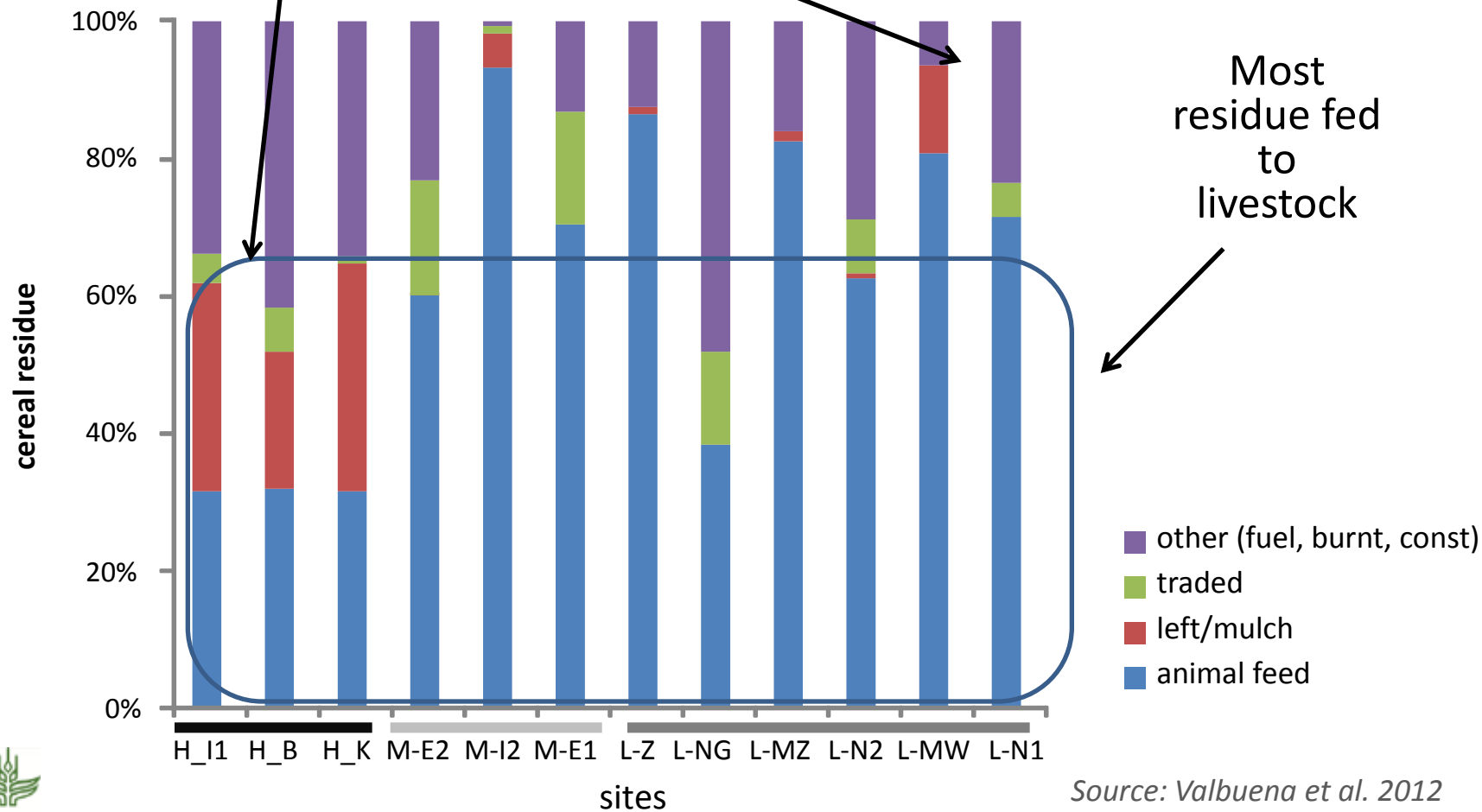
Modified from Erenstein & Thorpe 2010

Address the biomass challenge



Most crop residues fed to animals

Some mulching in low
and high
intensification sites



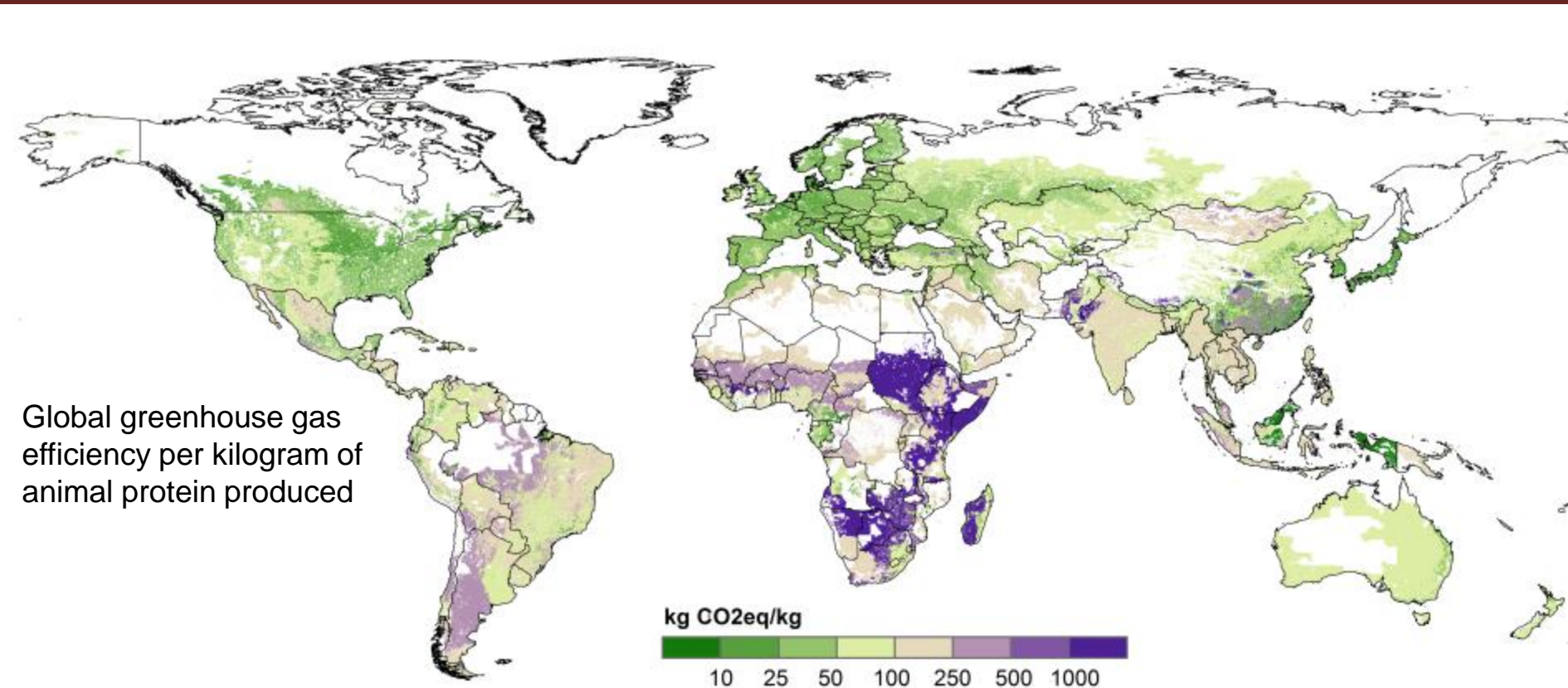
Source: Valbuena et al. 2012

More biomass?



- Don't compete with food
- Crop residue quantity and quality
- Forages
- Whole-farm management of biomass

Improve livestock production efficiency to mitigate environmental harm

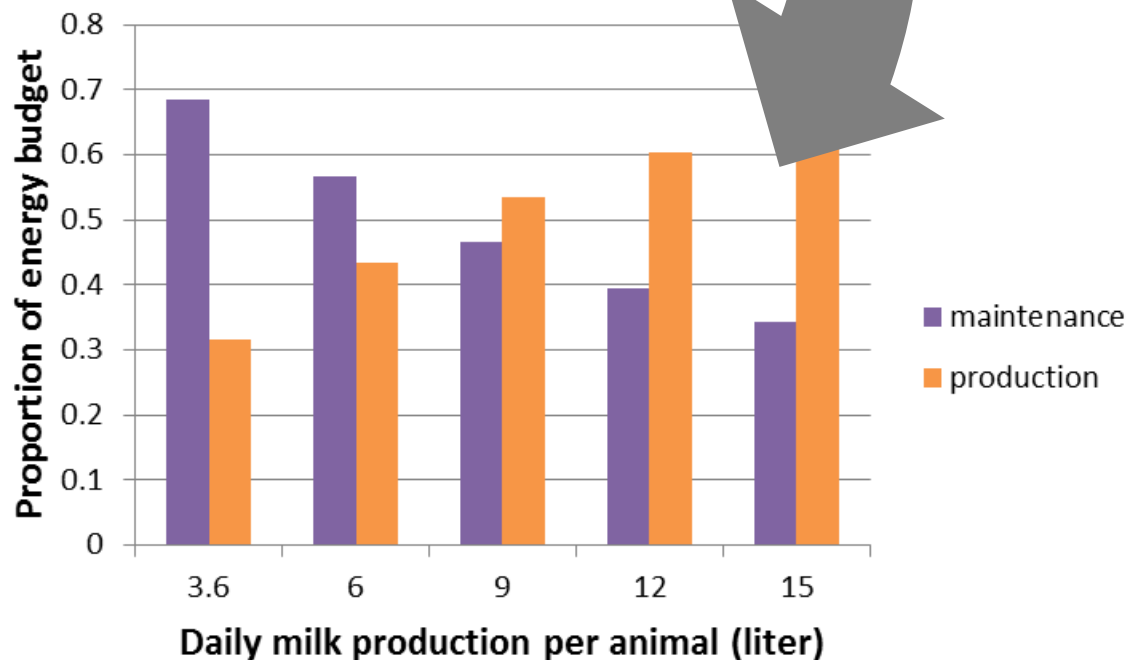


Large livestock production inefficiencies in the developing world present an opportunity

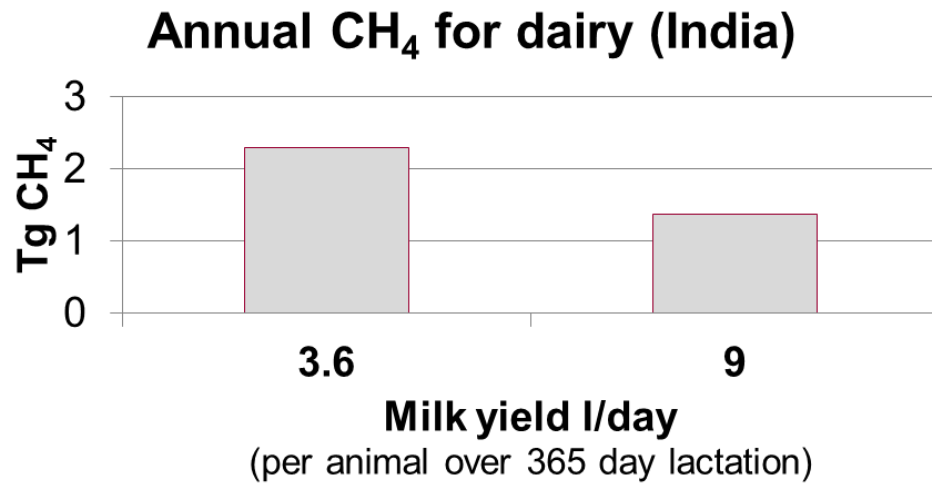
Improved sorghum – 12% better digestibility

Ingredients	%
Sorghum stover	50
Bran/husks/hulls	18
Oilcakes	18
Molasses	8
Grains	4
Minerals, vitamins	2

Only small non by-product inputs



Opportunities to improve efficiency without moving to industrial grain-fed systems



- Huge variations exist in GHG emissions levels
- Developing countries have as yet untapped potential to mitigate GHG emissions:
 - Through improved efficiencies (e.g., better feeds and feeding systems)

Key messages

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