

Valuing leftover streams through livestock: impact of livestock system and productivity



O. van Hal¹, H.H.E. van Zanten¹, C. Schader², A. Muller², W.J.J. Gerrits³, S. de Vries³ and I.J.M. de Boer¹

¹Animal Production Systems group, ²Research Institute of Organic Agriculture (FiBL), ³Animal Nutrition group

Background

- Livestock can contribute to global nutrition security by converting leftover streams* into animal sourced food
- Not all leftover streams (waste) are currently allowed to be fed to livestock
- Converting low quality leftover streams requires low productive animals

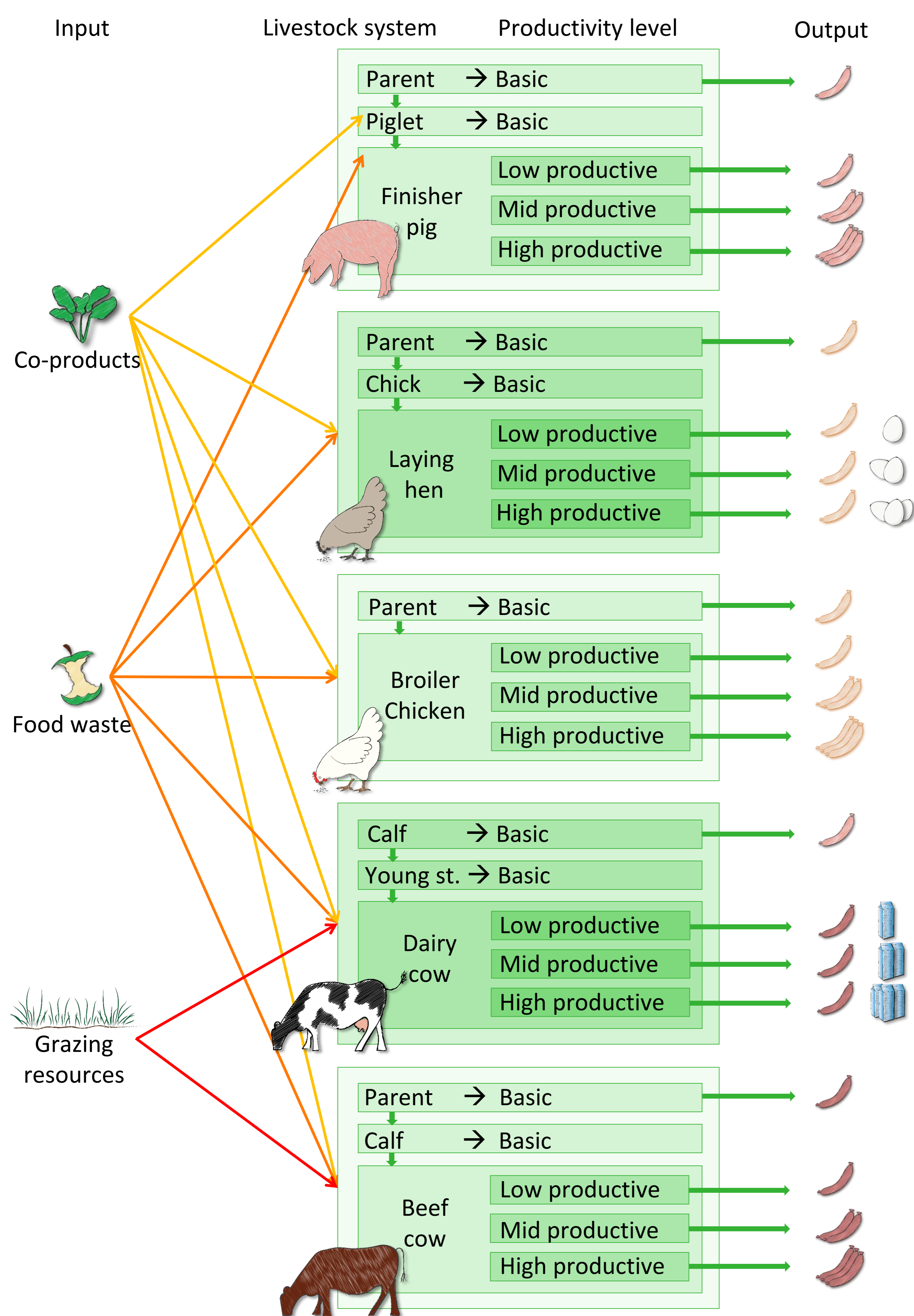
Objective

Identify the combination of livestock systems and productivity levels that optimally convert leftover streams into animal protein.

Methodology

Optimisation model:

- Maximise animal protein output
- Feeding only leftover streams available in EU28
- Using 5 livestock systems with 3 productivity levels.



Scenarios:

- Production restrictions to meet current consumption pattern
 - **None:** no restrictions
 - **Simple:** restrictions to the amount of meat, milk and eggs
 - **Complex:** additional restrictions on meat origin
- Food waste utilisation as feed (0-100%)

Conclusions

Optimal use of leftover streams fulfils 2/3 of our need for protein, but requires a shift towards lower productive dairy cattle.

Maintaining consumption patterns reduces availability of protein.

Societal impact of my research

- Reduced consumption of animal source food and changed farming practices are needed to feed the growing world population.
- Legalisation of feeding food waste is needed to produce resource efficient monogastric livestock.

Results

Production Restrictions	Animal protein output (g/cap/day)						
	Total	Milk	Meat	Pork	Poultry	Bovine	Eggs
None	39	32	6	<1	<1	6	1
Simple	33	12	18	2	5	11	2
Complex	26	11	12	5	5	2	1

Animal protein production

None restrictions

39 g/cap/day, mostly from dairy production, high compared to previous studies (7 - 31 g/cap/day), due to:

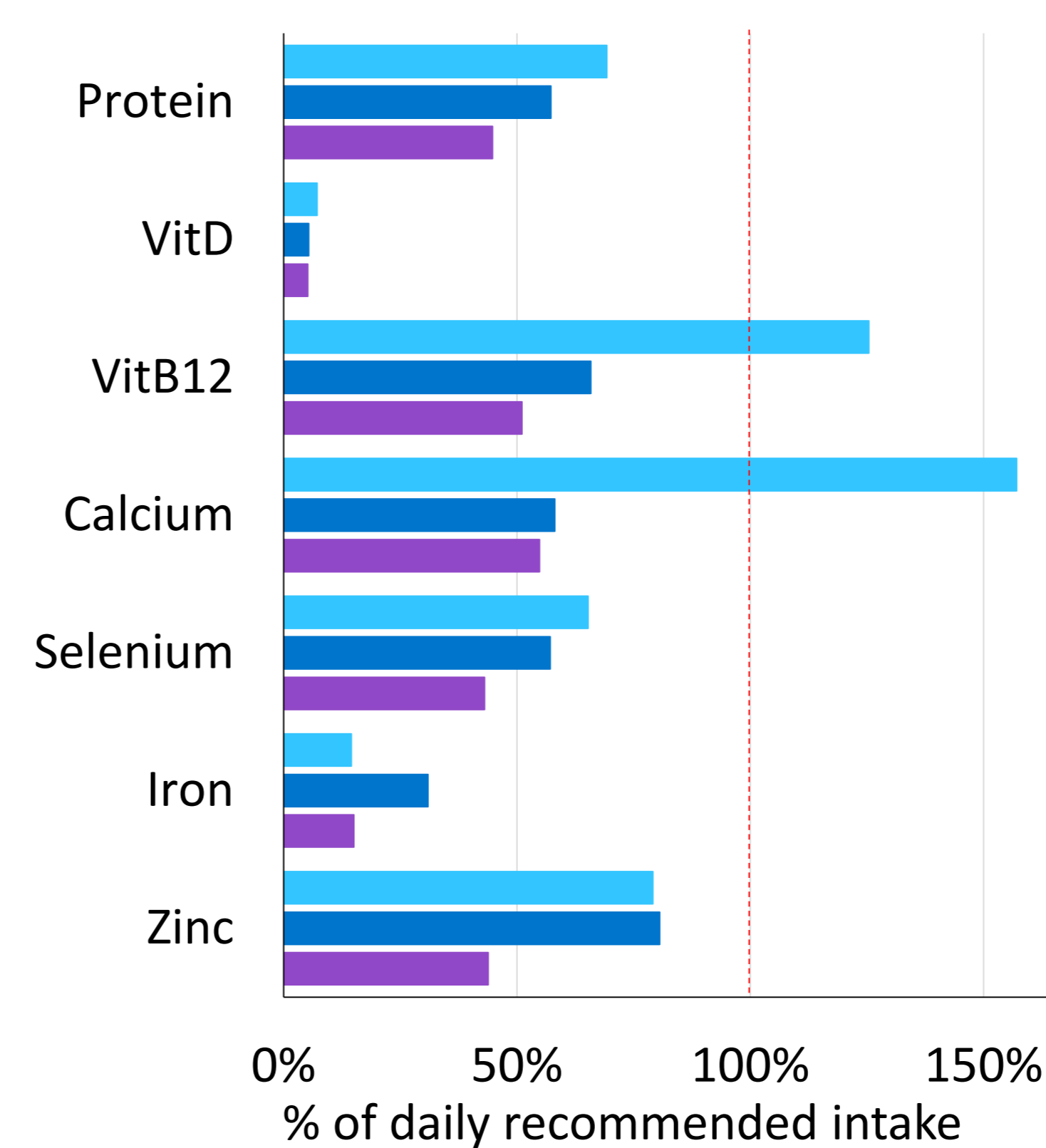
- High assumed availability of leftover streams
- Inclusion of grassland situated on arable land

Simple or **Complex** restrictions

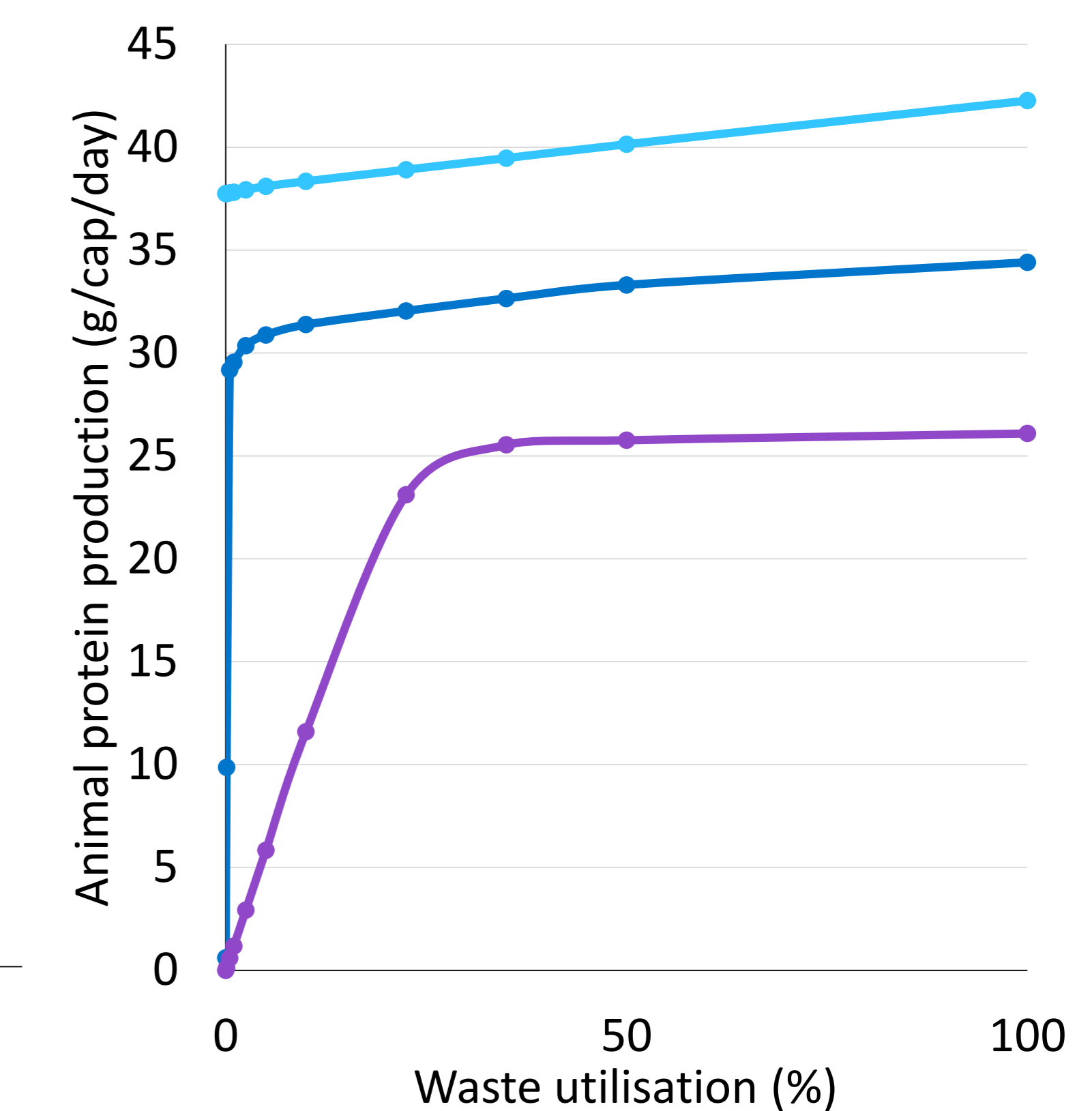
Reduced to 33 and 26 g/cap/day due to:

- Use of less efficient livestock systems
- Part of grass unused to meet production restrictions

Essential nutrient provision



Food waste utilisation



Essential nutrients

None restrictions

- 69% of daily recommended intake of protein
- >100% of daily recommended intake vitamin B12 and calcium

Simple or **Complex** restrictions

- Zinc and iron provision increase under **Simple** restrictions
- All other nutrient provision reduced

Food waste utilisation

Food waste utilisation is of major influence when aiming to maintain consumption patterns