

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



O. van Hal<sup>1</sup>, H.H.E. van Zanten<sup>1</sup>, C. Schader<sup>2</sup>, A. Mueller<sup>2</sup>, W.J.J. Gerrits<sup>3</sup>, S. de Vries<sup>3</sup> and I.J.M. de Boer<sup>1</sup>

<sup>1</sup>Animal Production Systems group, <sup>2</sup>Research institute of Organic Agriculture (FiBL), <sup>3</sup>Animal Nutrition group

## Background

- Livestock can contribute to global nutrition security by converting leftover streams\* into Animal Source Food (ASF)
- Not all leftover streams (waste) are currently allowed to be fed to livestock
- Converting low quality leftover streams requires low productive animals

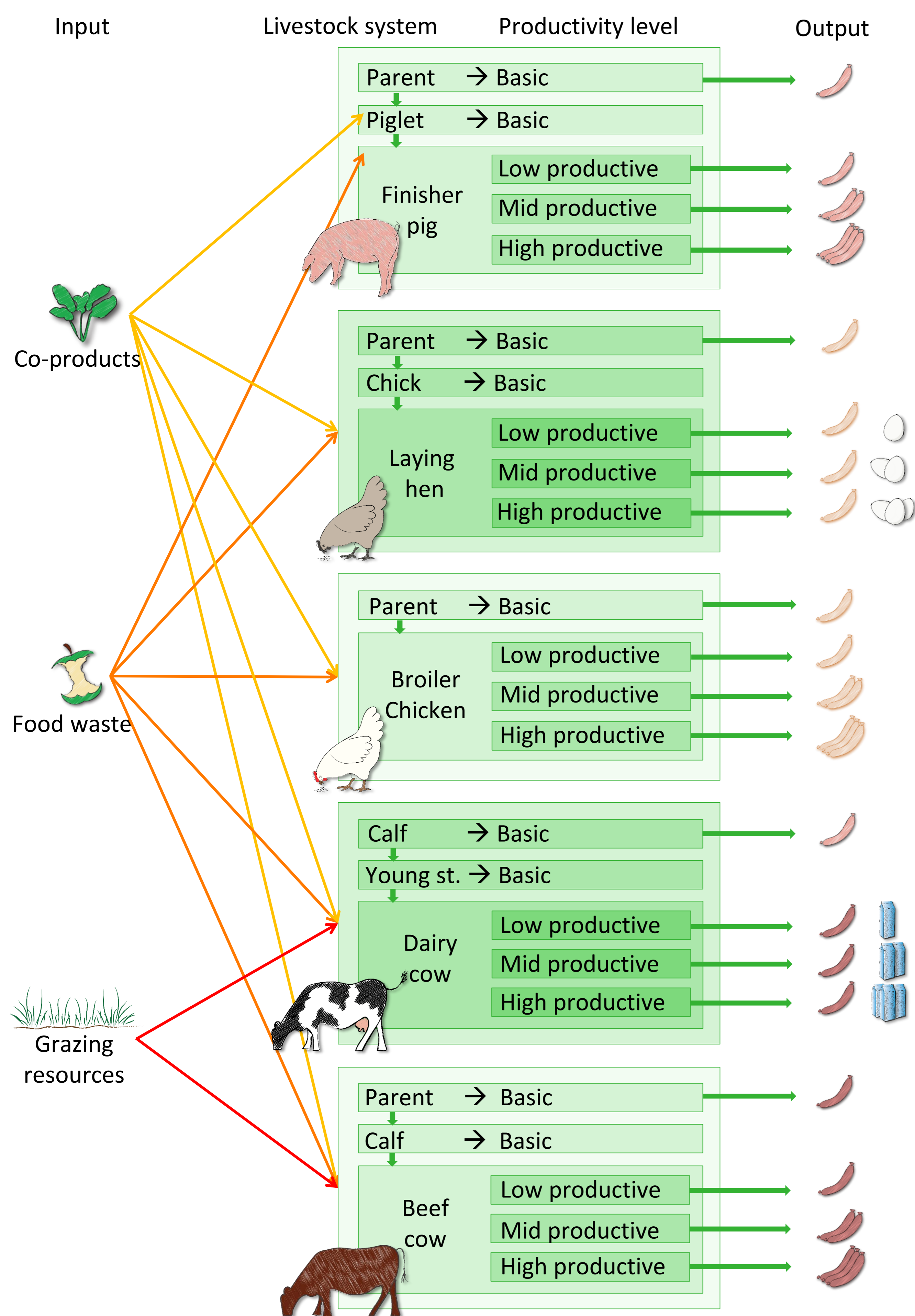
## Objective

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 available leftover streams provides 39 g of animal protein/cap/day.

Optimal use of available leftover streams requires a shift towards dairy cattle under various productivity levels.

Maintaining consumption patterns reduces the amount of protein available.

## 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:

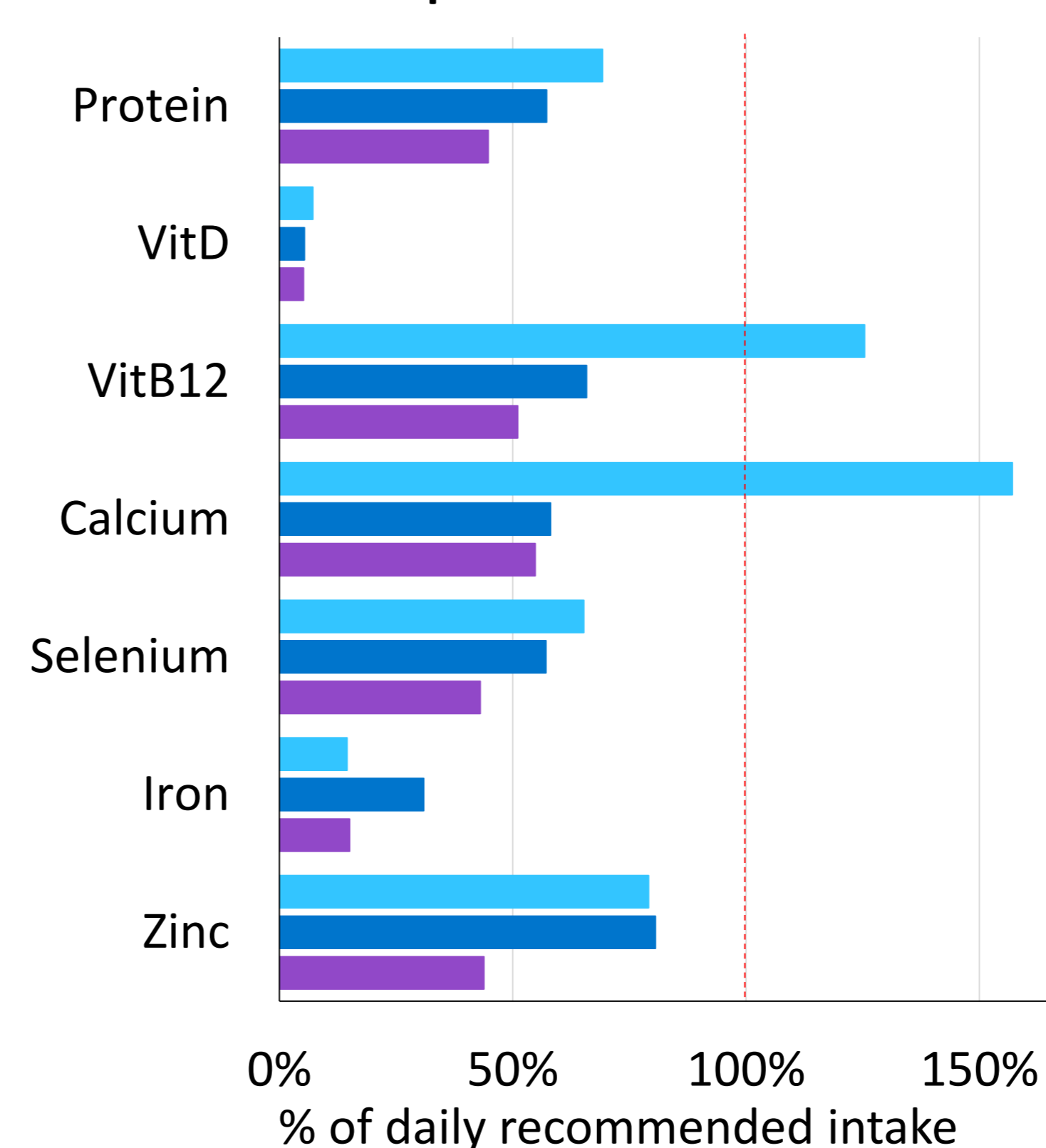
- High assumed availability of leftover streams
- Inclusion of grassland situated on arable land

**Simple** or **Complex** restrictions

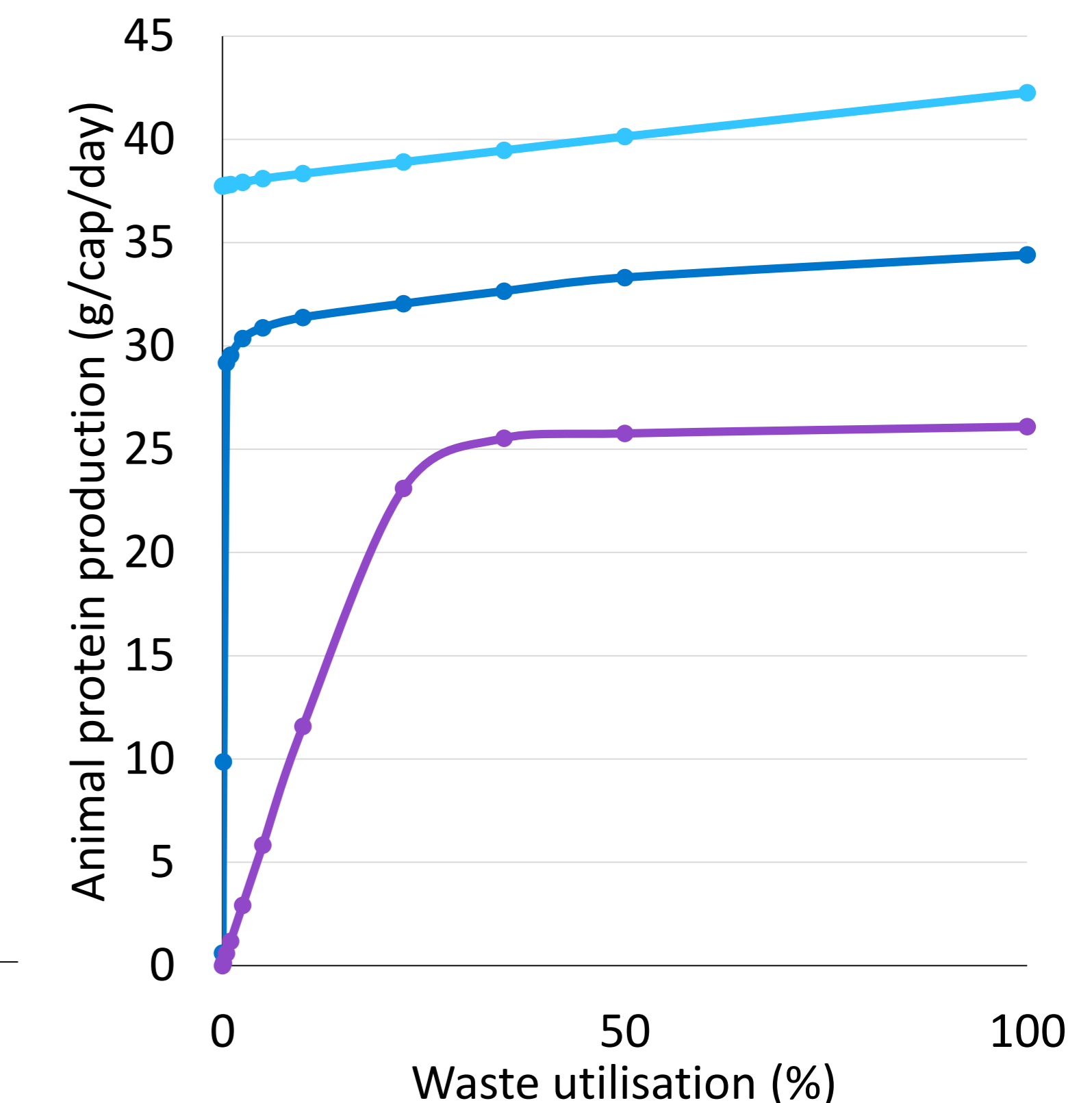
Reduced to 33 and 26 g/cap/day due to:

- 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