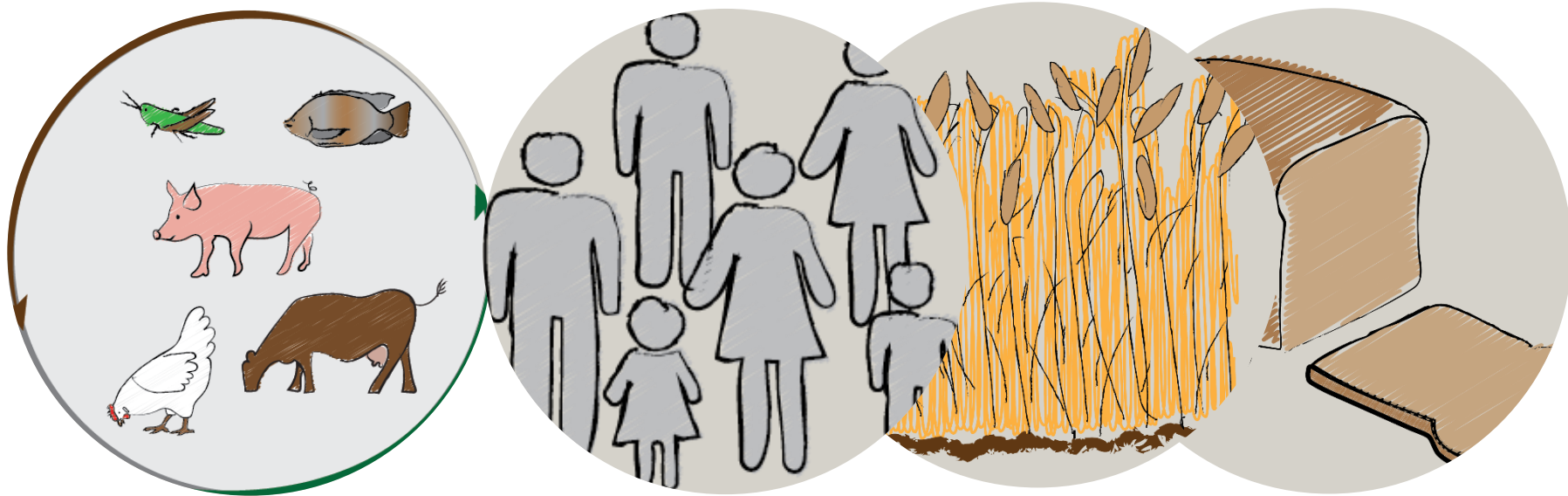


# Upcycling food leftovers and grass resources through farm animals

Ollie van Hal, Imke de Boer, Adrian Muller, Sonja de Vries,  
Karl-Heinz Erb, Christian Schader, Walter Gerrits and  
**Hannah Van Zanten**



# Planet Earth

10 Billion in 2050



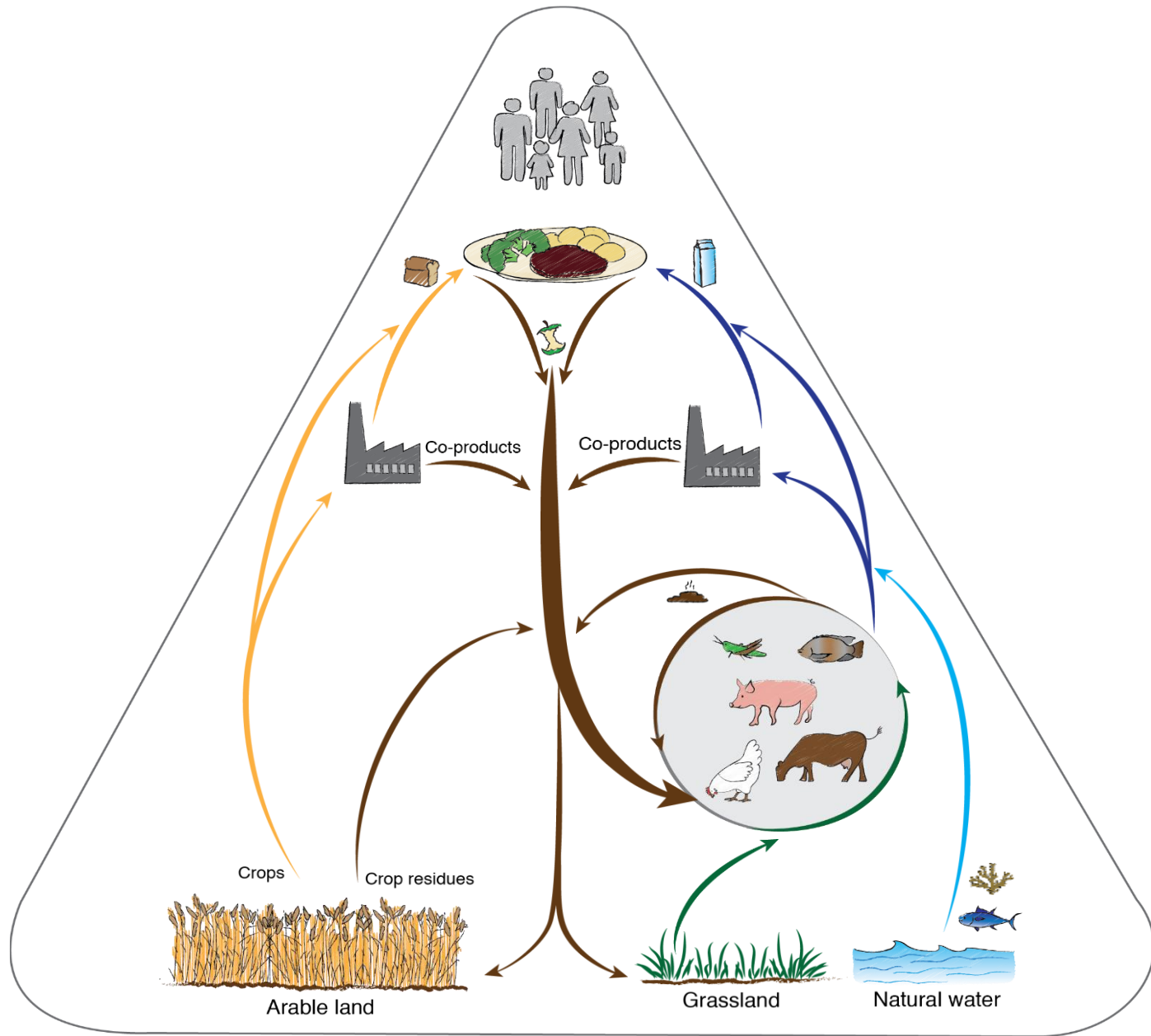
# Role of animals in sustainable diet?

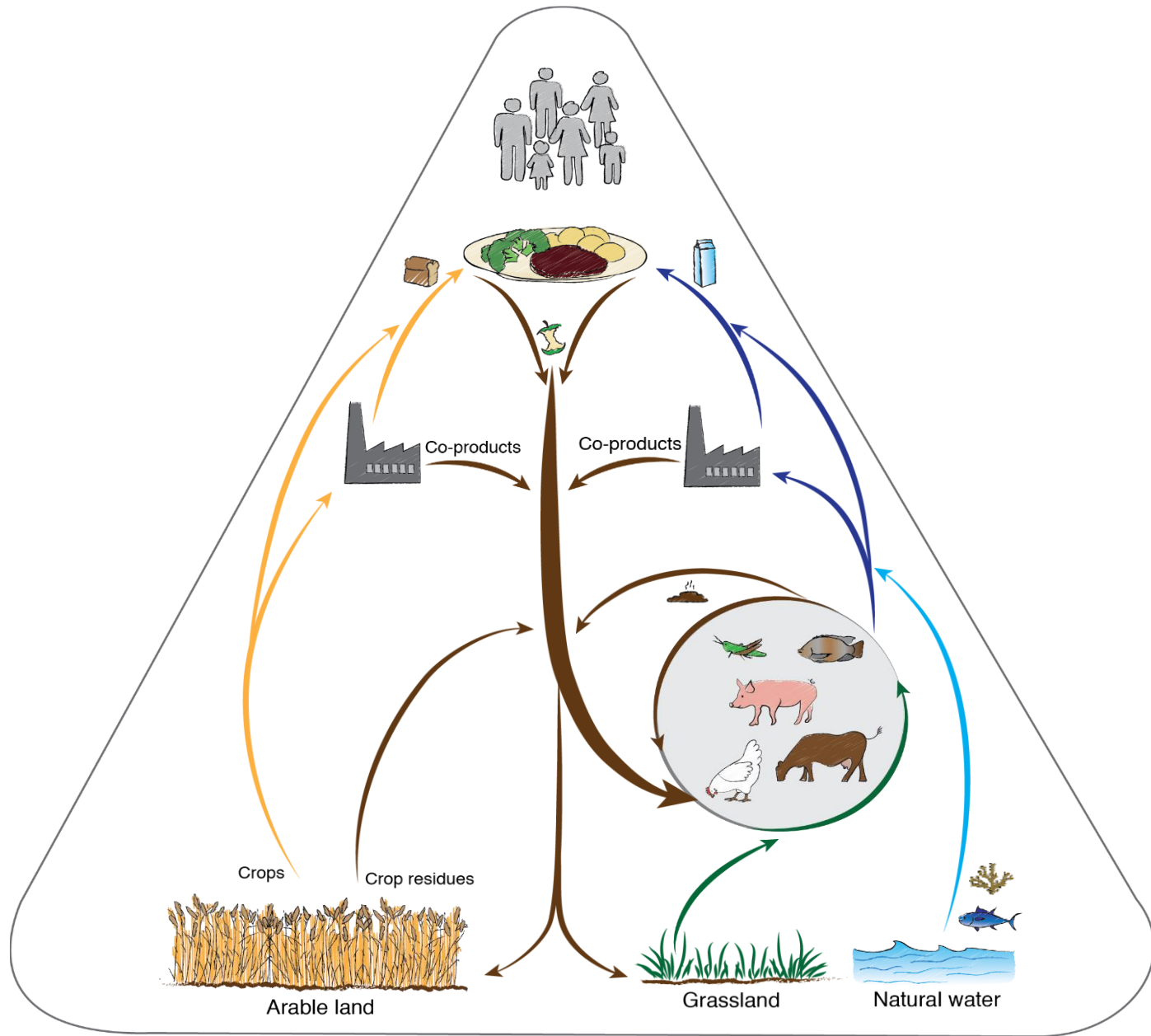
Production narrative  
“Produce more with less”

Consumption narrative  
“Eat less, no ASF”



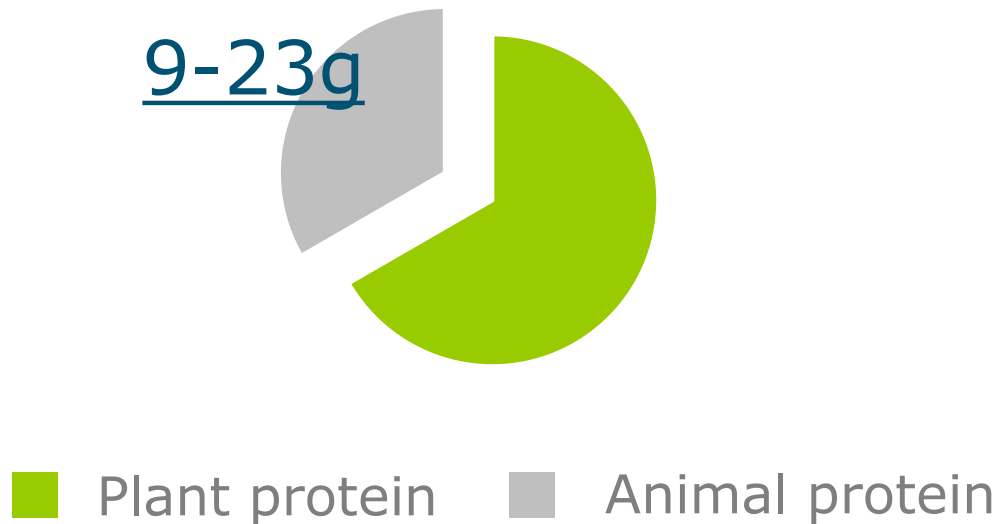
Circular narrative  
“Animals as recyclers”





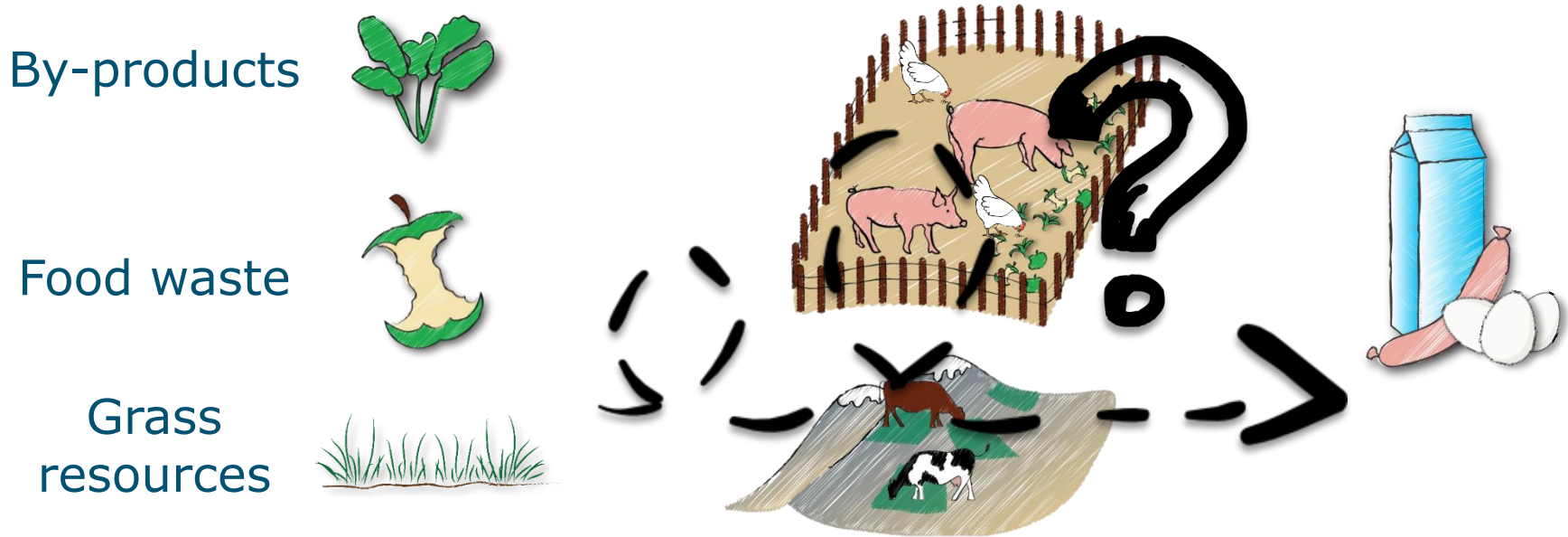
# How much animal protein can we consume?

Daily protein requirement (60g)



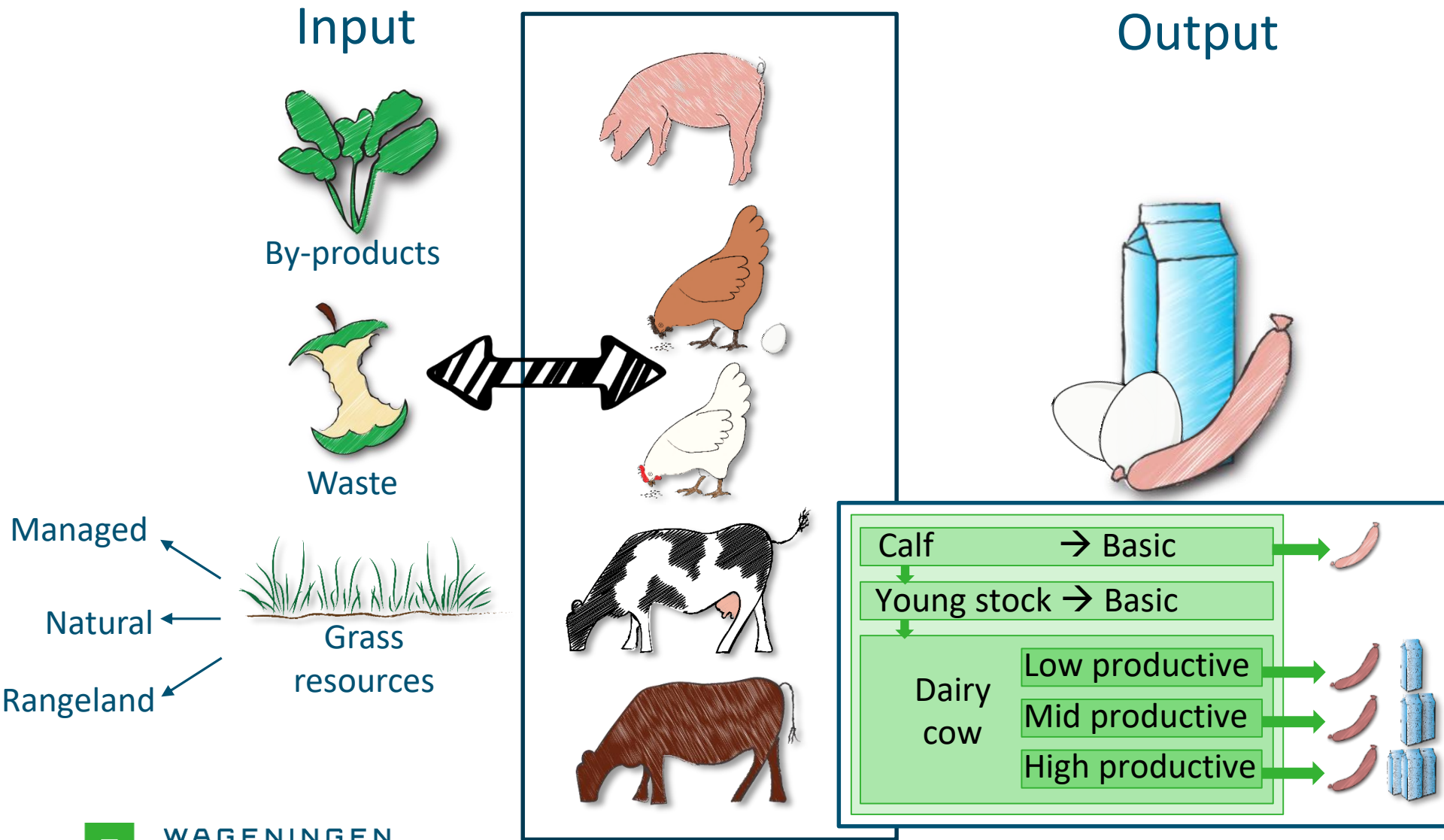
What is causing this high variation?

# Feeding what to who?



Which combination of livestock systems  
- differing in production level -  
can optimally convert leftovers into animal protein?

# Optimisation model





# Livestock systems

- 100%  0

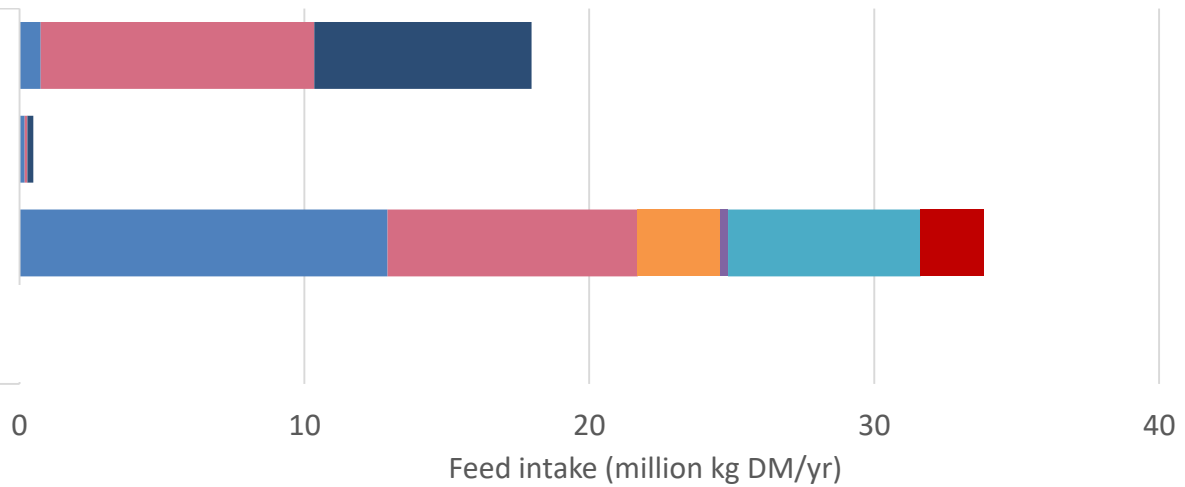
- 100%  0

- 78%  56 mln

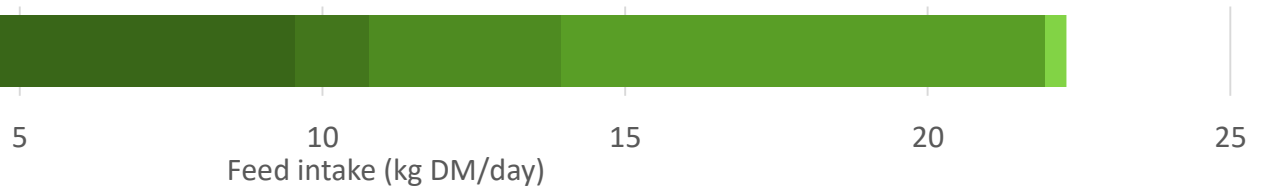
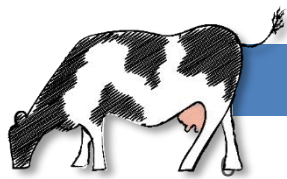
- 98%  10 mln

+ 9%  30 mln

Unused

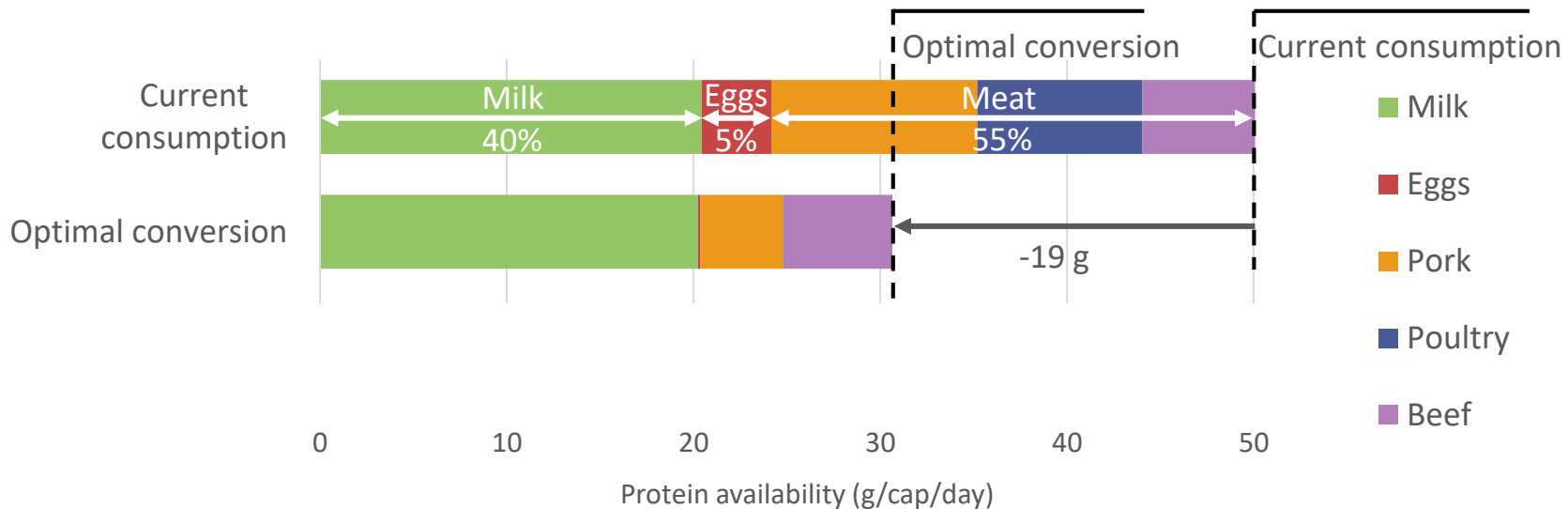


■ Cereal ■ Oil seed ■ Roughage ■ Tuber ■ Pulp ■ Molasses ■ Waste

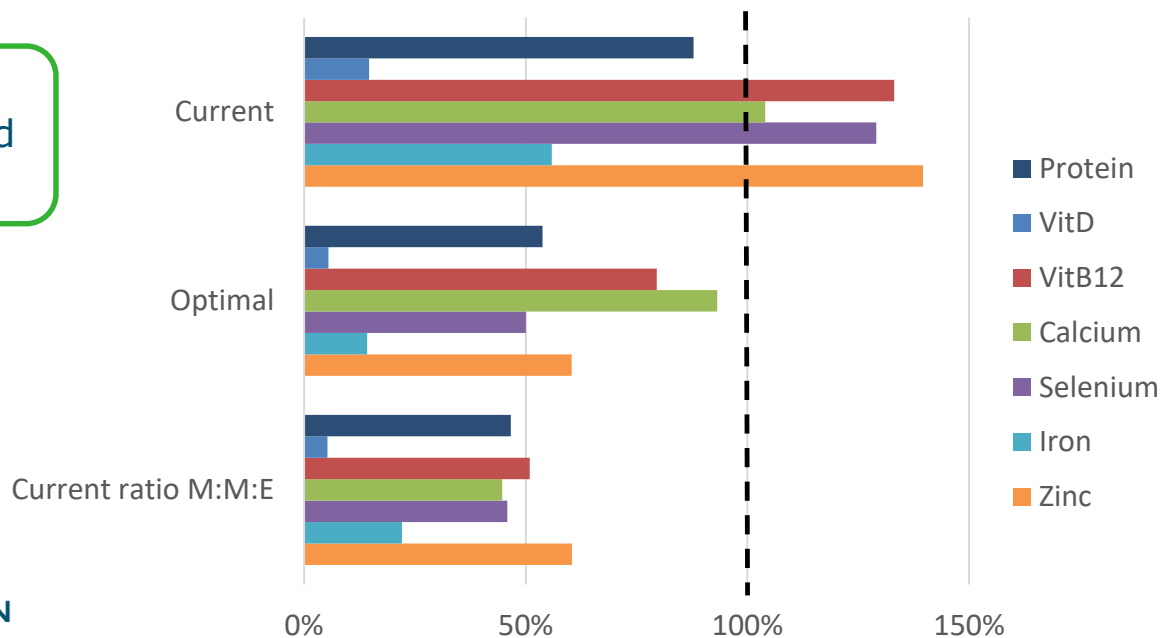


Grass resources:   
 ■ High ■ Mid ■ Low    ■ High ■ Mid ■ Low    ■ High ■ Mid ■ Low   
 Managed grass                      Natural grass                      Rangeland

# Consequences for our diet



2 glass milk per day,  
twice a week beef and  
twice a week pork



# Conclusion

- Optimal use of leftovers increases the production of ASF.
- Requires a transformation of our livestock production system.
  - Animals numbers and animal productivity
  - Not only high productive animals
- Requires a reduction of the consumption of ASF in high income countries.
  - From meat to more dairy based diets
- What about the environmental impacts and other animals?

# Animal Production Systems group

[Hannah.vanzanten@wur.nl](mailto:Hannah.vanzanten@wur.nl)

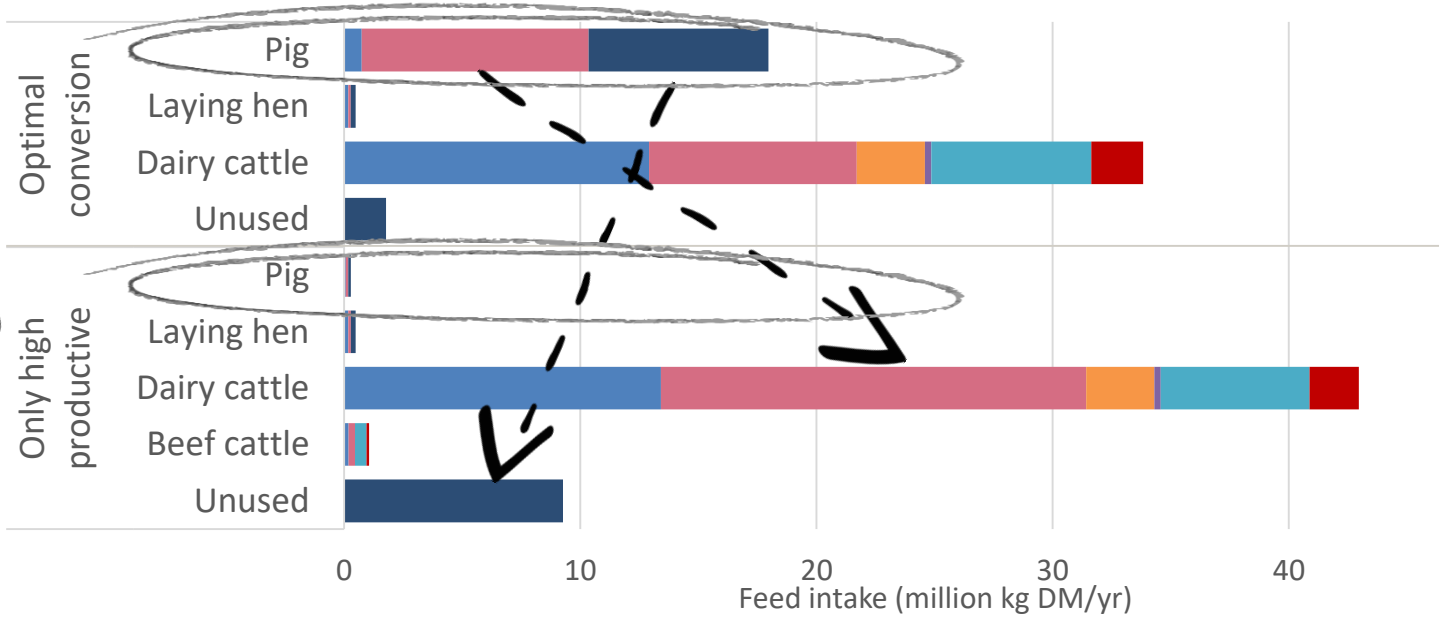
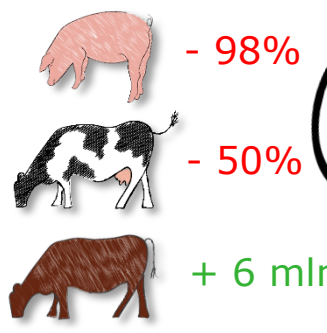


O. van Hal, I.J.M. de Boer, A. Muller, S. de Vries, K.-H. Erb, C. Schader, W.J.J. Gerrits c, H.H.E. van Zanten

Upcycling food leftovers and grass resources through livestock: Impact of livestock system and productivity

Journal of Cleaner Production, 219 (2019) 485-496

# Only high productivity



■ Cereal ■ Oil seed ■ Roughage ■ Tuber ■ Pulp ■ Molasses ■ Waste

