Feed-a-Gene

Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems

Novel tools for efficient livestock: the Feed-a-Gene project

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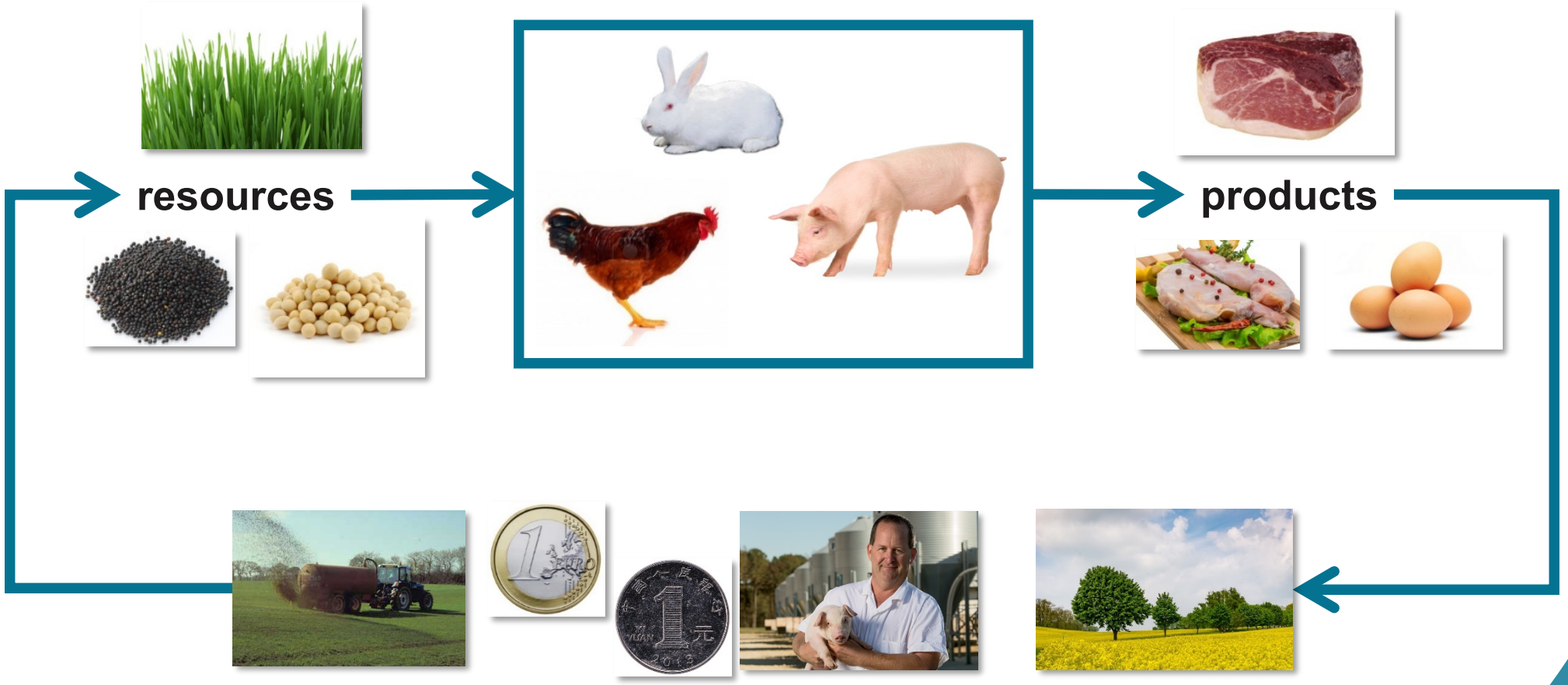
Is efficient livestock only gain-over-feed?



EU funded Research project

2015
2020

€10 M Budget

Feed-a-Gene

Adapting the **feed**, the **animal** and the **feeding techniques** to improve the efficiency and sustainability of monogastric livestock production systems

(www.feed-a-gene.eu)

23
Partners
EU + China

15
Industry

8
Academic

Objectives of the Feed-a-Gene project

Feed:

- Novel feed proteins that are not or less in competition with food
- Novel feed processes for enhanced nutritional value of feed resources

Gene:

- Novel traits indicative for feed efficiency and robustness => selection criteria
- “Do better with feeds that may be worse”

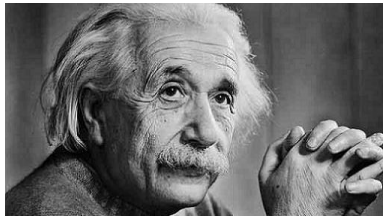
Traits, models, and feeding techniques:

- Appreciate variation among animals
- Develop precision feeding techniques
- Evaluate the overall sustainability

Taking advantage of variation

Observe variation in feeds, animals, and the environment

Predict using data-driven models and quantify interactions and variation



Understand the underlying mechanisms of variation

Control through livestock management (e.g., feeding, breeding)

Novel feed ingredients/real-time characterisation

Protein from green biomass: up-scaling



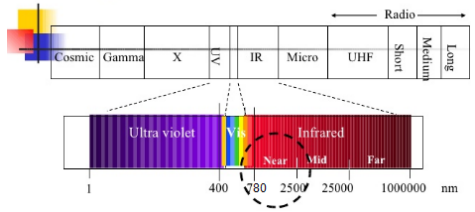
Upgrading meals by processing technologies, enzymes

Fiber-rich fraction

Protein-rich fraction

New assessment methods for composition and nutritive value

NIR Spectra



Novel traits indicative of Feed Efficiency for novel feeding and breeding strategies

Behavior and welfare




image analysis
serotonin,
cortisol

Individual feed intake

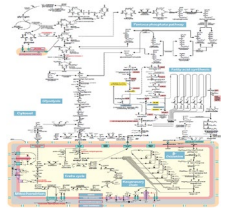
feed intake patterns
feeding behavior

Digestive efficiency


digestibility markers
gut health
microbiota

Metabolic efficiency

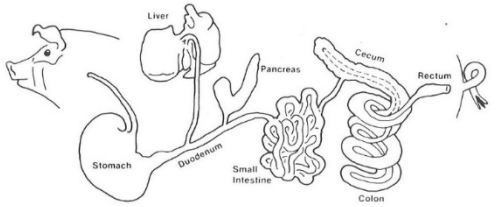


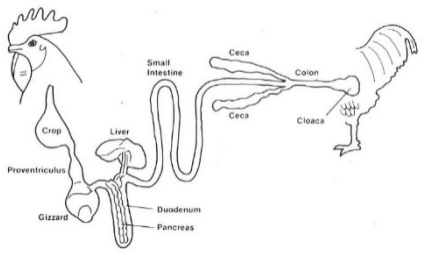


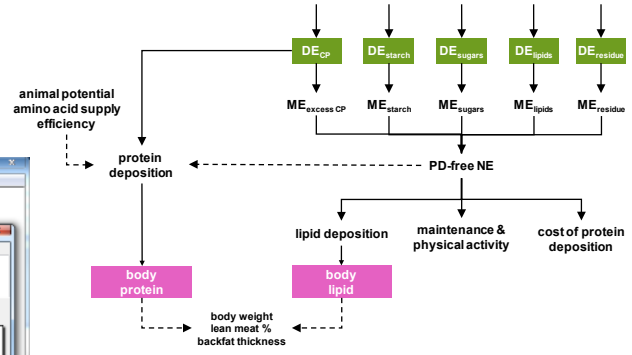
metabolomics

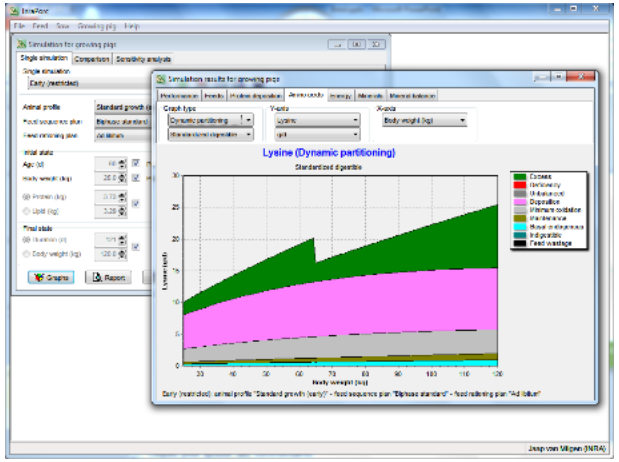
FeedUtiliGene: a tool to integrate models of feed use and animal response to nutrient supply and environmental challenges

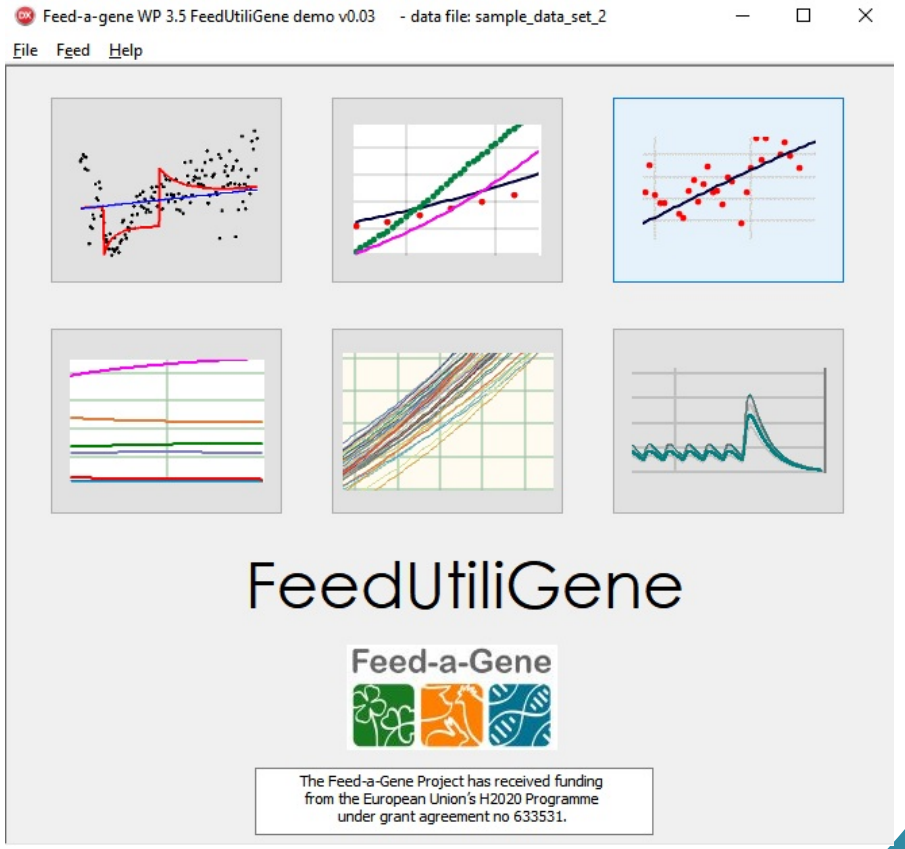
$$PA = (a + \bar{a}M) \times e^{[(b + \bar{b}M) \times WT + (c + \bar{c}M)/WT + (d + \bar{d}M) \times WT^2]}$$



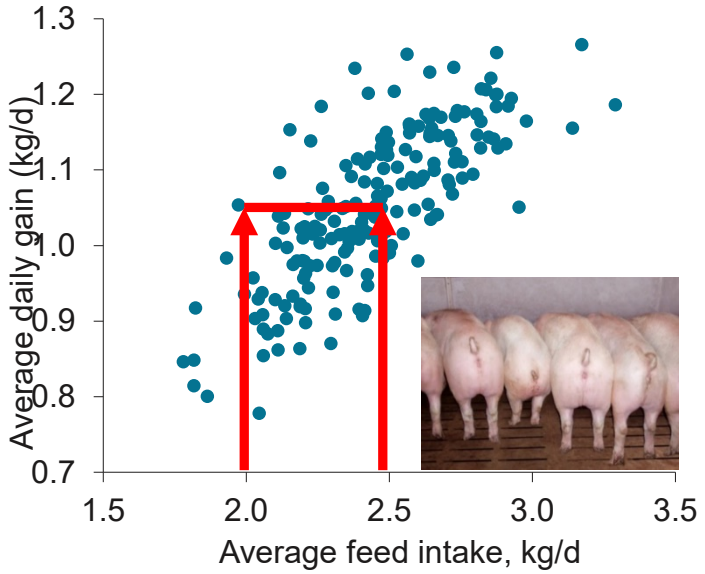


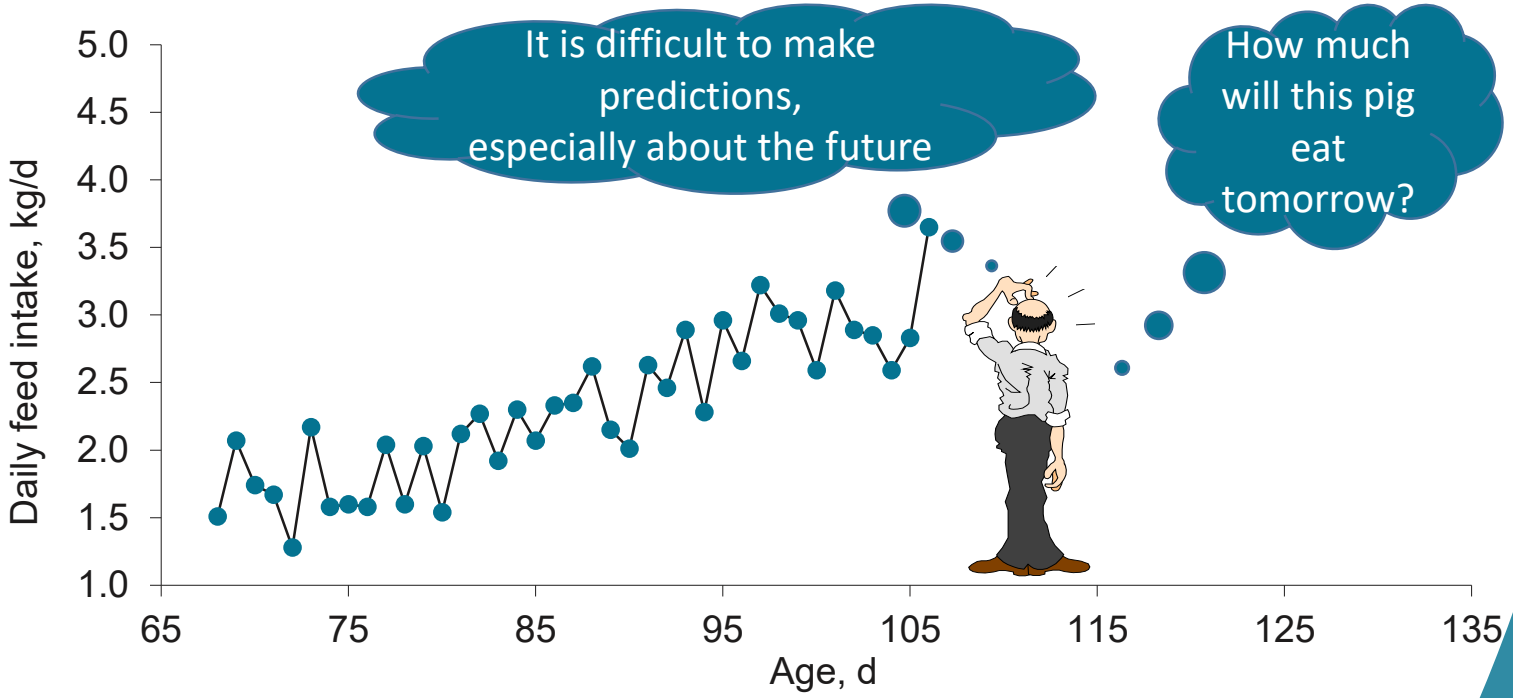


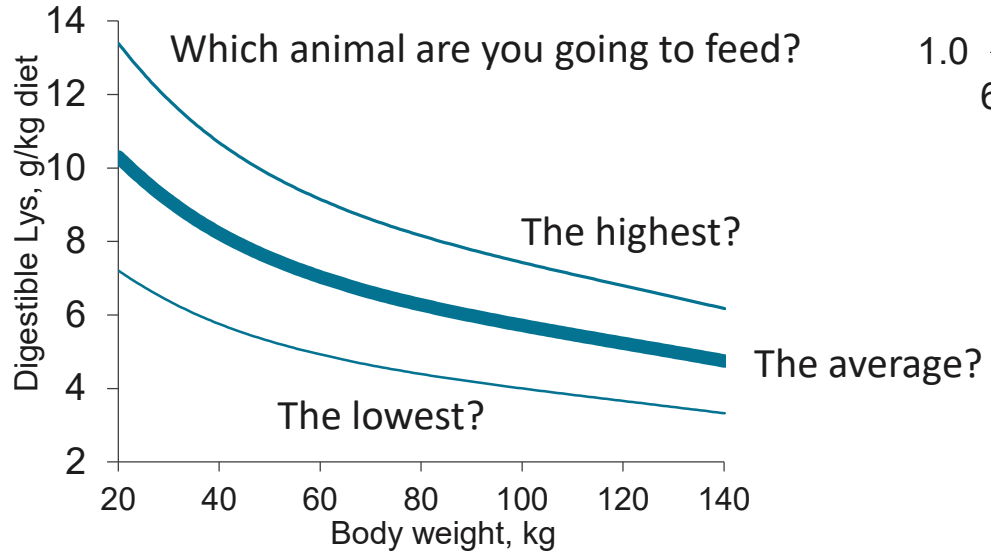




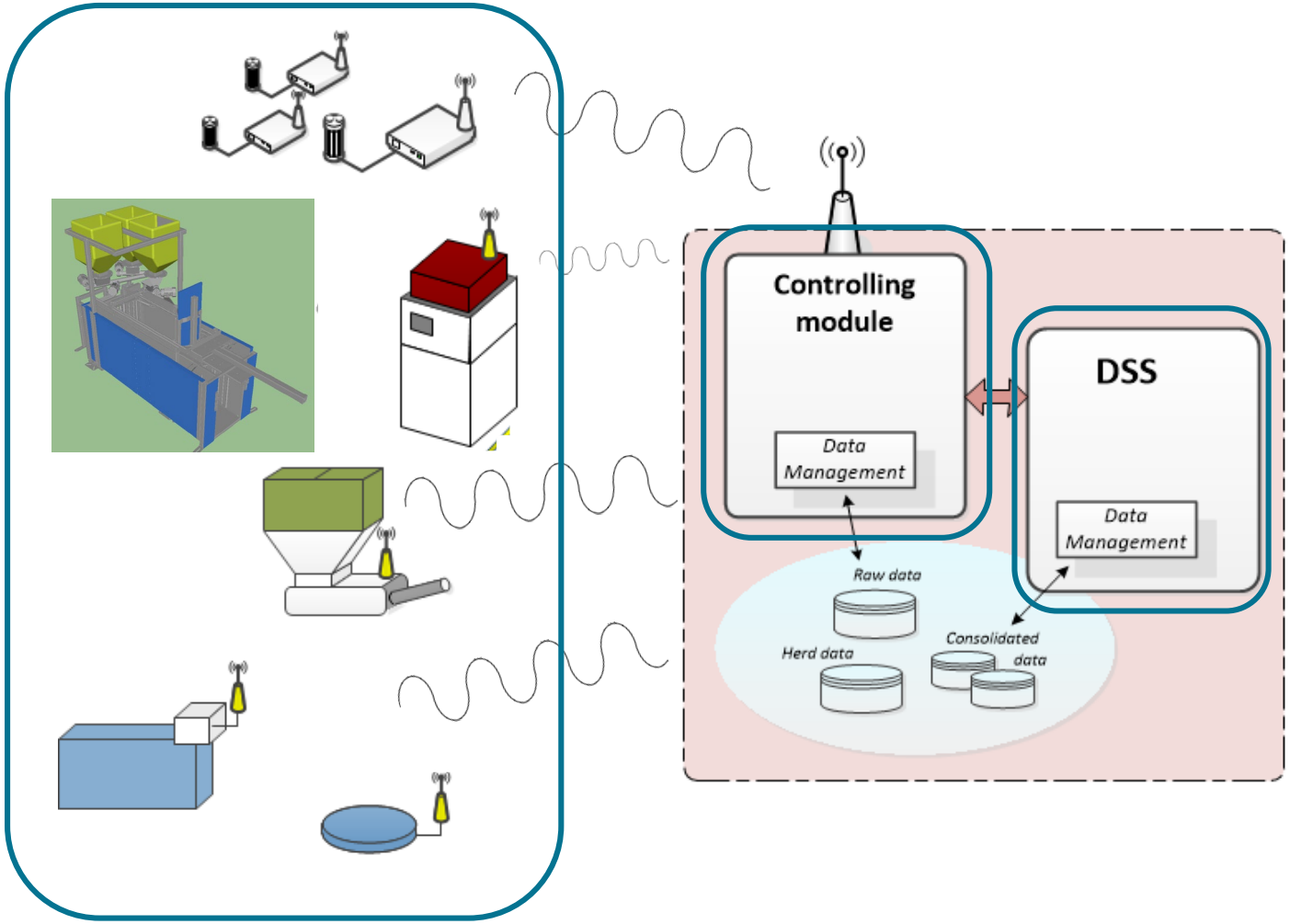
Control individual variation through precision livestock feeding



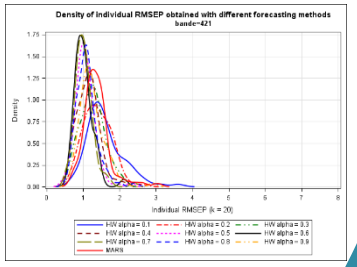




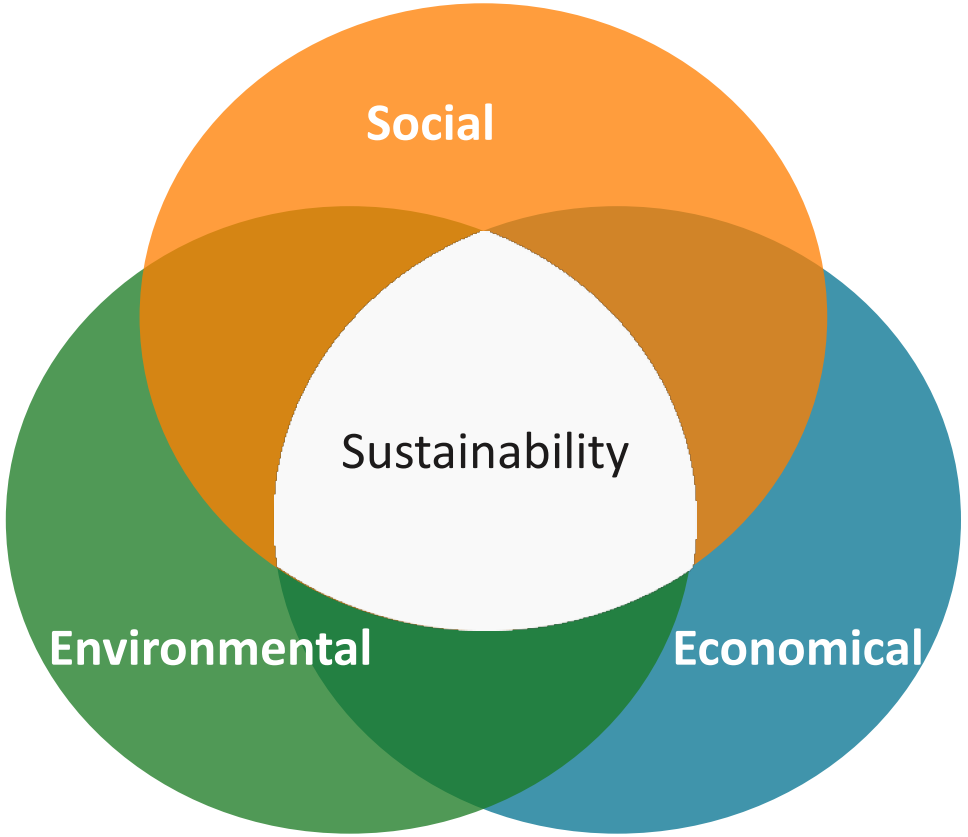
Management tools for precision livestock feeding



- Data collection
- Data cleaning
- Managing missing data
- Body weight prediction
- Feed intake prediction
- Determination of amino acid requirements



Sustainability evaluation



- Identification of sustainability indicators
- Life Cycle Assessment of some of the proposed management systems
- Cost-benefit analysis
- Evaluation of consumer and farmer attitudes
- Overall sustainability appraisal

Conclusion

Feed-a-Gene provides tools to increase the efficiency and robustness of livestock production systems while making them more sustainable

There is no more “one-size-fits-all”: variation (among animals and systems) is key to progress

Feed-a-Gene is a research project, it is now necessary that stakeholders take the novel tools to “real life”

To go further and have fun with Feed-a-Gene

www.feed-a-gene.eu

Thanks for your attention

Feed-a-Gene outcomes