

Sustainable farm animal production: synergies and trade-offs

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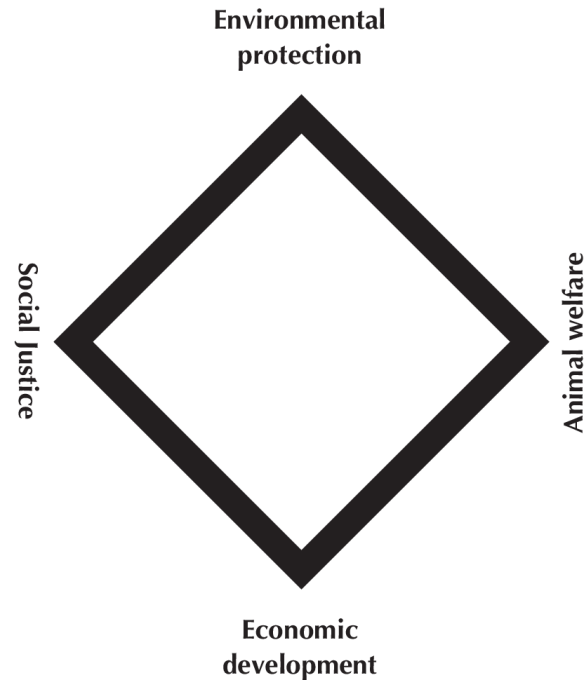
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Sustainable farm animal production: synergies and trade-offs

1. Animal welfare is a sustainability issue
2. Including welfare and antibiotic use in sustainability assessments mitigates trade-offs
3. Pressures on supply chains to be efficient AND achieve multiple, often competing sustainability objectives
4. A methodology for benchmarking farms and decision support



Animal welfare is a sustainability issue



The "Sustainability Diamond" (Rawles, 2012)

- Sentience is the bedrock of animal welfare concern - placing *intrinsic value* in including welfare in sustainable development
- Also has *instrumental value*
- 5 welfare needs, to a "good life"
- But - animal welfare is often absent from sustainability definitions, frameworks and discourse

Wensley, 2020; de Pastille & Rushen, 2005; Hartung et al, 2009; Bright & Joret, 2012; Alonso et al, 2020; Chen & Weary, 2022; Bright et al, 2011; FAWC, 2009; Rawles, 2012.

Antibiotic use is a sustainability issue

- AMR is amongst the most significant and pressing health challenges facing human civilisation
- Antimicrobial use in animals is a key driver of resistance pressure and a precursor to diffuse environmental pollution with antibiotics and resistance genes
- Human health, animal welfare, economic, social and environmental consequences



ECDC et al. 2017; Tang et al. 2017; Moran, 2019; Sarmah et al., 2006; Blanco et al, 2020.
Image from: <https://www.discoverwildlife.com/animal-facts/birds/facts-about-vultures/>

Sustainability synergies and trade-offs

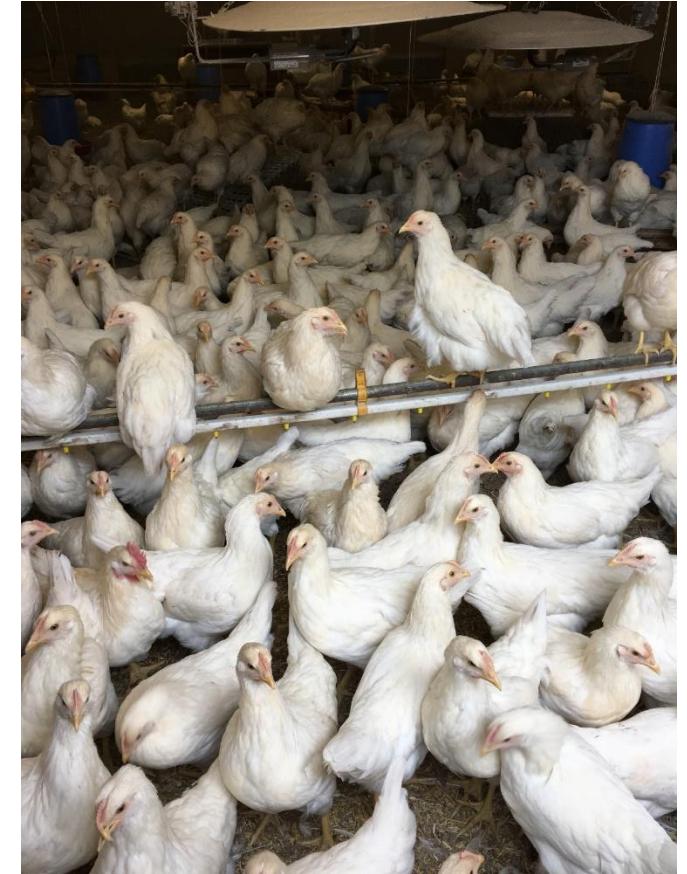
Global livestock production is on the rise

Broiler production has increased in tonnage by a factor of 14 since the 1960s

Remarkable productivity gains in global animal agriculture have been achieved to maximize production and improve efficiency

Antimicrobial use, disease predispositions and some environmental outcomes represent harmful trade-offs

UNFAO, n.d., Bennett et al, 2018; BPC, 2020; Bessei, 2006.



Sustainability synergies and trade-offs

Modern broiler production is perhaps the best exemplar of this trend

EFFICIENCIES

High yield & rapid growth

Low feed conversion ratio and
land/labour efficiency

Nutritional security

Carcass balance

GHG emissions

EXTERNALITIES

Disease predispositions

Adverse animal welfare impacts (e.g.
mobility, foot/hock lesions,
behavioural opportunity)

Food safety – antimicrobial use,
Campylobacter

Biodiversity impacts of feed
production, pollution, air quality



Bennett, 2018; Bessei, 2006; Poore & Nemecek, 2019; Higham et al, 2018; Boggia et al, 2010.

Pressures on supply chains

Government and industry antimicrobial use targets

plus

Growing demands on the chicken industry from retailers, NGOs and investor groups for animal products from higher welfare, low antibiotic use, environmentally sustainable systems

=> Results in pressure on retailers to attain **multiple and often competing** sustainability objectives.

O'Neill, 2016; RUMA, 2019.

	1. Policy publicly available	2. New for 2021: Policy covers all own brand products	3. New for 2021: Policy covers all branded products	4. Bans routine prevention	5. Does the policy restrict the use of HPCs/AUT	6. Bans colistin	7. Monitors antibiotic use	8. Publishes antibiotic usage data	9. Publishes data by farming system	10. Reduction strategy in place	11. New for 2021: Antibiotic use reduction targets	12. New for 2021: Policy covers imported products and ingredients
	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓	✗	✗
	✓	✗	✗	✓	—	✗	—	—	—	✗	✗	✗
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	✓	—	✗	✓	✓	✗	✓	—	✗	✓	✓	✗
	✓	✓	N/A	✓	✓	✓	✓	✓	—	✓	✓	✓
	✓	✗	✗	✓	✓	✓	✓	—	✗	✓	✓	✗
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BBFAW
Business Benchmark
on Farm Animal Welfare

FAIRR
A COLLIER INITIATIVE
FARM ANIMAL
INVESTMENT
RISK & RETURN

ShareAction
the movement for Responsible Investment

THE BETTER CHICKEN
COMMITMENT IS THE LEADING
SET OF STANDARDS for broiler
welfare driving the food industry
towards higher welfare practices.

**THE RESTAURANT SECTOR
AND ANTIBIOTIC RISK**
Progress Report, 2017

**Winging it: UK's chicken boom is
fuelling deforestation in South America**

Greenpeace calls on supermarkets to set meat-reduction targets

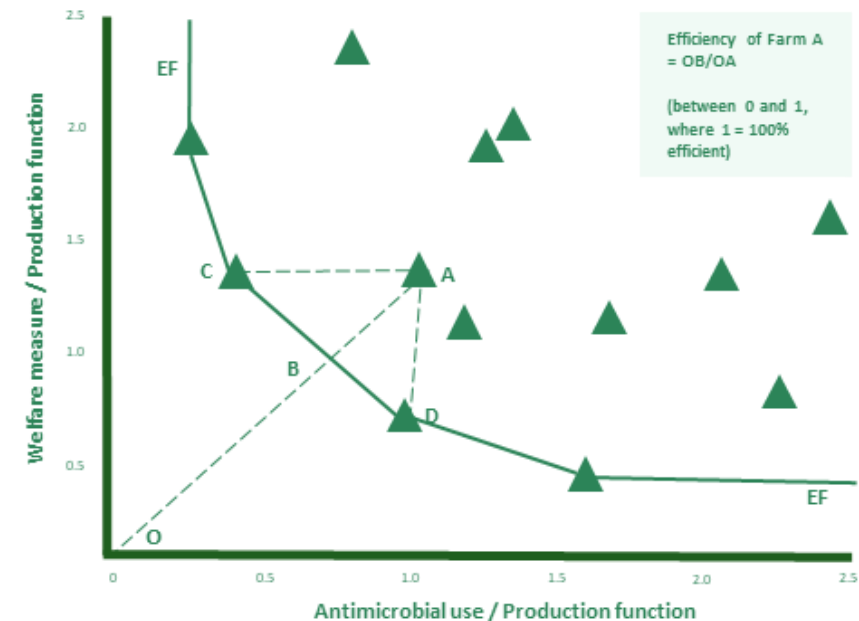
21ST JANUARY 2020 — FORESTS — PRESS RELEASE

Benchmarking farms

Benchmarking farms on the 'efficiency frontier' including welfare parameters

Linear programming technique data envelope analysis (DEA) enables the benchmarking of farms or 'decision making units' in terms of their efficiency in using a given quantity of inputs (animal welfare and antibiotic use 'costs') to optimise outputs (chicken production).

An EXAMPLE Benchmark of Broiler Farms relative to the Efficiency Frontier using Data Envelope Analysis (Input orientation, Variable Returns to Scale)



- ▲ = a single Decision Making Unit (farm)
- EF = The Efficiency Frontier
- O = Origin
- A = Example Farm A
- B = position at which a straight line to Farm A cuts the Efficiency Frontier
- C and D = The Farms C and D on the Efficiency Frontier to which Farm A is compared

Decision support for farming policy

- Multi-stakeholder consultation to agree the inputs and outputs defining 'efficiency'
- Best-performing farms on the 'efficiency frontier' are further analysed using regression to determine their common characteristics and supply chain standards
- Can inform sustainable chicken production standards that support positive public good outcomes alongside private production goals

Example predictor variables

<i>Stocking density</i>	<i>Management / personnel</i>
<i>Breed (slow growing / conventional)</i>	<i>Turnaround time</i>
<i>Parent flock age</i>	<i>Month of depletion</i>
<i>Hatchery culls</i>	



Call to action

- To integrate animal welfare into our sustainability definitions, frameworks and discourse
- Including welfare and antibiotic use measures into sustainability assessments will help to mitigate trade-offs
- Efficiency has dominated the sustainability discourse, but producers, processors and retailers and are now under pressure to attain multiple often conflicting sustainability objectives
- Need sustainability solutions that can balance multiple objectives and capitalise on synergies. DEA Benchmarking is an example of a decision-support tool.





Thank you!

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