

Indoor controlled agricultural systems

There are options for farming crops and livestock in indoor environments with certain systems like pigs, poultry, greenhouses and vertical farming leaning naturally to indoor use

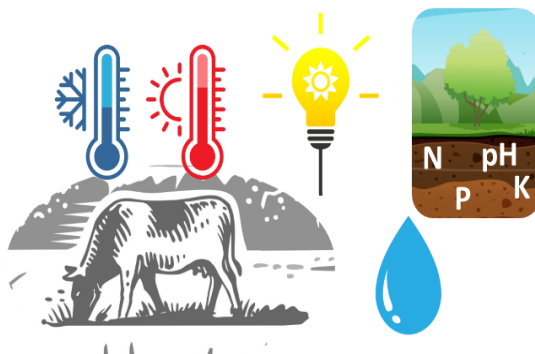
Why Indoors?

Protection



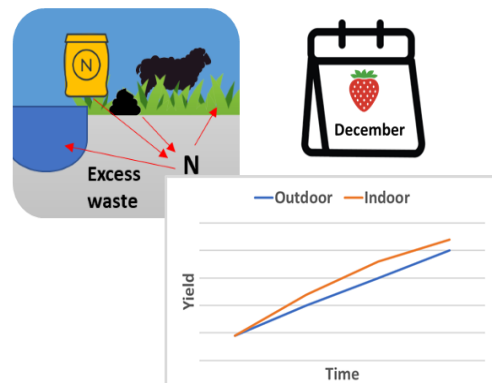
- Extreme weather
 - Disease
 - Predation
- Outdoor Stressors

Consistency/control



- Temperature / climate
 - Lighting
- Energy input (feed or nutrients)
- Water availability and safety

Productivity



- Optimal growing
- Less wasted energy
- Easier health assessments
- Out of season products

What about sustainability and the environment?

Indoor systems require energy and inputs but there are ways to make them more efficient

Renewables

- Integrate into infrastructure – Solar on roofs
- Mitigate some energy needs



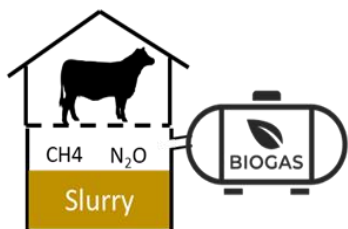
Circularity

- Generate energy from waste
- Recycle closed system inputs like water and nutrients



Capture emissions

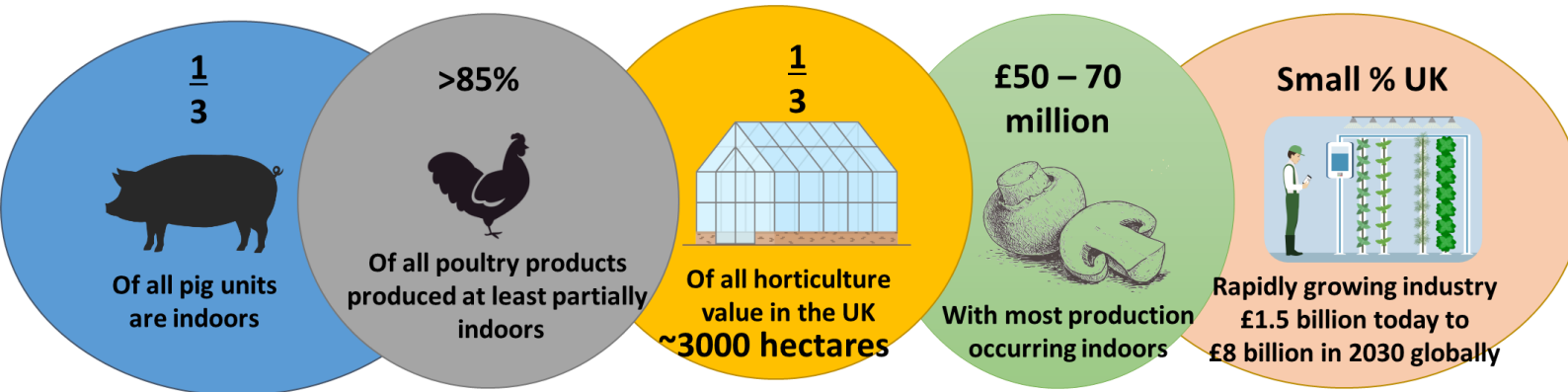
- In future direct from the indoor environments?
- Manure processing and other waste materials in one place easier to capture



Did you know?

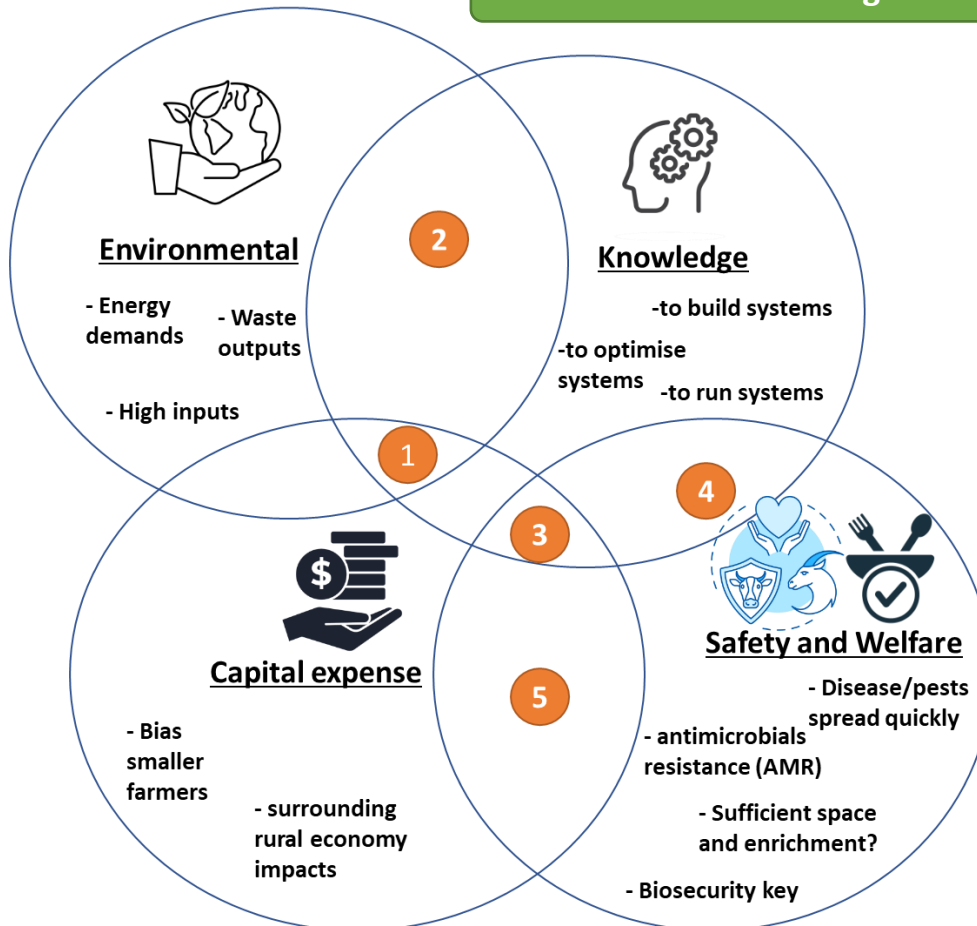
Indoor productivity tends to be higher per unit of space so could help to free up land specifically for use in sustainable and environmental practices like increasing woodlands or producing species-rich ecosystem-benefitting pasture swards

Indoor farming figures UK



Most livestock systems in the UK require housing at least partial during winter months and often during birthing with all indoor farming having the scope for increased fine control

Barriers and challenges



- 1** - Renewables can solve issues but need knowledge to build and run and capital
- 2** - Good knowledge and expertise can help to minimise input output issues on system design
- 3** - Good knowledge of safety and welfare issues can allow capital investment targeted at technologies and systems to mitigate risks or specialist agronomist or veterinary advice
- 4** - A lot of indoor safety and welfare concerns require good knowledge to implement controls
- 5** - Bespoke infrastructure is better for providing correct environments for safety and welfare but often costs more

Outdoor vs Indoor

- Some locations may benefit better with one system over another
- Combination systems could add sustainability and economic benefits
- Different uses could open up diversification opportunities and revenue streams
- Currently knowledge and expertise of indoor system is lacking more in the UK

Livestock and crops

- People tend to discuss livestock and crop indoor systems separately
- Essentially both have the same or similar benefit, challenges and considerations
- Technologies between these overlap with regards to heating, ventilating and others
- There are even experimental systems for combining crops and livestock indoors