



**Cows produce meat and milk,  
Oh and methane -  
Can diet control make cows  
greener?**

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# Cows produce meat and milk



Nutritionally valuable



Protein

Fats

Trace elements

Vitamins



# UK Cattle numbers



0.6M replacements



0.3M replacements



0.06M beef x females



2.1M annual slaughter



# GHG production



GHG	Total UK emissions of CO <sub>2</sub> eq	of total UK emissions as M t CO <sub>2</sub> eq
CO <sub>2</sub>	554	< 1 (<1%)
CH <sub>4</sub>	49.4	18.4 (37%)
N <sub>2</sub> O	37.8	25 (66%)
Total CO <sub>2</sub> eq	641.9	

85% of this from rumen fermentation

70% of this from cattle farming



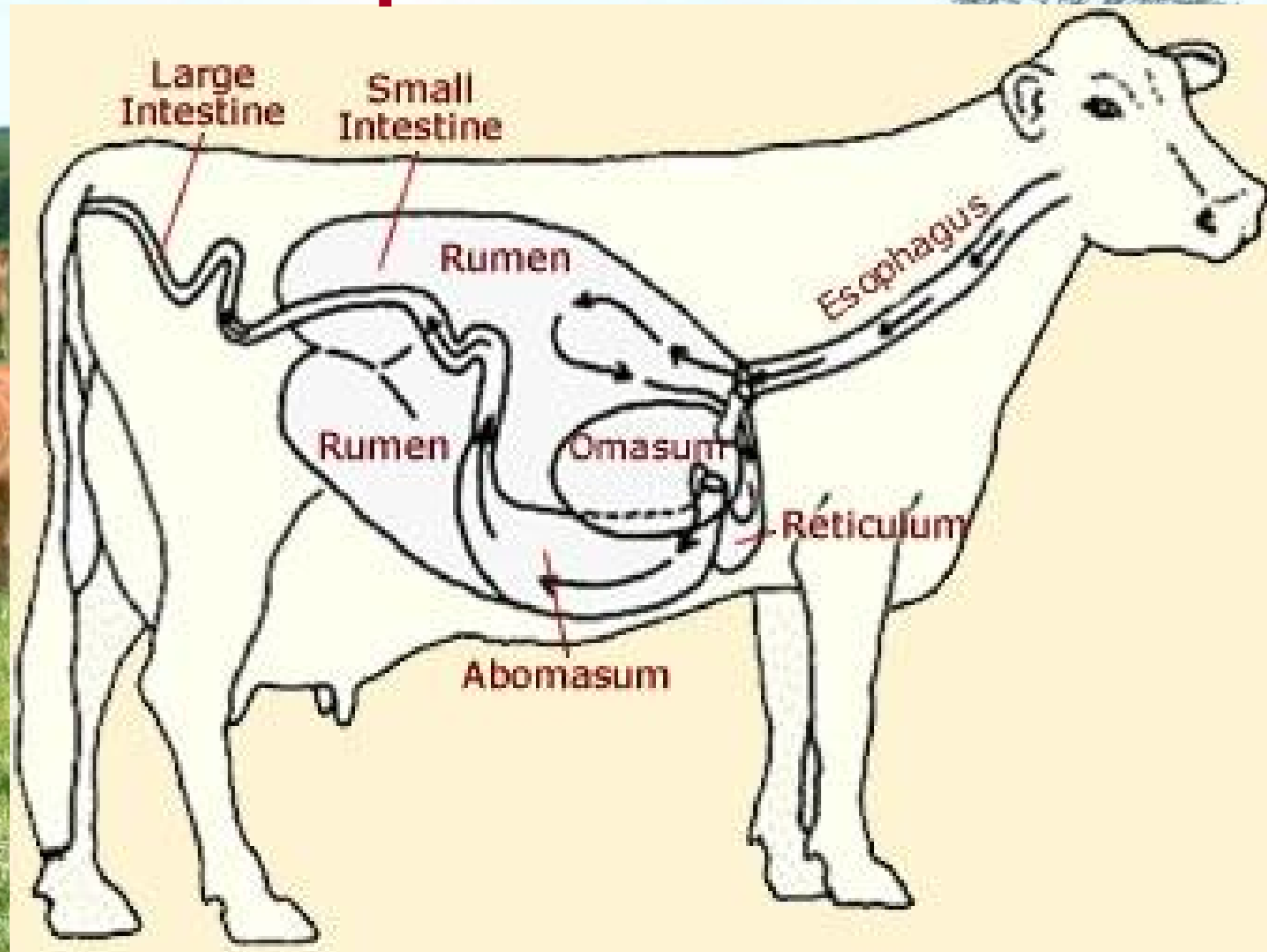
## GWP % contribution on farm- beef



	UK
Grazing	20
Conc and winter forage	30
Bedding and manure management	11
GHG emissions from stock	39



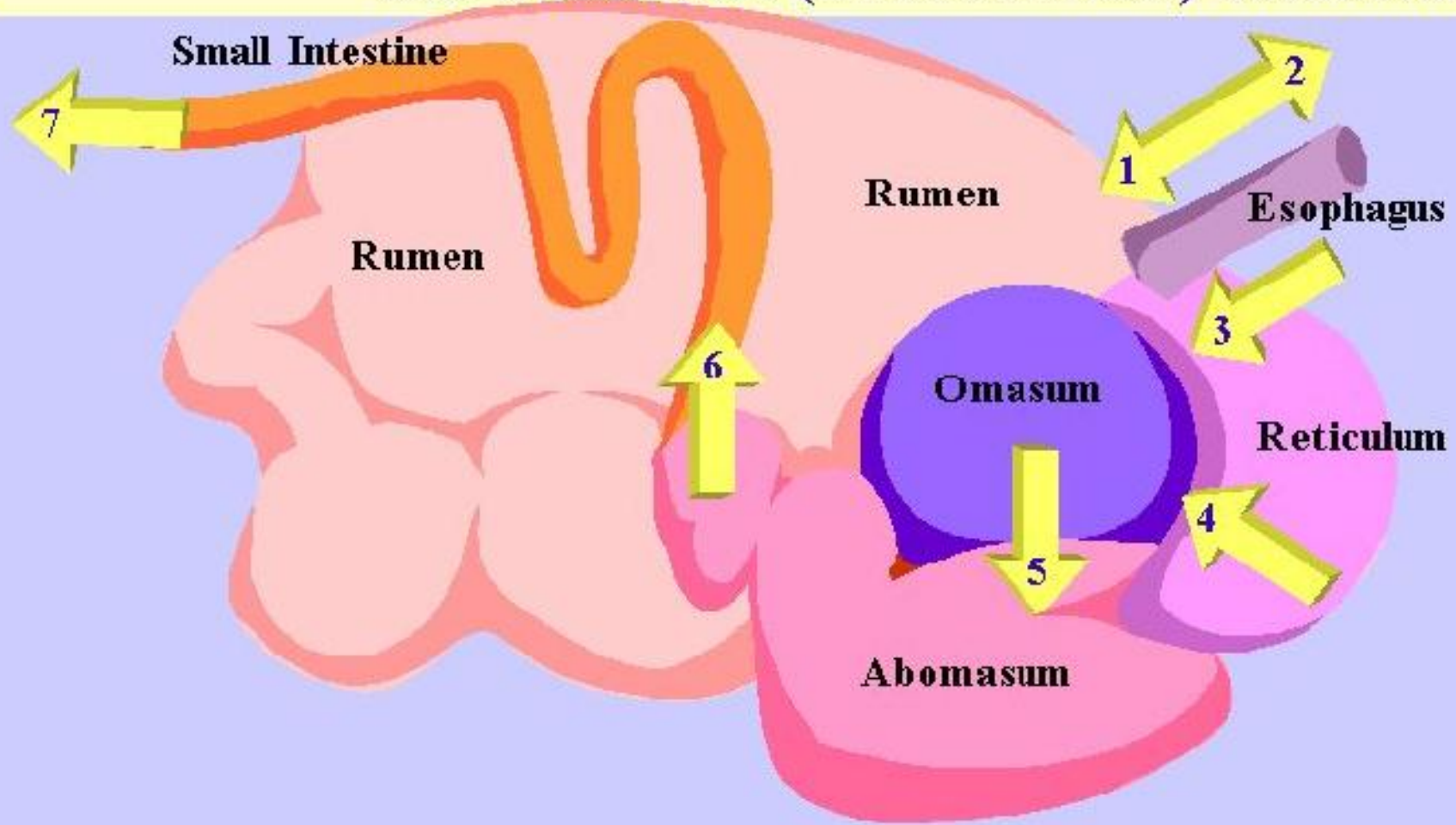
# Cows produce methane



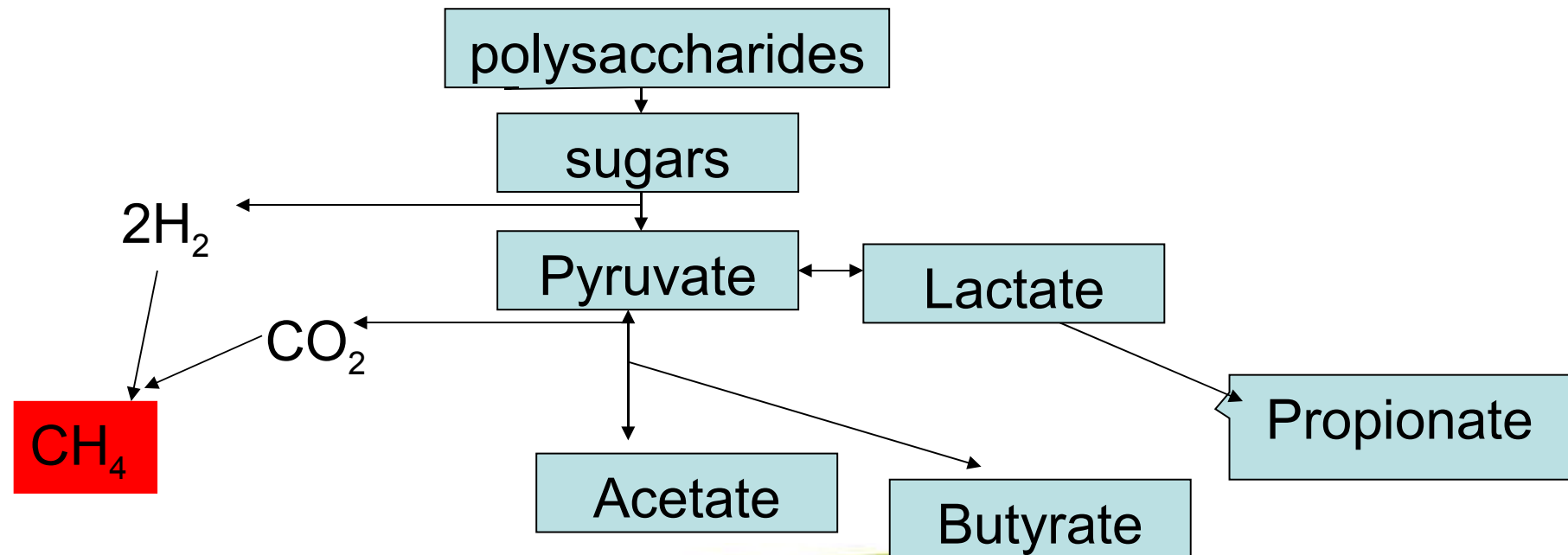
# Cows produce methane



## The Ruminant (DIGASTRIC) Stomach



# Rumen Microbiology







# **We know how to improve!!**

- 1. Select better animals**
- 1. Change the type of feed**
- 1. Change the quality of existing feeds**
- 1. Manage resources better**



# Select better animals



- Feed utilisation efficiency is heritable
- Productivity (milk production and meat growth) are heritable
- Fertility, Disease Resistance and Longevity are heritable

# Change the type of feed



Feed	ME MJ/kg DM	CP g/100 DM
Maize Grain	14.3	
Field Beans	13.8	
Wheat Distillers' Grains	13.5	
Barley grain	13.2	
Oats	12.2	
Maize Silage	13.0	
Grass silage	9-11	
Hay	8.0	
Straw	6.0	



Increasing digestibility

# Change the feed quality



## High Sugar Ryegrass



## Lower protein Clover



# Manage resources better



Layers of management

Natural resources

Soil, climate, feed production

Animal resources

Breed and cross

Match genetics to resources

System Choices

When to calve

When to house



# Conclusions



- **Cattle produce valuable products for human consumption but at a GHG “cost”**
- **The GHG cost can be reduced considerably if we apply what we already know**
- **There are large areas of the UK which cannot reasonably produce food for people unless cattle (or sheep) are the vehicle**
- **Unless consumer behaviour changes reducing production at home will simple export the problem**

