



Food from Livestock Production

By

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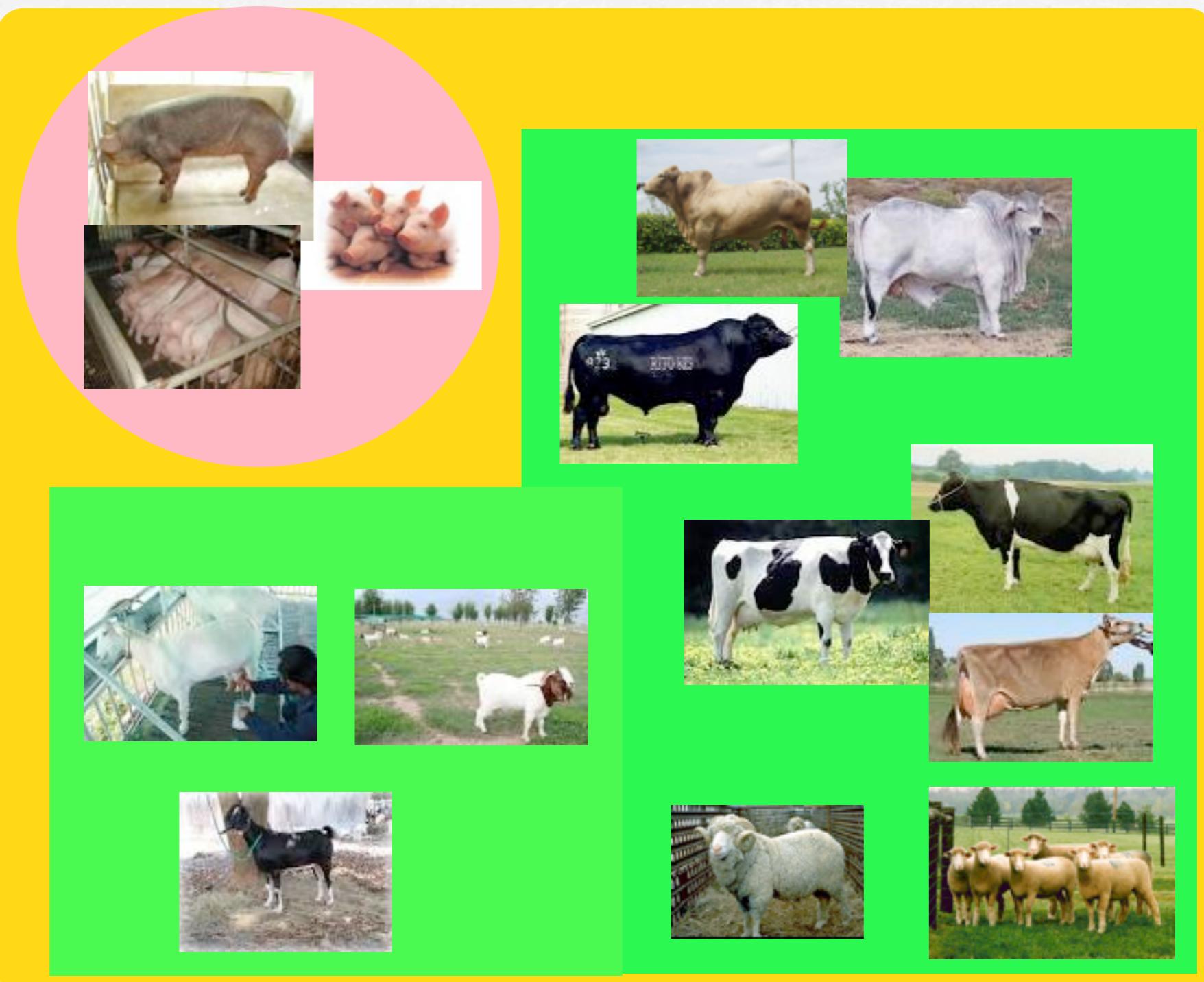
Livestock

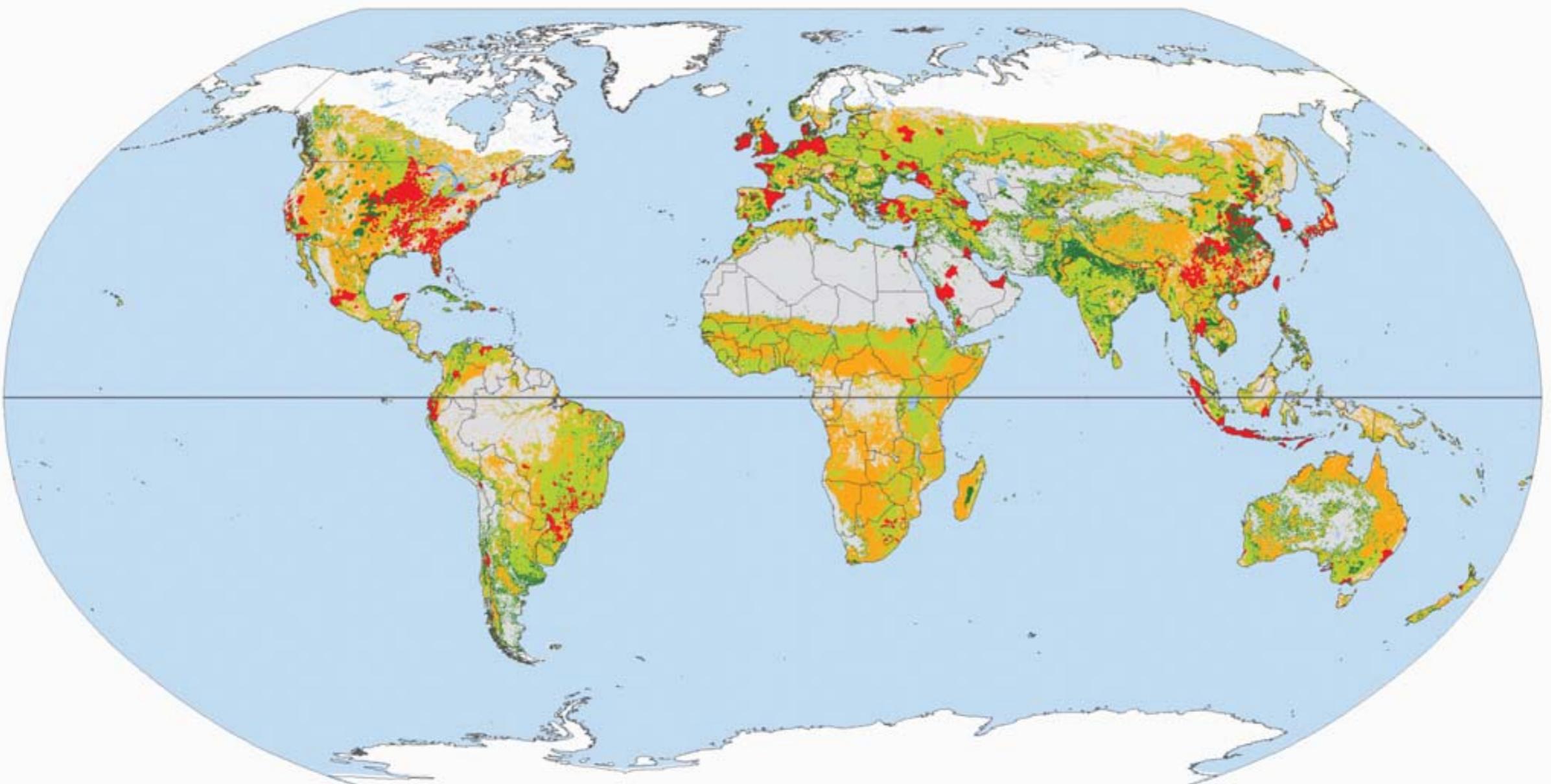
- Farm animals are kept, raised and used by people
- Raise for profit
- To produce food, fiber and labor
- Cattle, sheep, pigs, goats, horse and others except poultry
- Sometimes include poultry

Poultry



Mammal





Landless production systems for (sub)tropical and temperate climates

■ Areas dominated by landless production

Land-based systems

■ Mixed, irrigated

■ Mixed, rainfed

■ Grazing

■ Other type

■ Boreal and artic climates

~~~~ National boundaries



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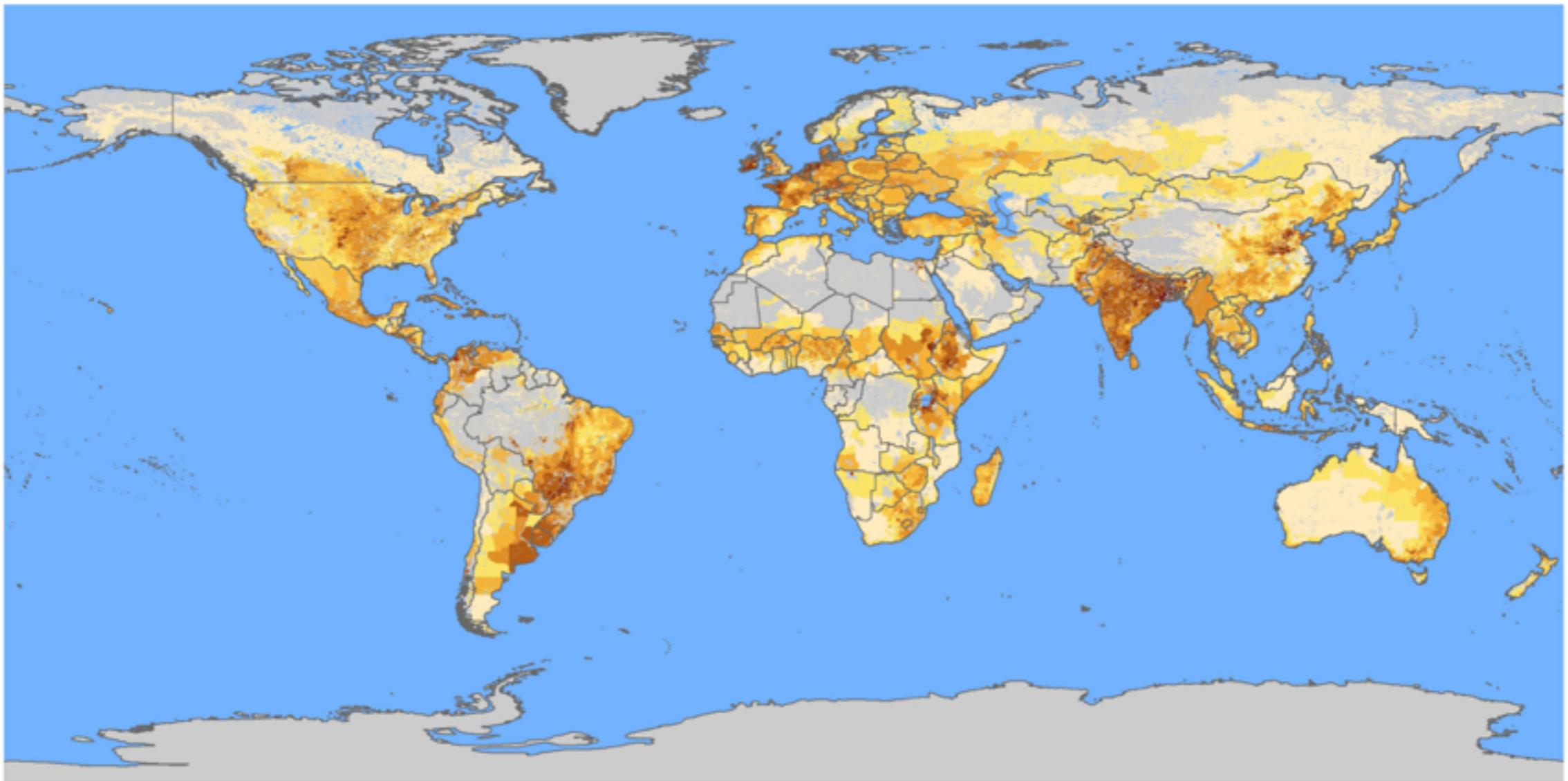
5,000

km (at the equator)



## Cattle density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km

<1

5-10

20-50

100-250

Water

1-5

10-20

50-100

>250

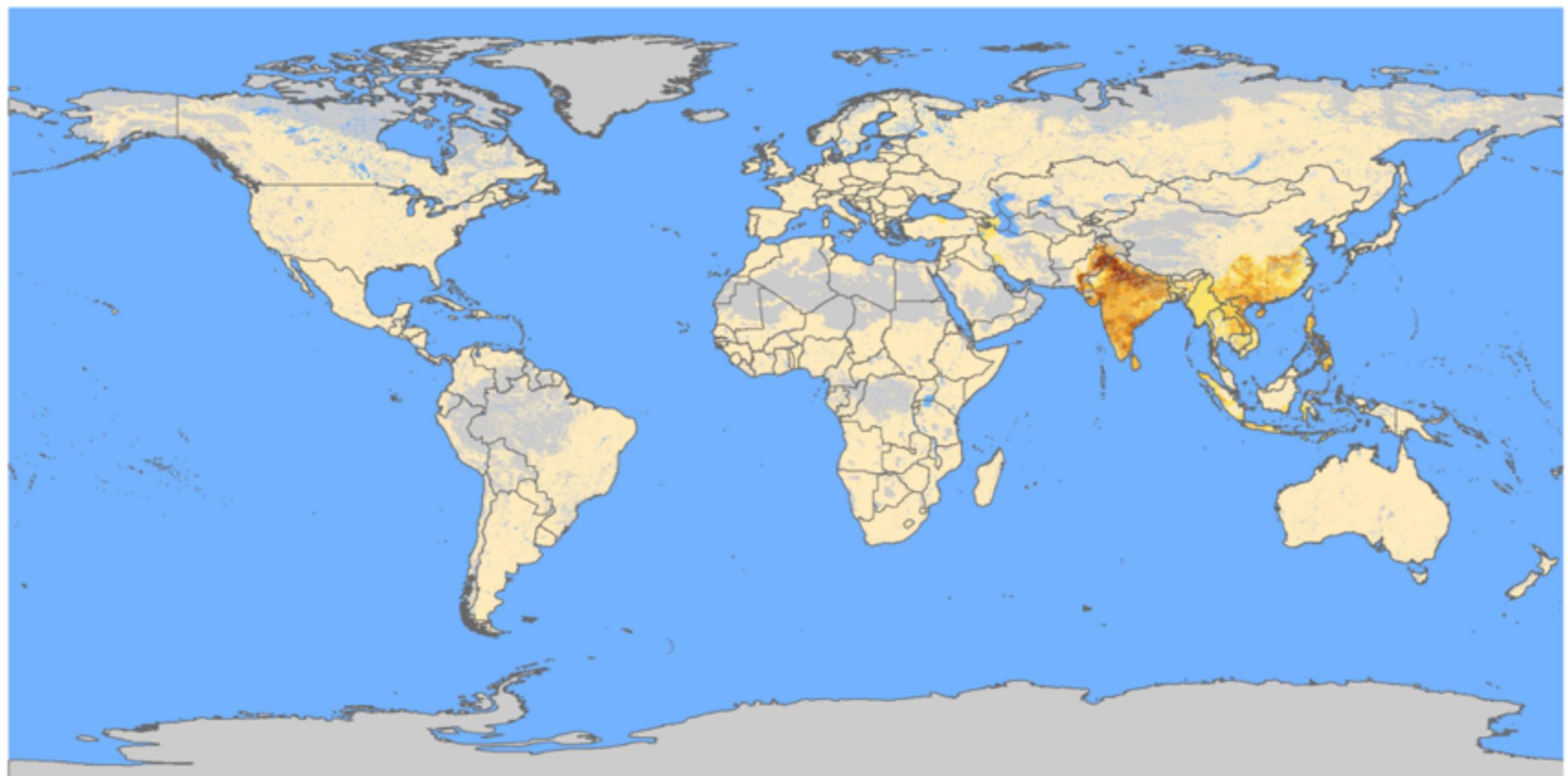
Unsuitable for ruminat

Source: Gridded Livestock of the World



## Buffaloes density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km

<1

5-10

20-50

100-250

Water

1-5

10-20

50-100

>250

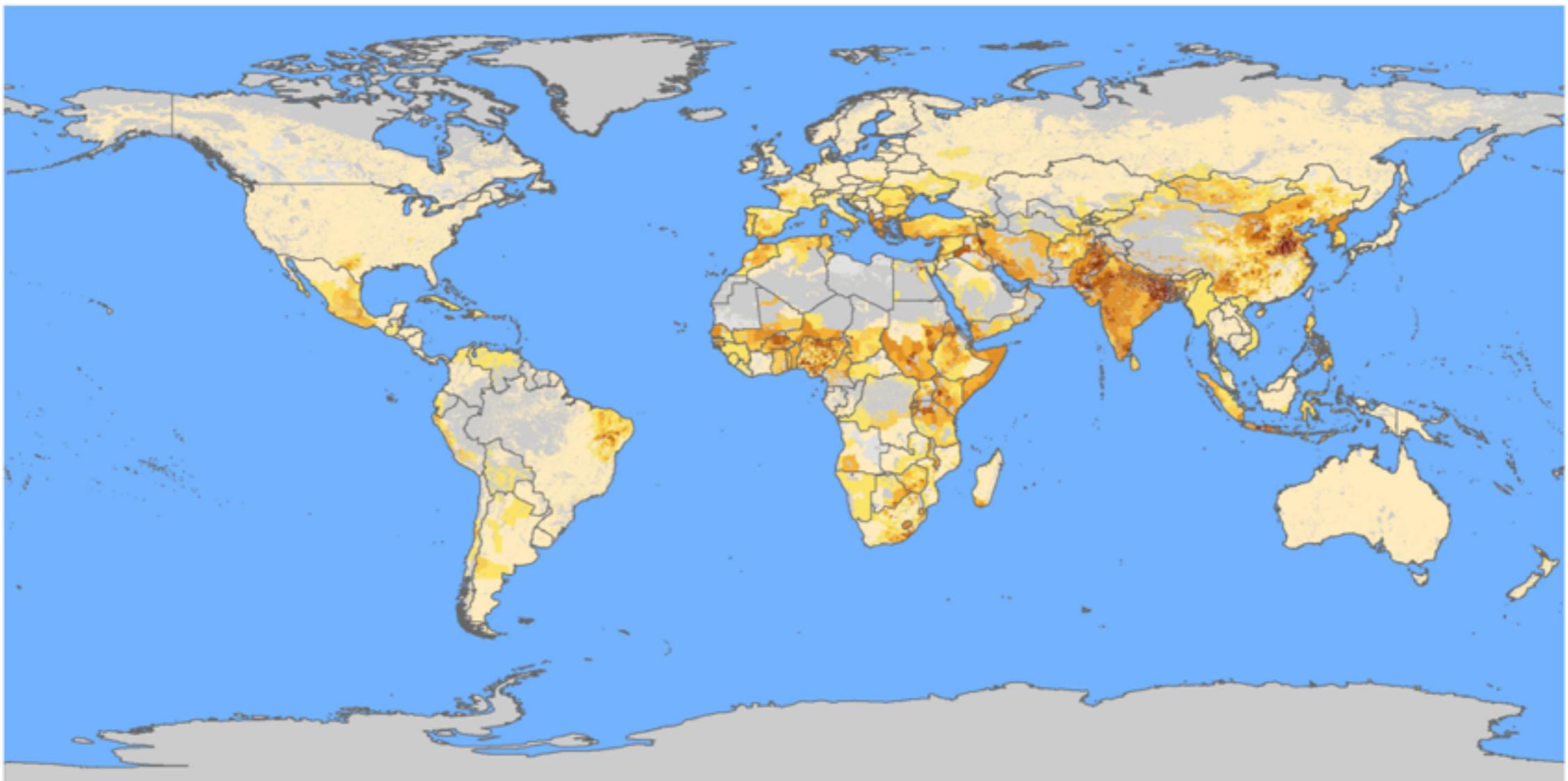
Unsuitable for ruminat

Source: Gridded Livestock of the World



## Goats density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km

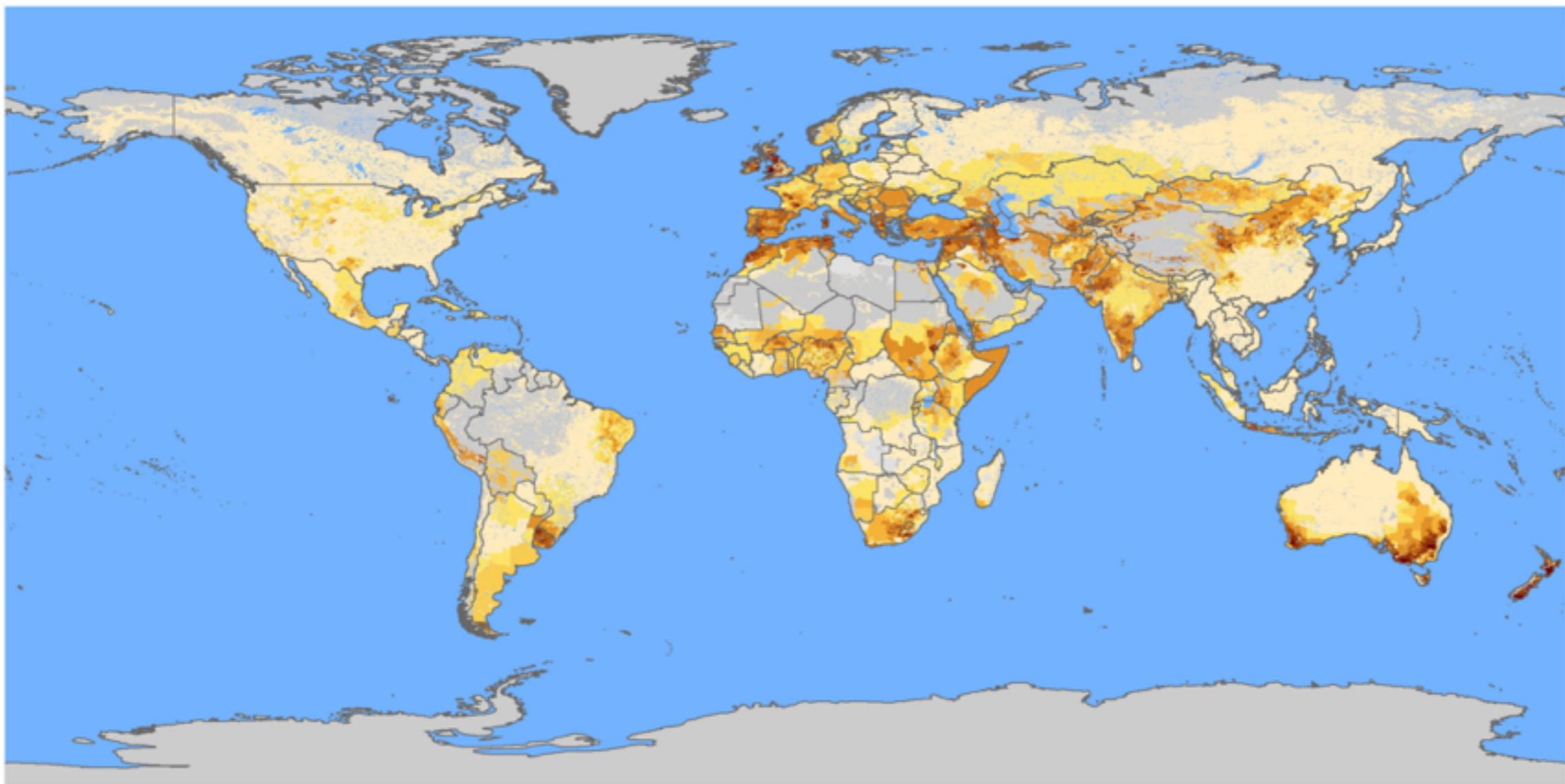
|    |     |      |       |       |        |         |      |       |                        |
|----|-----|------|-------|-------|--------|---------|------|-------|------------------------|
| <1 | 1-5 | 5-10 | 10-20 | 20-50 | 50-100 | 100-250 | >250 | Water | Unsuitable for ruminat |
|----|-----|------|-------|-------|--------|---------|------|-------|------------------------|

Source: Gridded Livestock of the World

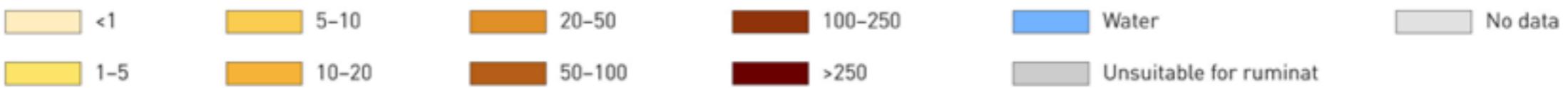


## Sheep density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km

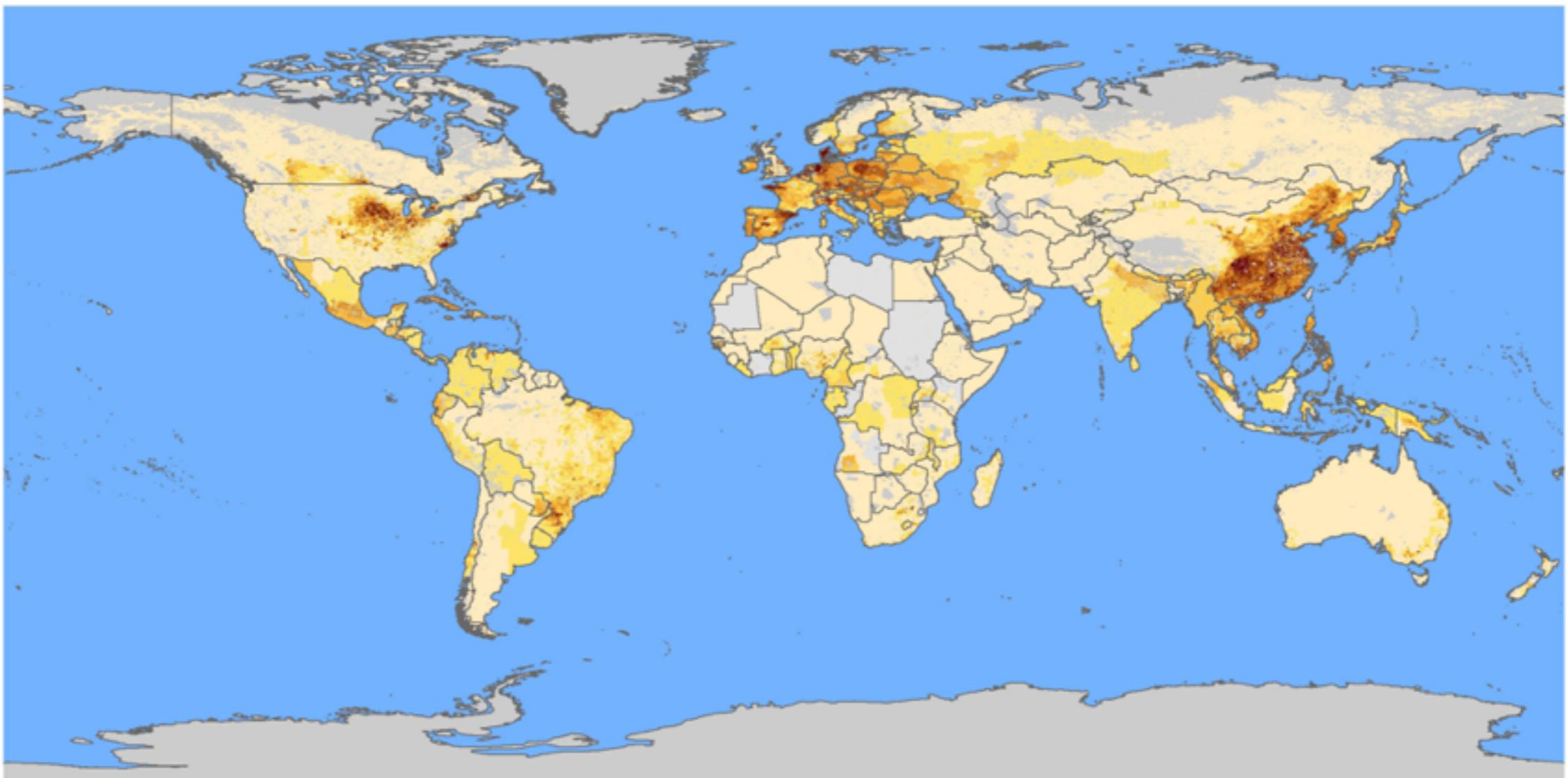


Source: Gridded Livestock of the World



## Pigs density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km

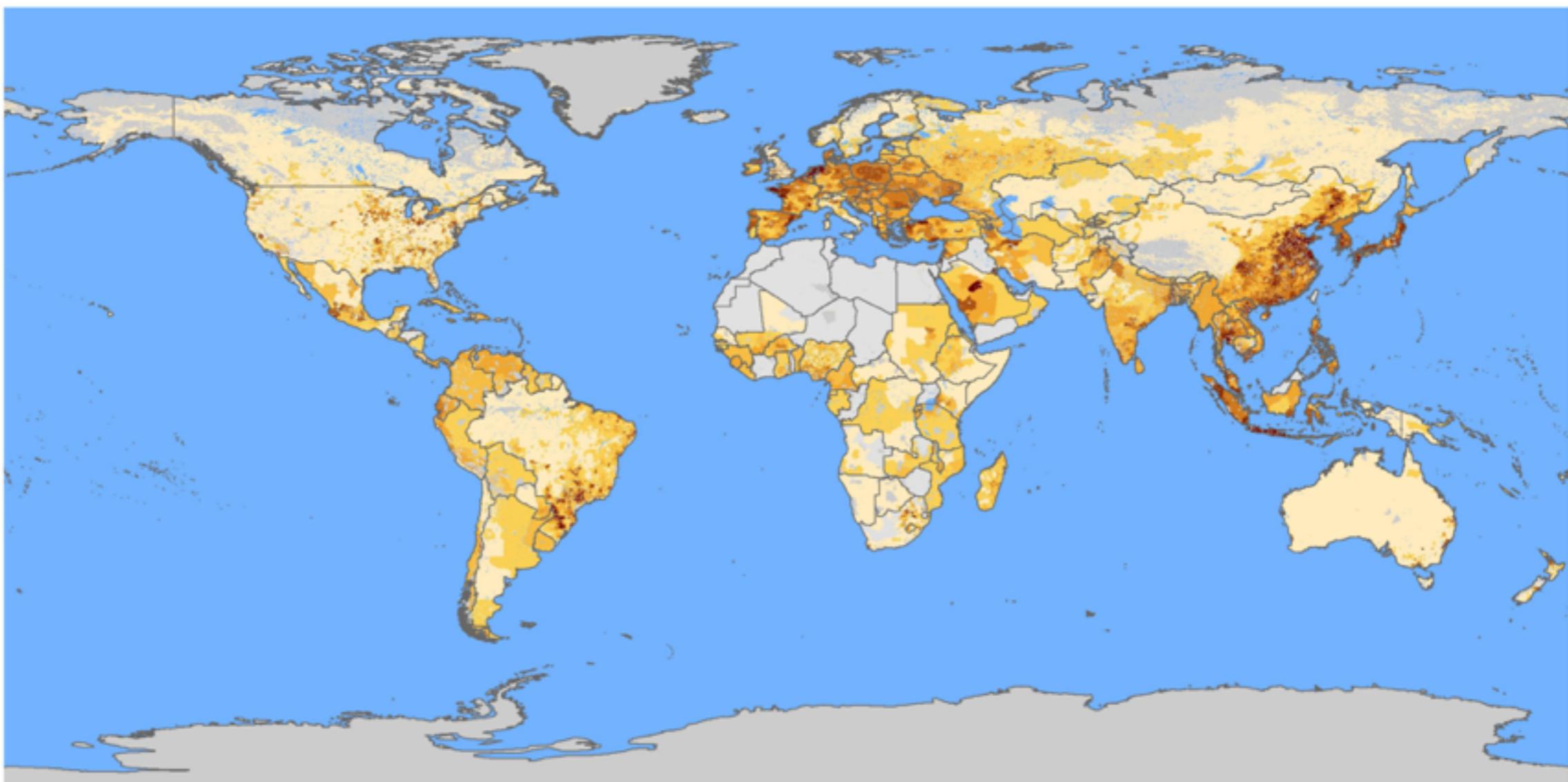


Source: Gridded Livestock of the World



## Poultry density map – 2005 (census data)

AGRICULTURE AND CONSUMER PROTECTION DEPARTMENT  
Animal Production and Health Division



Number per square km



Source: Gridded Livestock of the World

## Daily protein supply from livestock and from all sources in 1980 and 2002 (in grams per capita)

| Region                   | Total protein from livestock |      | Total protein |       |
|--------------------------|------------------------------|------|---------------|-------|
|                          | 1980                         | 2002 | 1980          | 2002  |
| Sub-Saharan Africa       | 10.4                         | 9.3  | 53.9          | 55.1  |
| Near East                | 18.2                         | 18.1 | 76.3          | 80.5  |
| Latin America            | 27.5                         | 34.1 | 69.8          | 77.0  |
| Developing Asia          | 7.0                          | 16.2 | 53.4          | 68.9  |
| Industrialised countries | 50.8                         | 56.1 | 95.8          | 106.4 |
| World                    | 20.0                         | 24.3 | 66.9          | 75.3  |

Source: FAOSTAT (7; accessed June 2006)

TABLE 6

**GLOBAL LIVESTOCK PRODUCTION AVERAGE BY PRODUCTION SYSTEM 2001 TO 2003**

|                      | LIVESTOCK PRODUCTION SYSTEM |                  |                    |                         |       | <i>(Million head)</i> |
|----------------------|-----------------------------|------------------|--------------------|-------------------------|-------|-----------------------|
|                      | GRAZING                     | RAINFED<br>MIXED | IRRIGATED<br>MIXED | LANDLESS/<br>INDUSTRIAL | TOTAL |                       |
|                      |                             |                  |                    |                         |       |                       |
| <b>POPULATION</b>    |                             |                  |                    |                         |       |                       |
| Cattle and buffaloes | 406                         | 641              | 450                | 29                      | 1 526 |                       |
| Sheep and goats      | 590                         | 632              | 546                | 9                       | 1,777 |                       |
| <b>PRODUCTION</b>    |                             |                  |                    |                         |       |                       |
| Beef                 | 14.6                        | 29.3             | 12.9               | 3.9                     | 60.7  |                       |
| Mutton               | 3.8                         | 4.0              | 4.0                | 0.1                     | 11.9  |                       |
| Pork                 | 0.8                         | 12.5             | 29.1               | 52.8                    | 95.2  |                       |
| Poultry meat         | 1.2                         | 8.0              | 11.7               | 52.8                    | 73.7  |                       |
| Milk                 | 71.5                        | 319.2            | 203.7              | -                       | 594.4 |                       |
| Eggs                 | 0.5                         | 5.6              | 17.1               | 35.7                    | 58.9  |                       |

Source: Steinfeld *et al.*, 2006

## **Livestock population and production in different agro-ecological zones (global averages, 2001 to 2003)**

| <b>Type of animal / animal product</b> | <b>Livestock population (10<sup>6</sup> heads) and production (10<sup>6</sup> tonnes)</b> |                                                    |                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|
|                                        | <b>Arid and semi-arid tropics and and sub-tropics</b>                                     | <b>Humid and sub-humid tropics and sub-tropics</b> | <b>Temperate and tropical highlands</b> |
| <b>Animal</b>                          |                                                                                           |                                                    |                                         |
| Cattle and buffaloes                   | 515                                                                                       | 603                                                | 381                                     |
| Sheep and goats                        | 810                                                                                       | 405                                                | 552                                     |
| <b>Animal product</b>                  |                                                                                           |                                                    |                                         |
| Total beef                             | 11.7                                                                                      | 18.1                                               | 27.1                                    |
| Total mutton                           | 4.5                                                                                       | 2.3                                                | 5.1                                     |
| Total pork                             | 4.7                                                                                       | 19.4                                               | 18.4                                    |
| Total poultry meat                     | 4.2                                                                                       | 8.1                                                | 8.6                                     |
| Total milk                             | 177.2                                                                                     | 73.6                                               | 343.5                                   |
| Total eggs                             | 4.65                                                                                      | 10.2                                               | 8.3                                     |

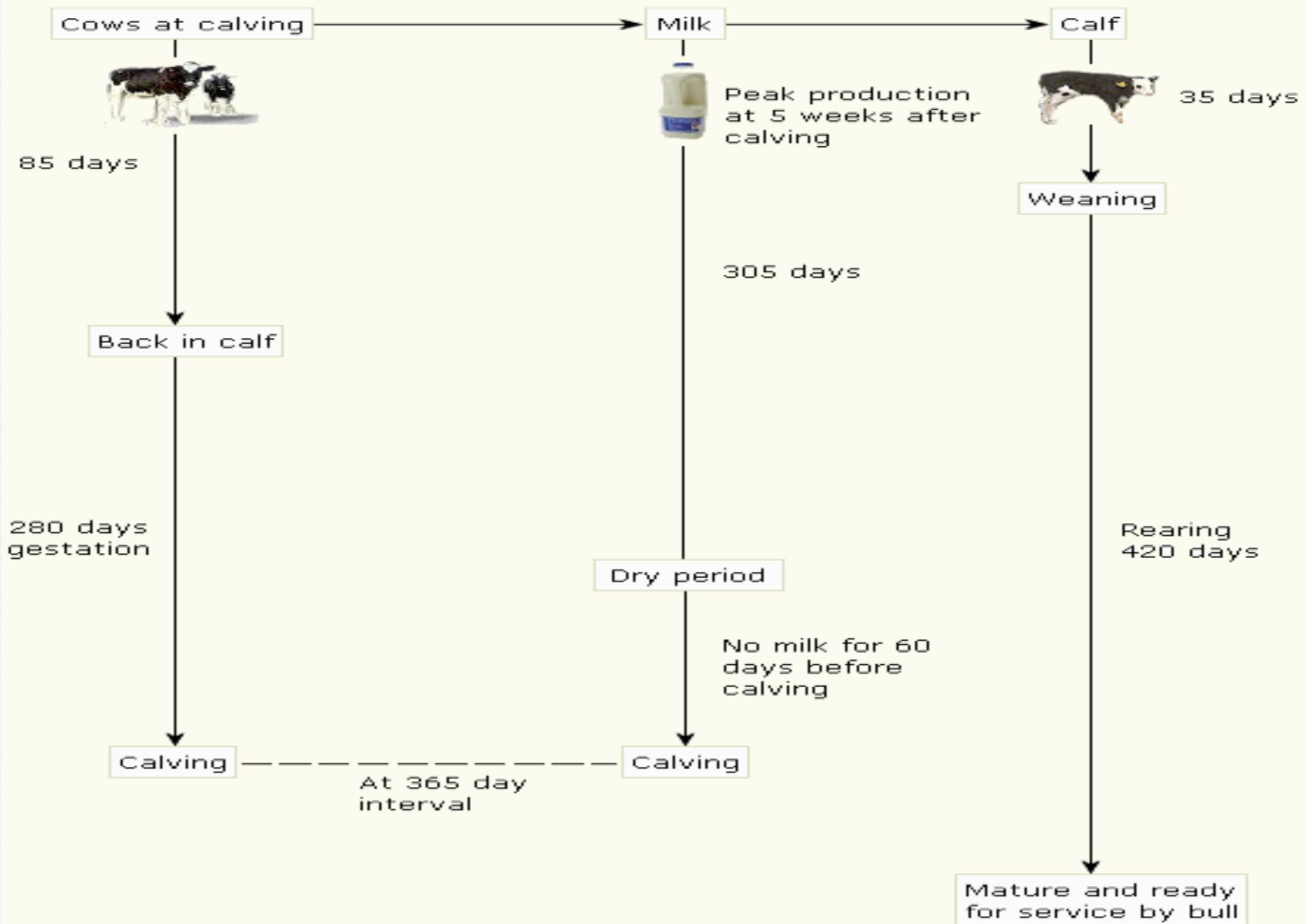
*Source:* based on FAOSTAT data and calculations by J. Groenewold ('Classification and characterization of world livestock production systems'; unpublished report for the Food and Agriculture Organization, 2005)

# Dairy Cattle Production in Thailand

- No of dairy cattle in Thailand app. 700,000 heads
- Most of dairy cattle in central part of Thailand (70%)
- Crossbred between Holstein Friesian (>75%) and Native cattle
- Small scale farmer ( < 20 cows/farm)
- Central - Saraburi and Rachaburi
- Northeast- Nakhon ratchasima, Khonkhen, Sakonnakhon, Udonthani
- South - Phatthalung
- Member of dairy cooperative
- Average milk production 12 kg/head/day



- Holstein Friesian, Brown Swiss, Jersey, Guernsey
- Ruminants are able to acquire nutrients from plant (grass or roughage) by fermenting it in rumen prior to digestion, principally through microbial actions.
- Regurgitation and rechewing is called rumination

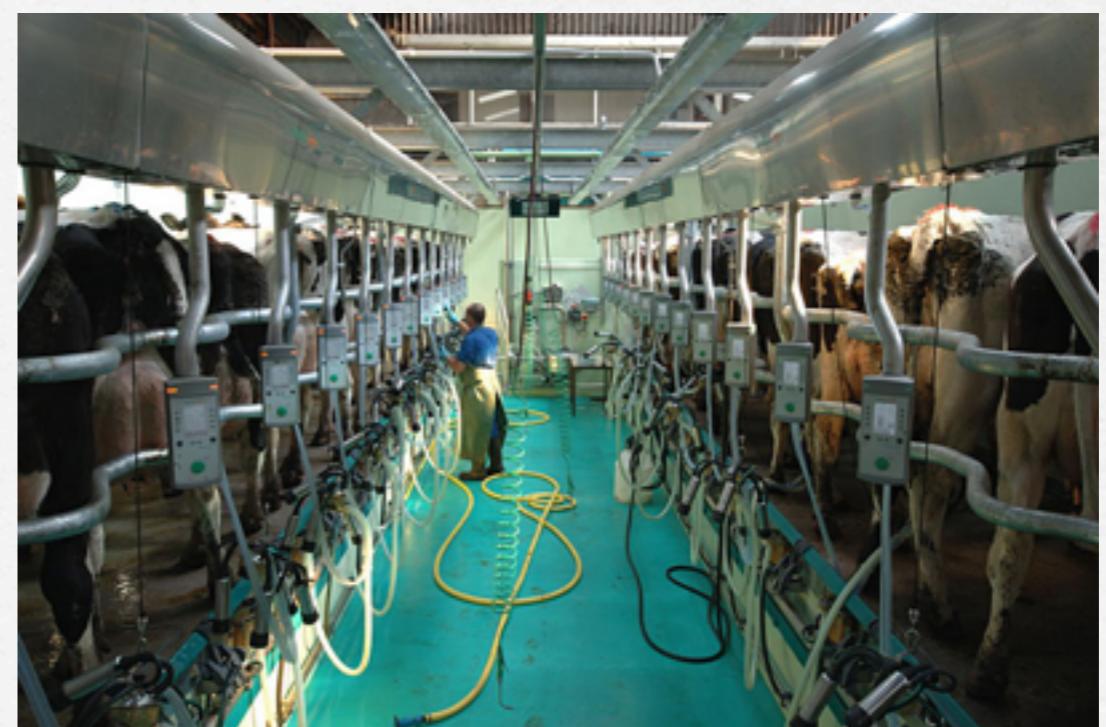


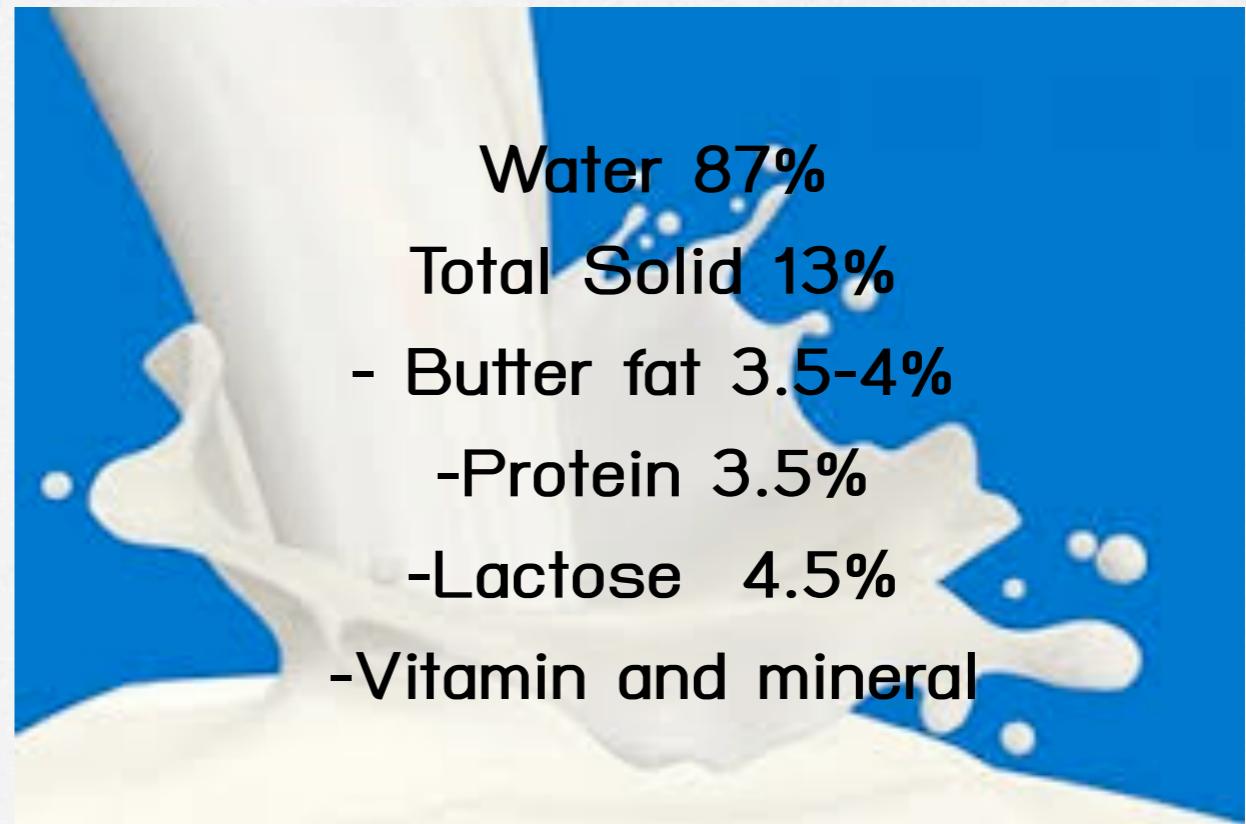
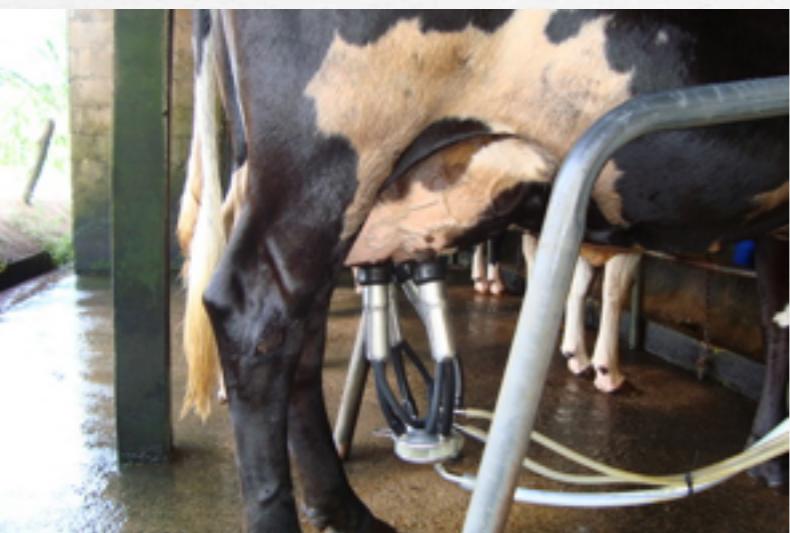
# Two types of housing system

- Loose housing
  - freely move around inside a building
  - partly bedded to give a lying area
- cubicle housing
  - has lots of separate cubicles
  - divided by barriers
  - can freely enter, lie-down in



- Bucket type
- Rotary
- Herringbone



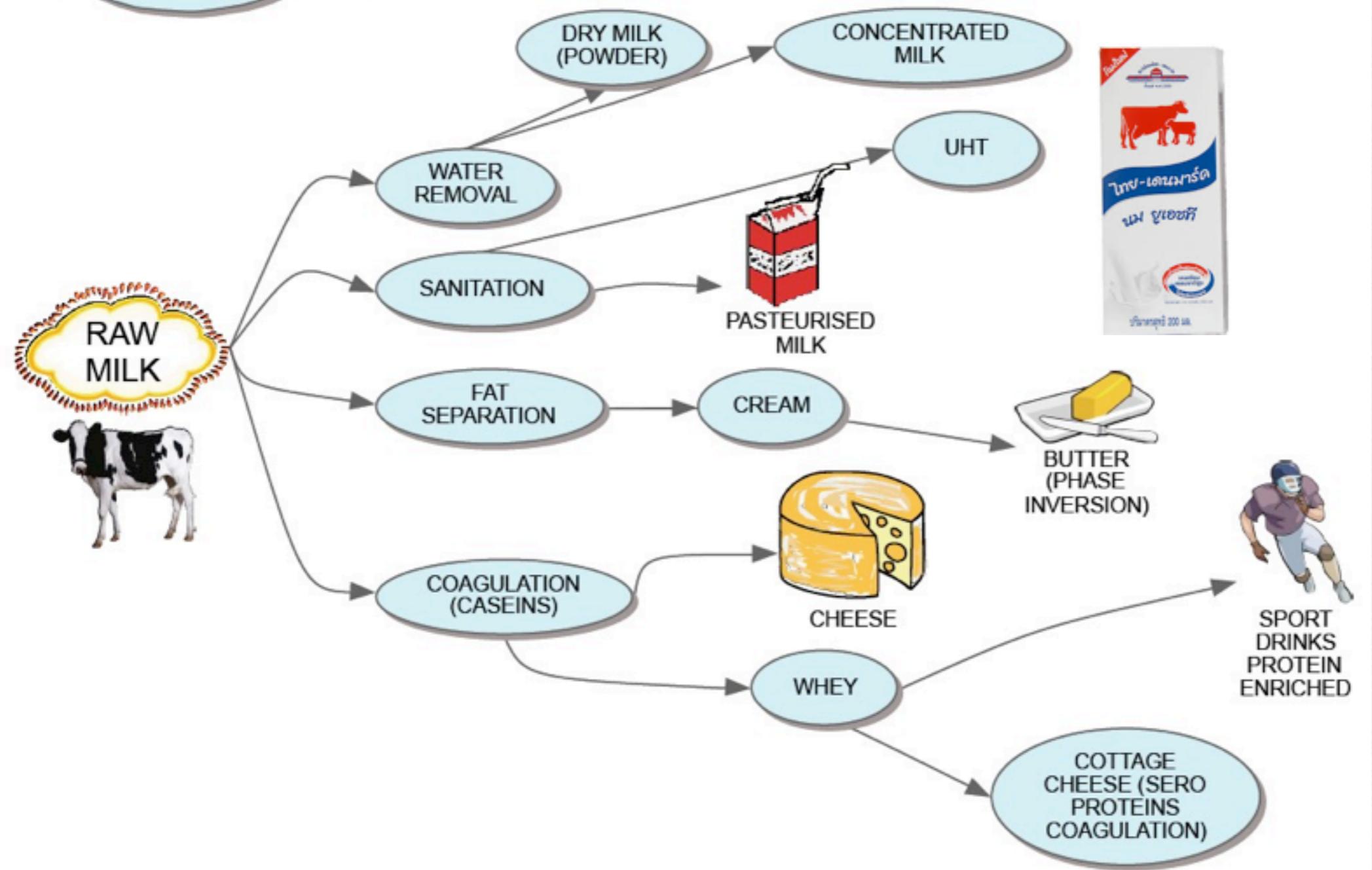


Water 87%  
Total Solid 13%  
- Butter fat 3.5-4%  
- Protein 3.5%  
- Lactose 4.5%  
- Vitamin and mineral

# Dairy Products

- Fluid milk
- Powdered milk
- Eggnog
- Whey Powder
- Cheese
- Butter Powder
- butter
- Meat
- Yogurt
- Leather goods
- Ice Cream
- Fertilizers
- Cosmetics

# DAIRY PRODUCTS MAP



LOTOP

Thai Tampon

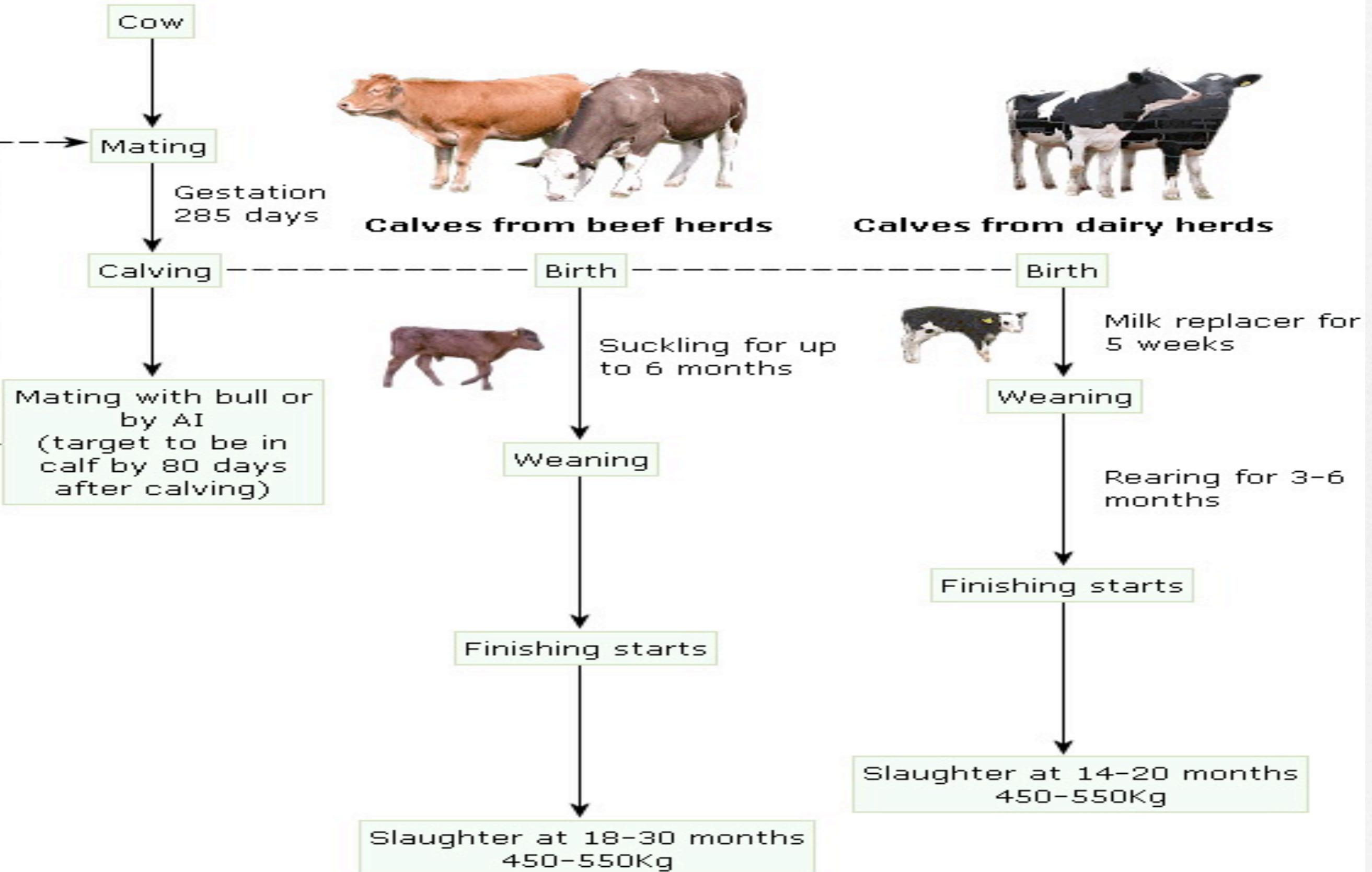
# Beef Cattle Production



- American Brahman, Angus, Charolais, Limousin
- Crossbred between European breeds and Native Cattle, Composite or synthetic breeds (Brangus, Simbrah, Kamphang Saen)
- Muscle development
- Less milk production, enough for calf

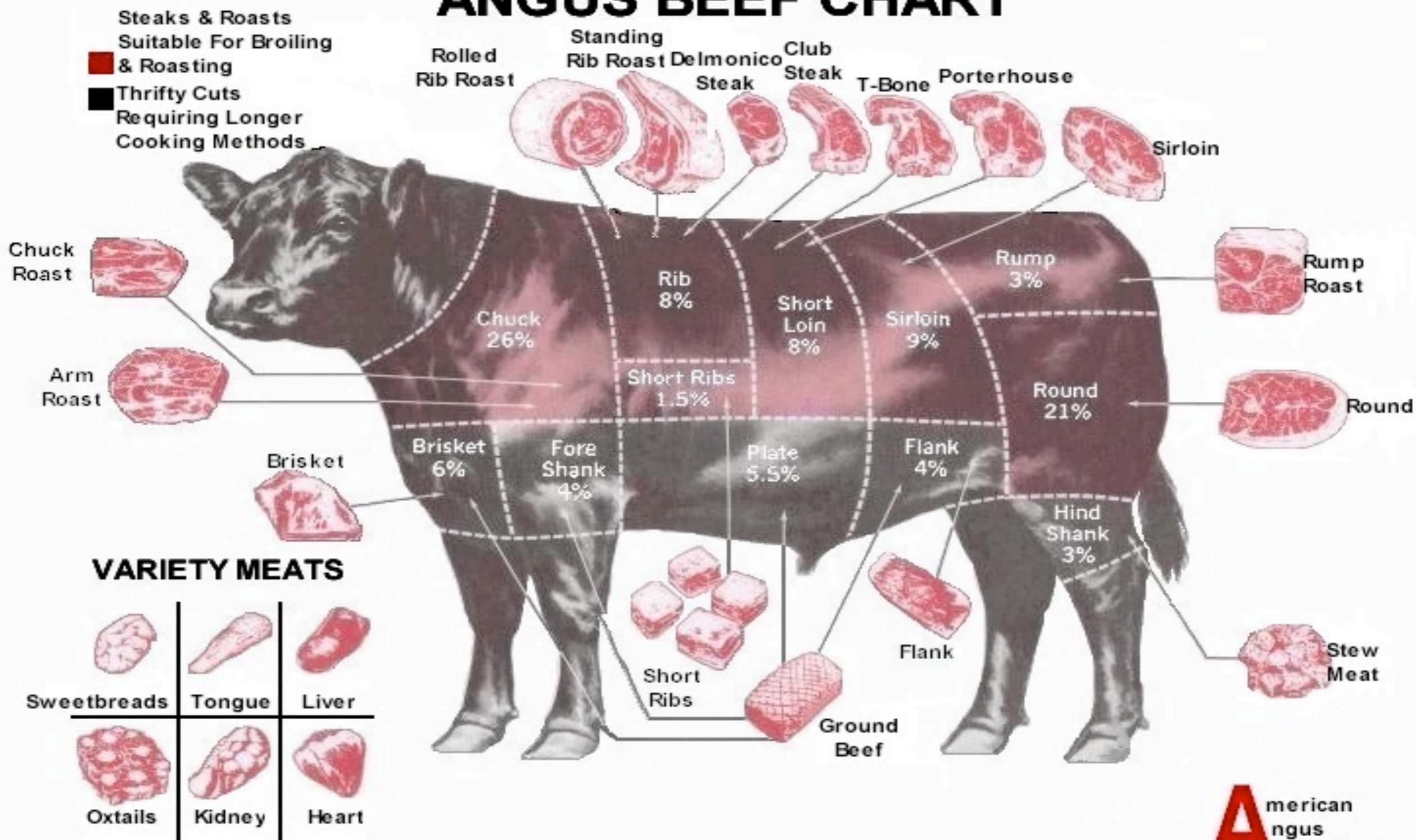
# Farming system

- Extensive grazing-based system
  - Mainly kept in fields and may be housed for part of year
- Intensive indoor system
  - May be housed throughout their lives

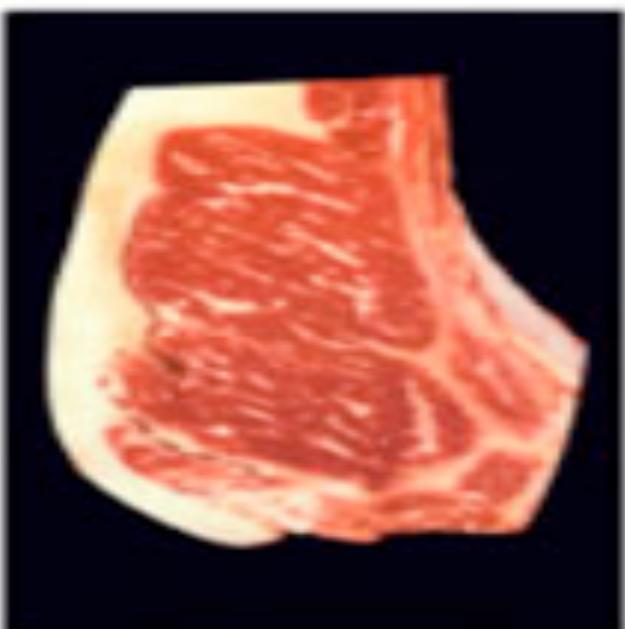




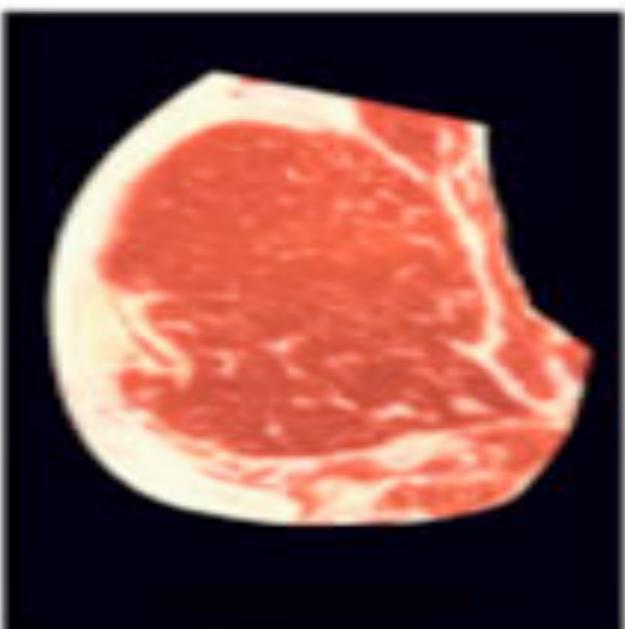
# ANGUS BEEF CHART



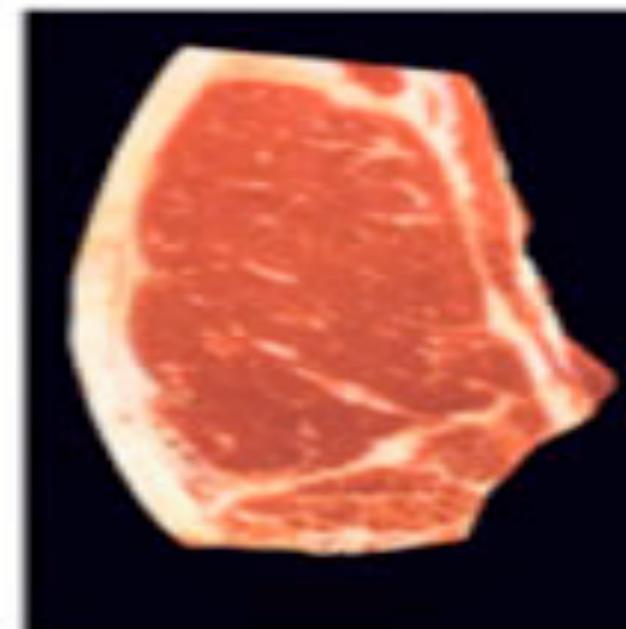
# Marbling Score



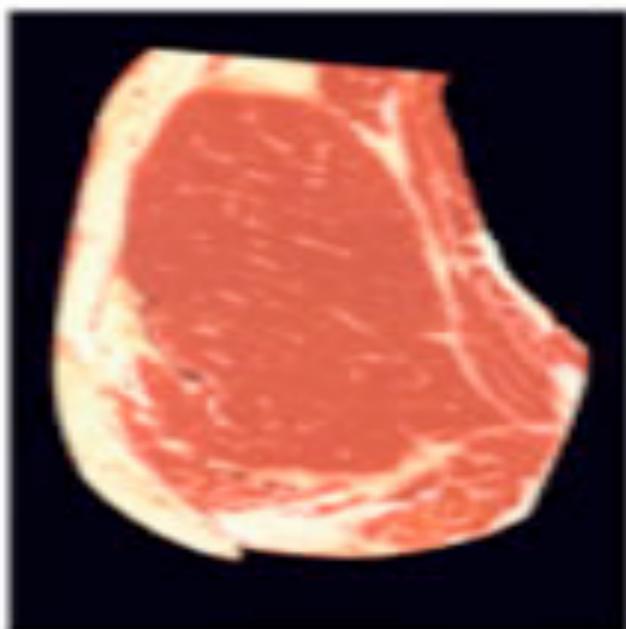
Moderately  
Abundant



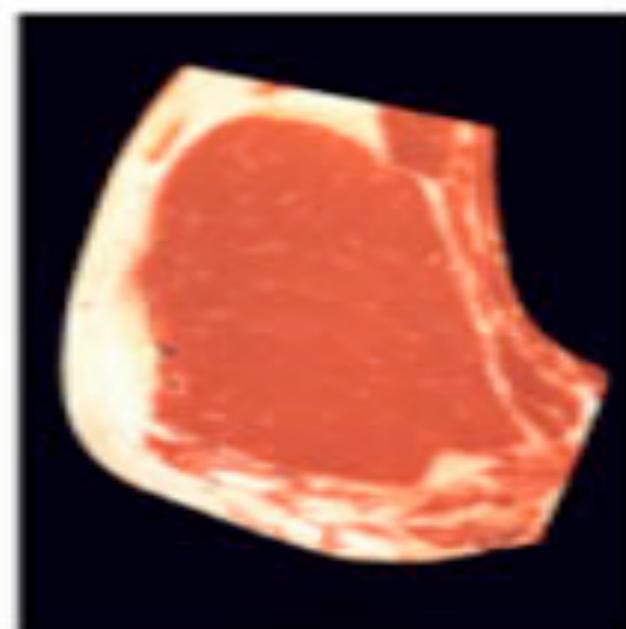
Slightly  
Abundant



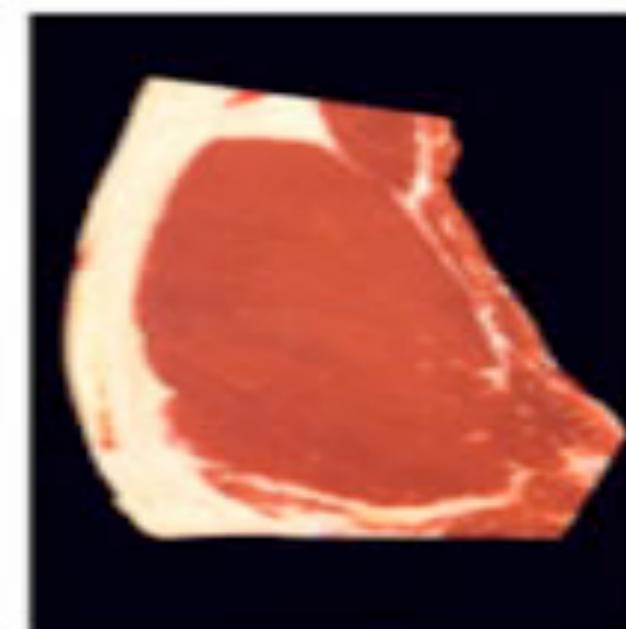
Moderate



Modest



Small

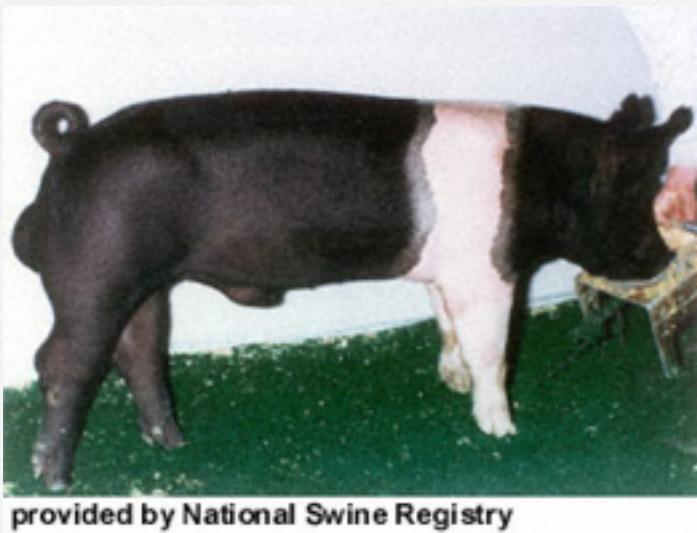


Slight

## Relationship between Marbling, Maturity & Carcass Quality Grade

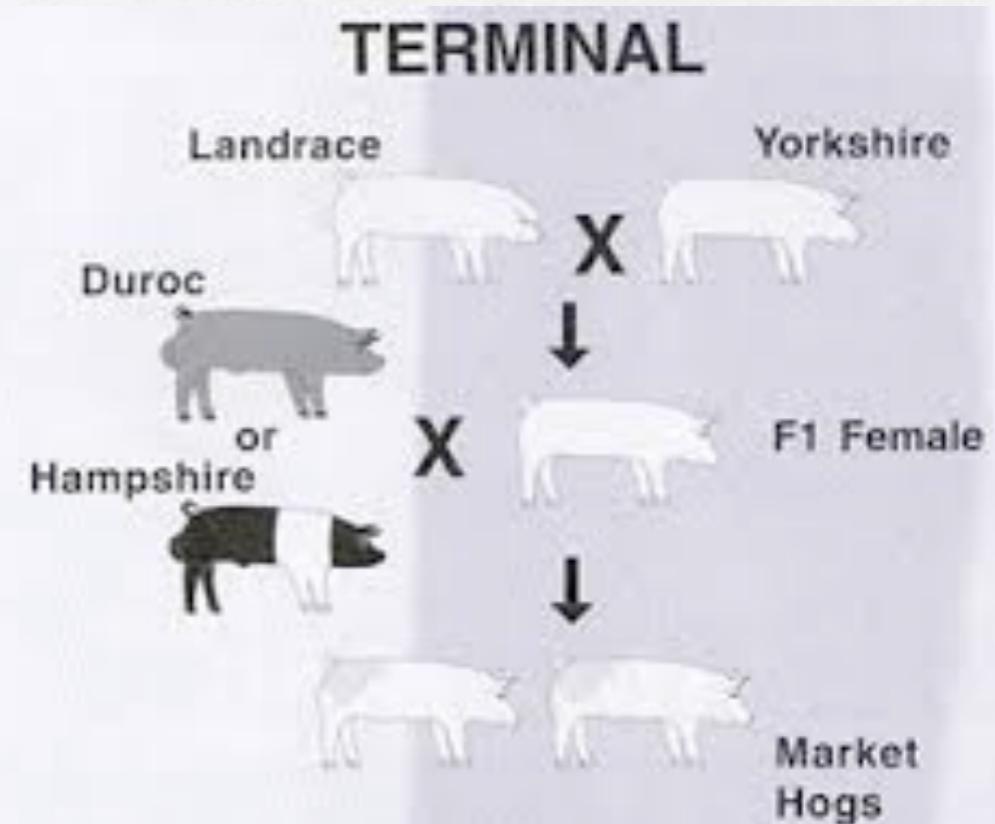
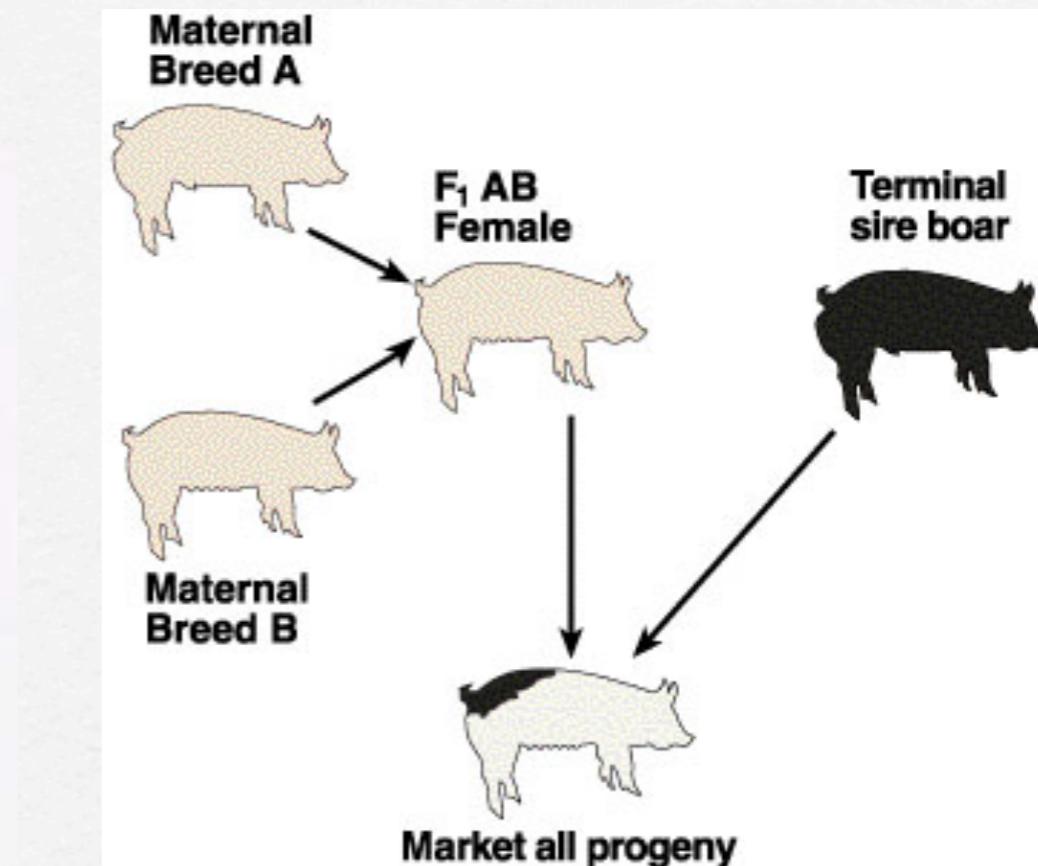
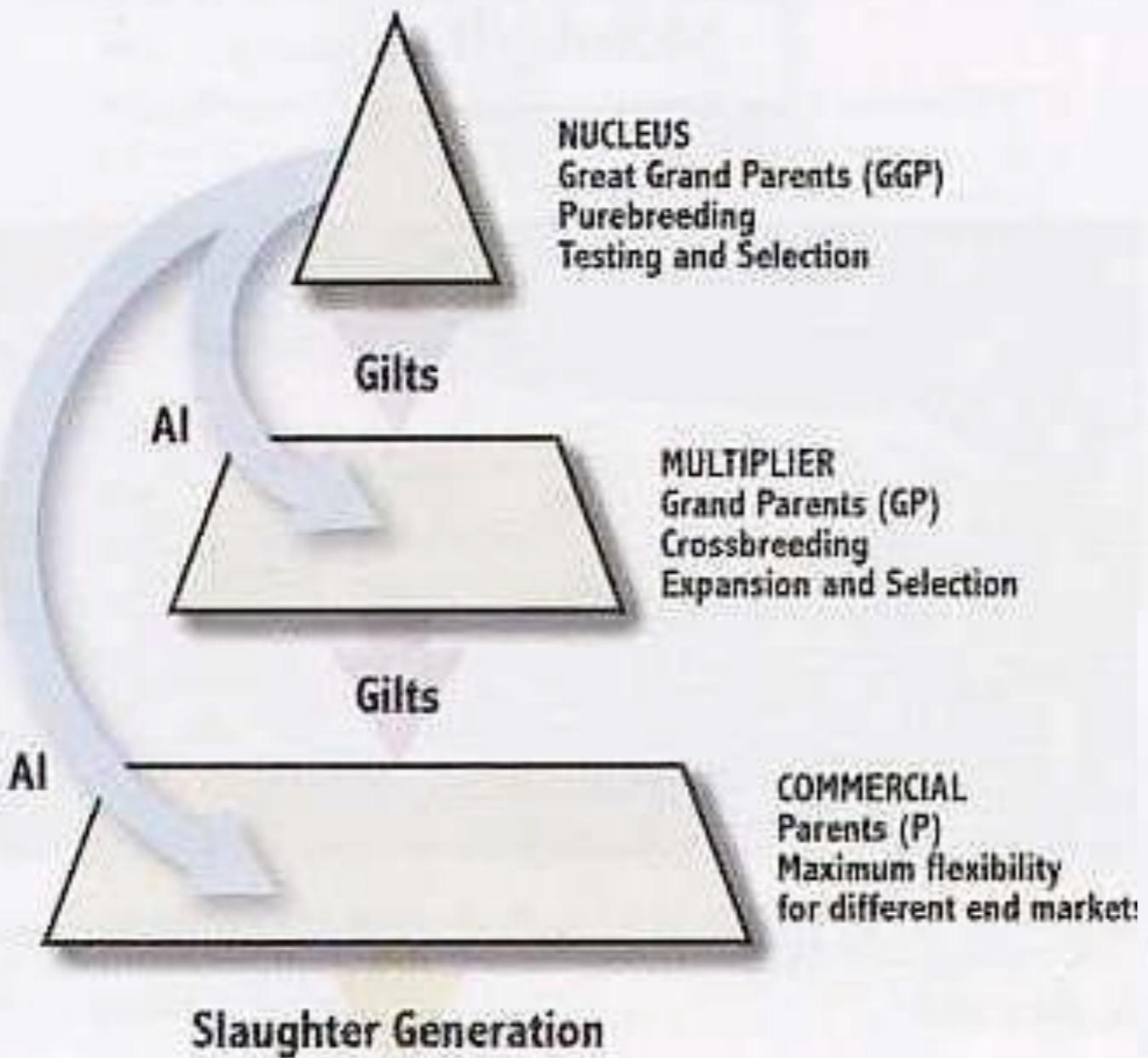
| Degrees of Marbling | Maturity           |                     |                      |                  |                       |
|---------------------|--------------------|---------------------|----------------------|------------------|-----------------------|
|                     | A<br>9 - 30 months | B<br>30 - 42 months | C<br>42months-6years | D<br>6 - 8 years | E<br>8 years or above |
| Abundant            |                    |                     |                      |                  |                       |
| Moderately Abundant |                    | Prime               |                      |                  |                       |
| Slightly Abundant   |                    |                     |                      | Commercial       |                       |
| Moderate            |                    | Choice              |                      |                  |                       |
| Modest              |                    |                     |                      |                  |                       |
| Small               |                    |                     |                      |                  |                       |
| Slight              | Select             |                     |                      | Utility          |                       |
| Traces              |                    | Standard            |                      | Cutter           |                       |
| Practically Devoid  |                    |                     |                      |                  | Canner                |

- Medium and large scale farm
- Pure breed to produce 3 breedcross
- Maternal line
  - Large White and Landrace,
- Paternal Line Duroc, Hampshire



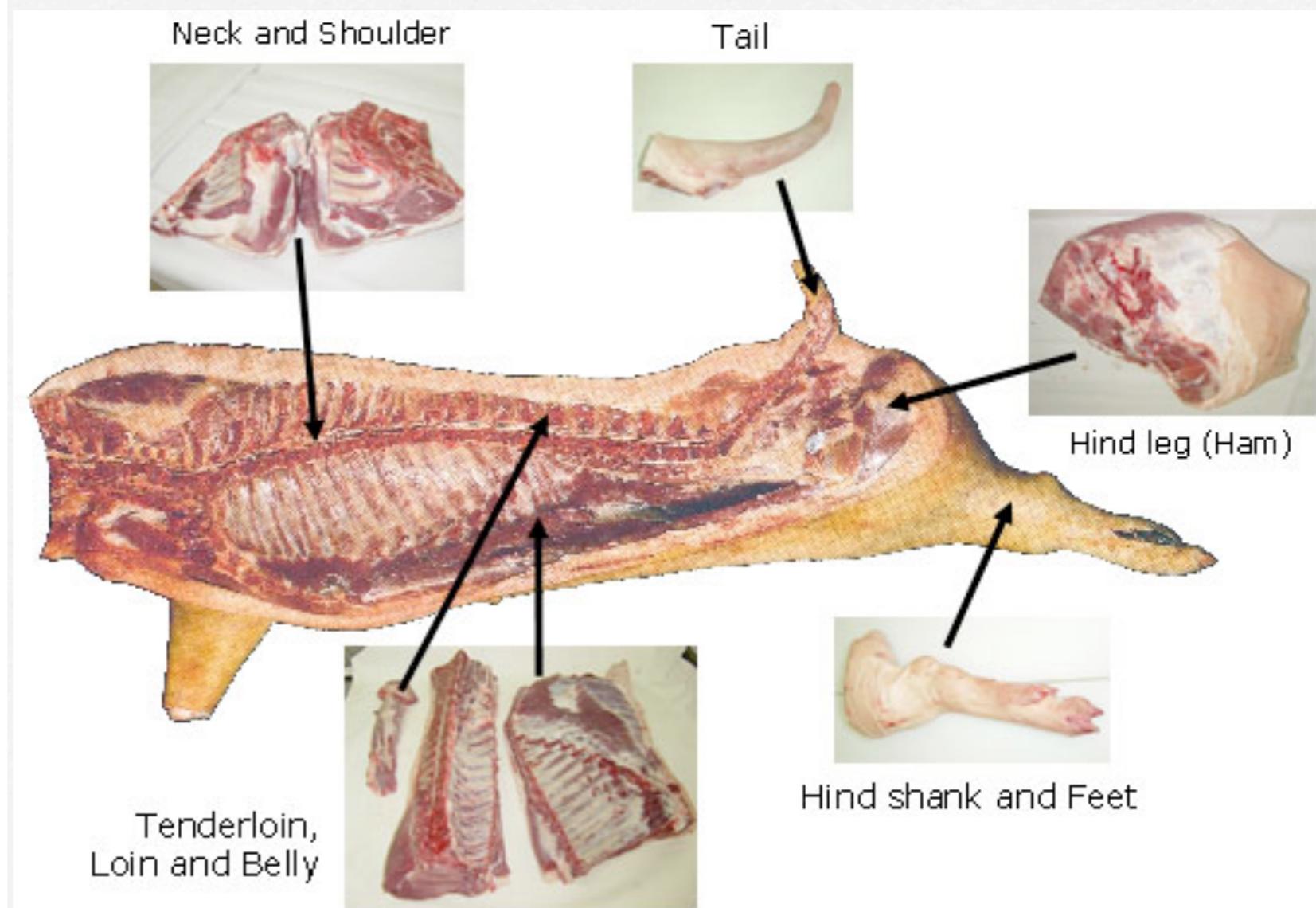
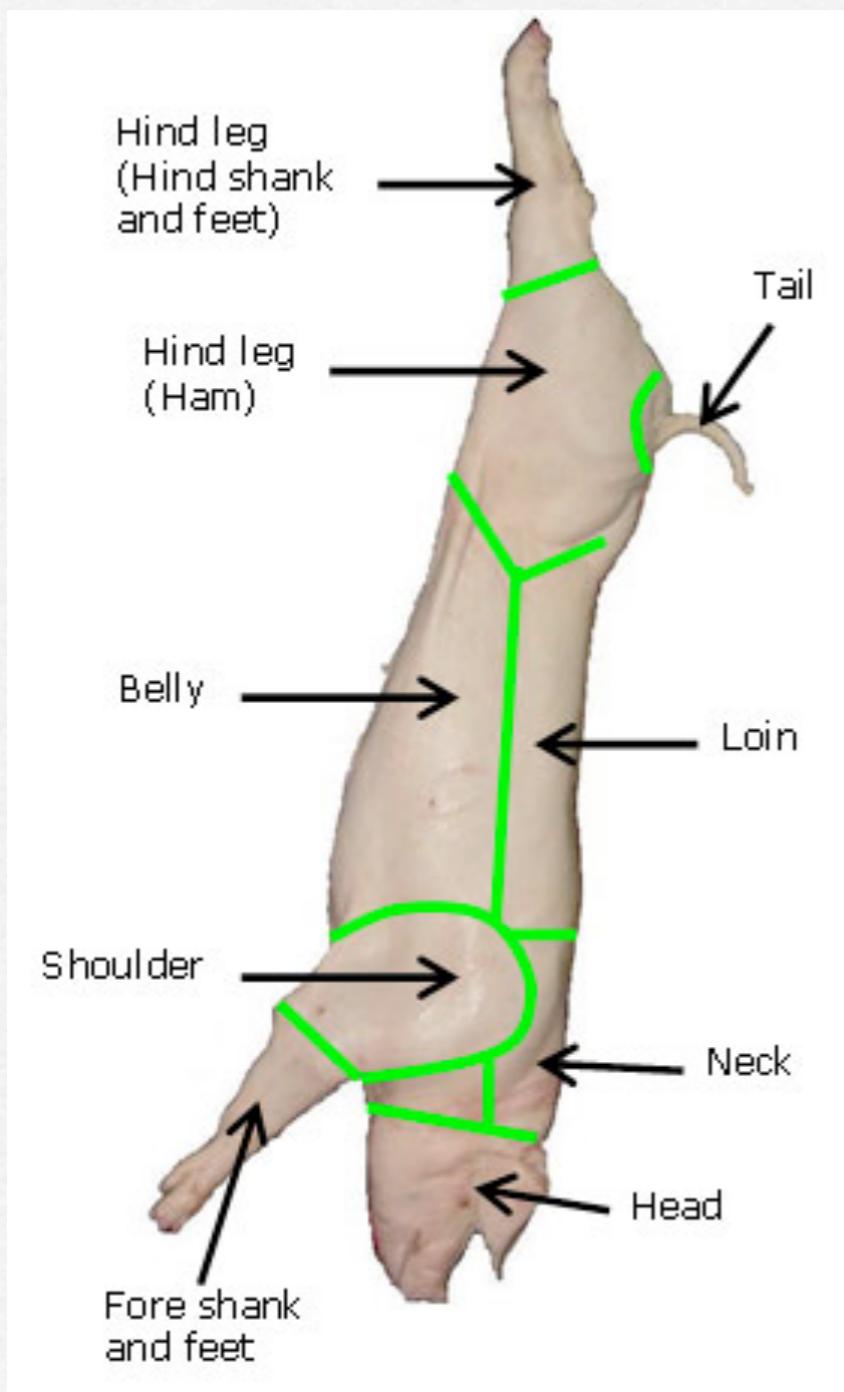
provided by National Swine Registry

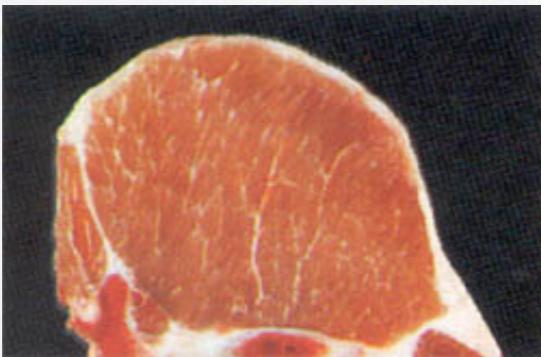




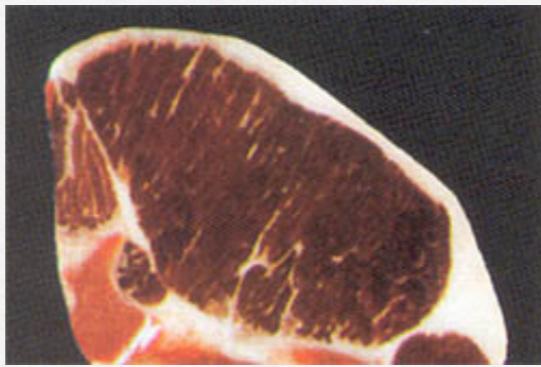
# Fattening Pig







Normal

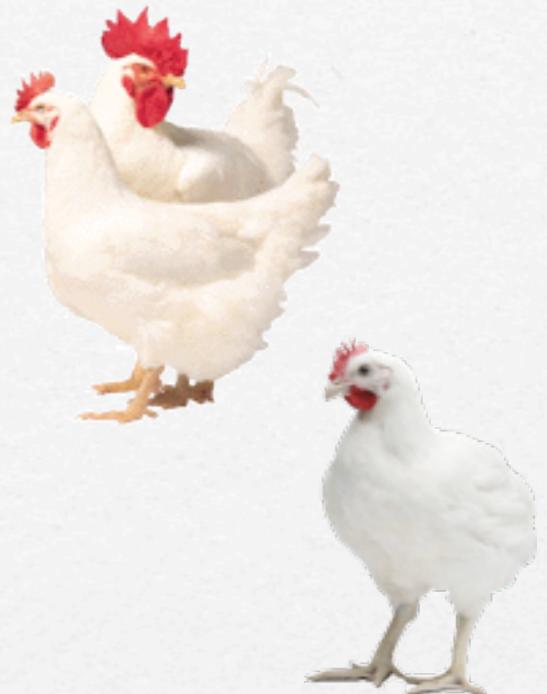


PSE (Pale soft and exudative), DFD (Dark firm and dry)





## More meat chicken (Broiler)

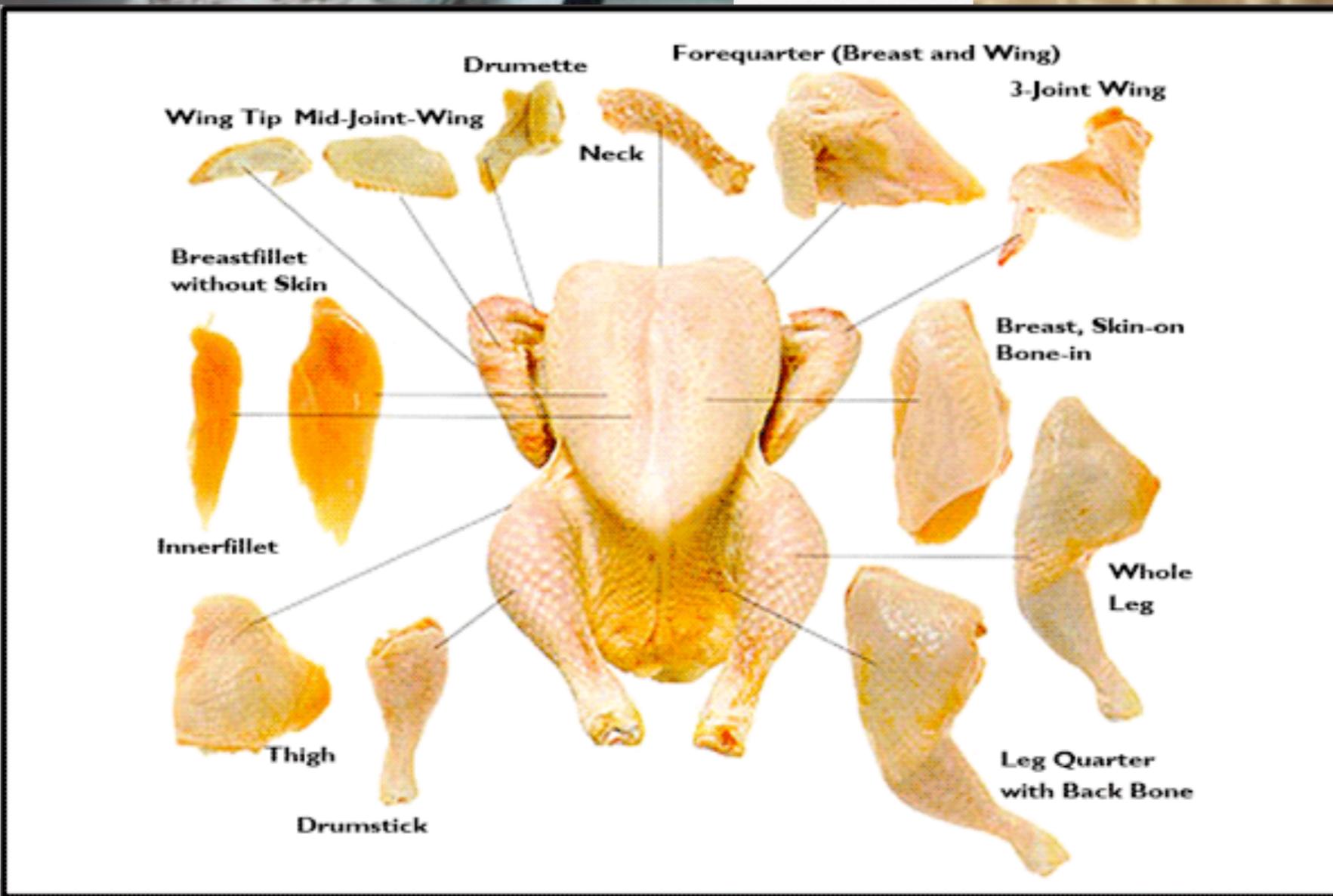


- 5 to 6 weeks depended on market
- Asia market requires 2.0-2.5 kg/bird
- European market requires >2.5 kg/bird

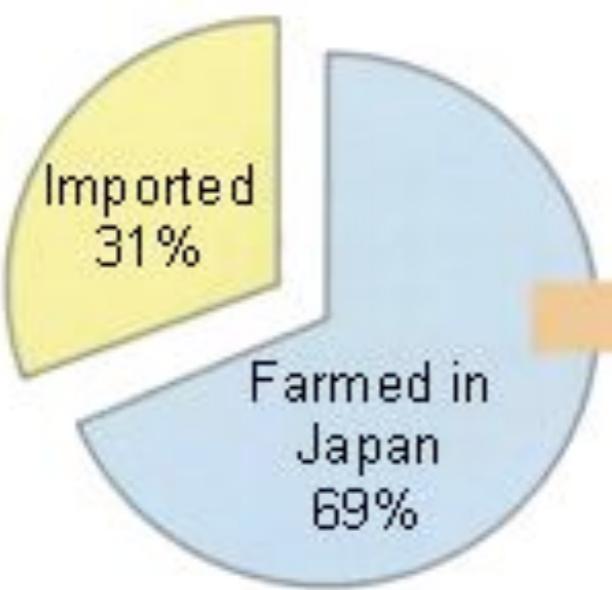
# Types of broiler production system

- Indoor reared
  - Large, closed buildings with controlled temperature, food and water, artificial lighting, ventilation
- Improved indoor reared
  - improve their welfare for ex. provide natural daylight, reduce stocking density, environmental enrichment (straw bales for birds to peck at)
- Free-range and organic
  - allow them access to an additional outdoor range area for part of their lives

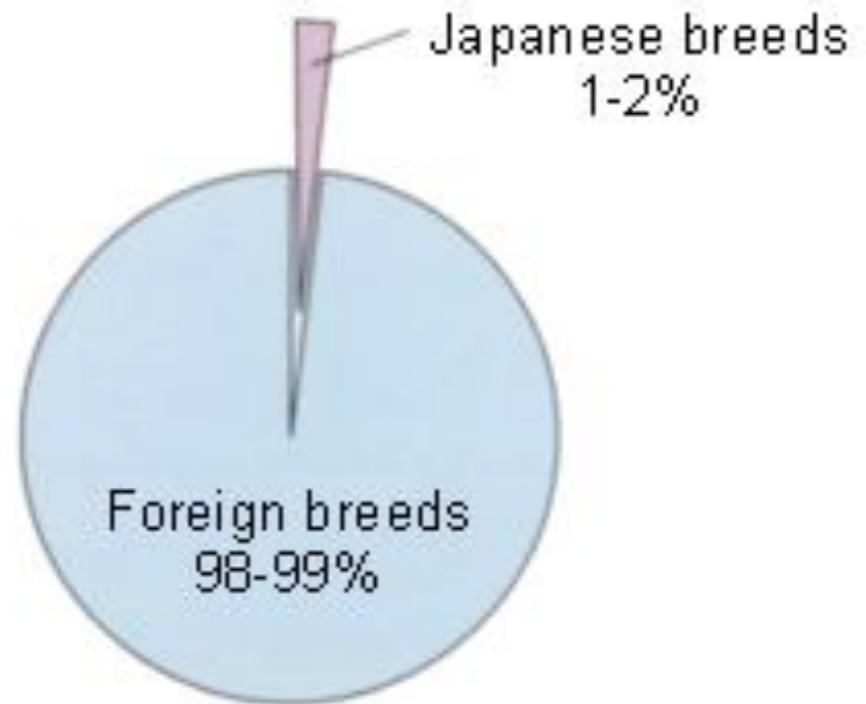




Sources of chicken meat  
(2006)

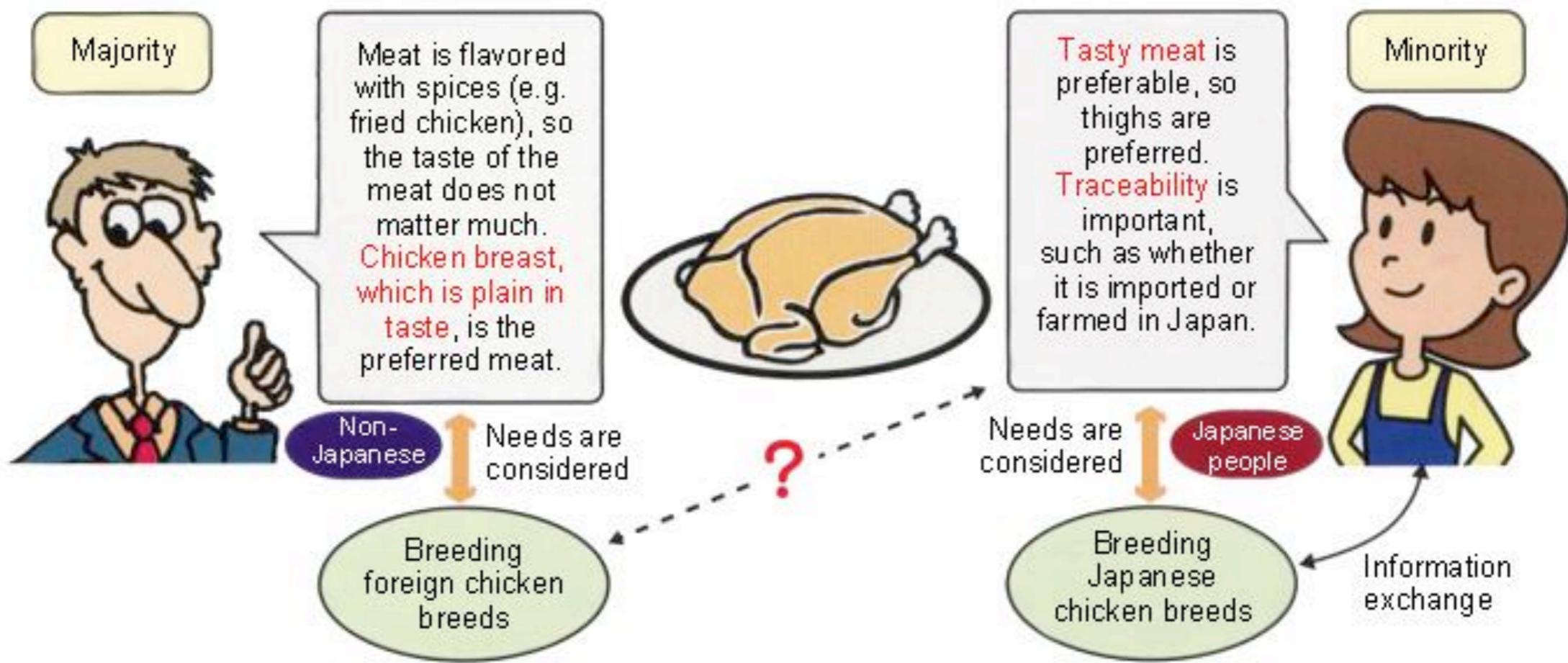


Chicken breeds farmed  
in Japan

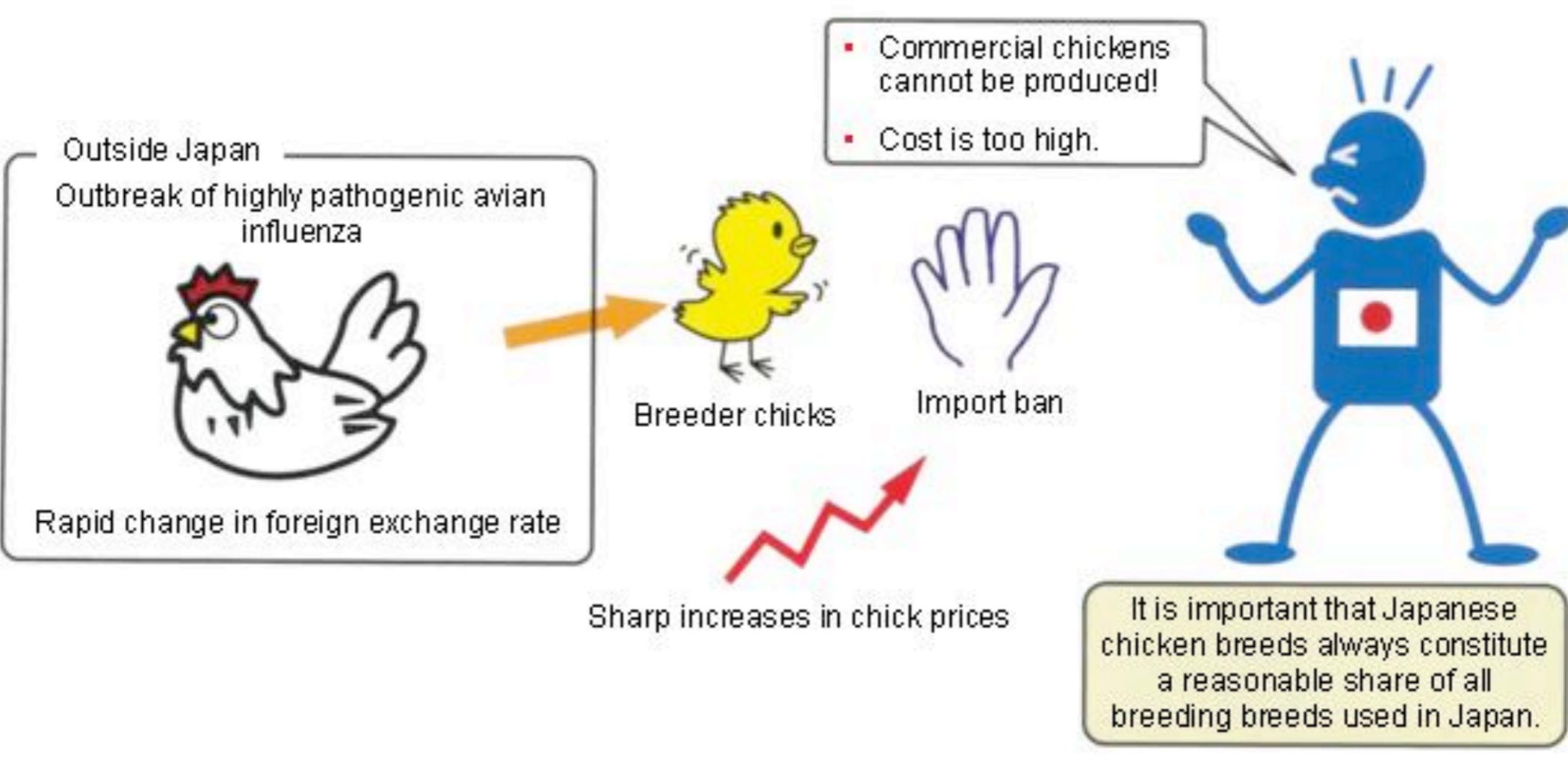


Breakdown

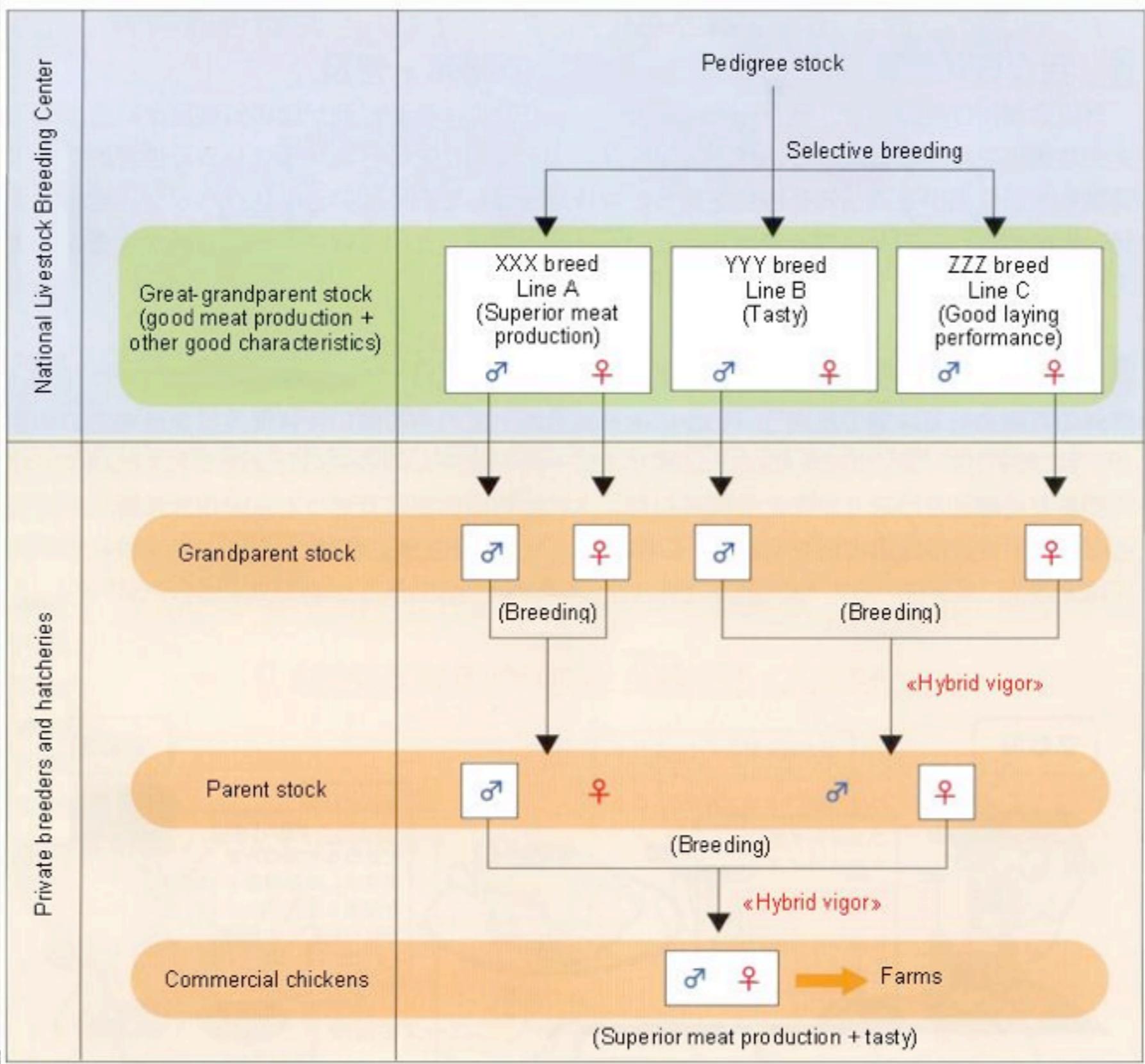
## The chicken meat preferred by Japanese people, and that preferred by non-Japanese people



## What would happen if there were no Japanese chicken breeds?



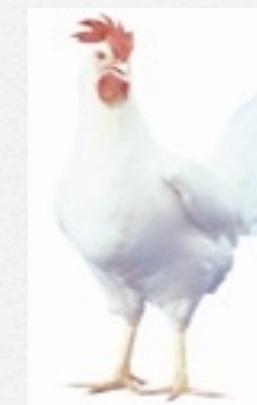
## From selective breeding to production of commercial broilers



# Layer

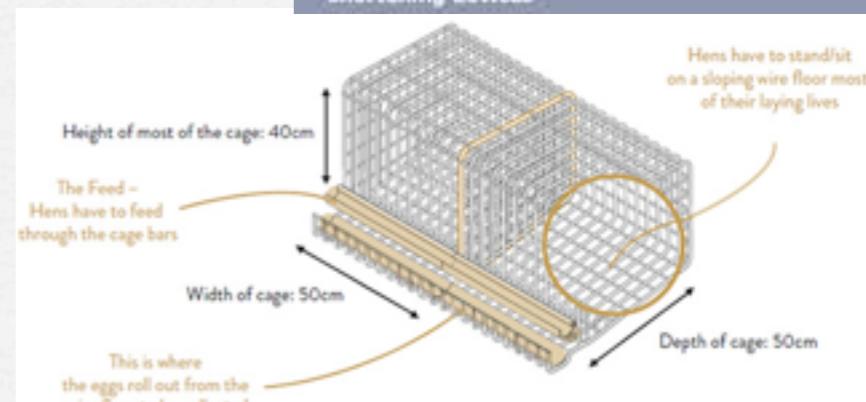
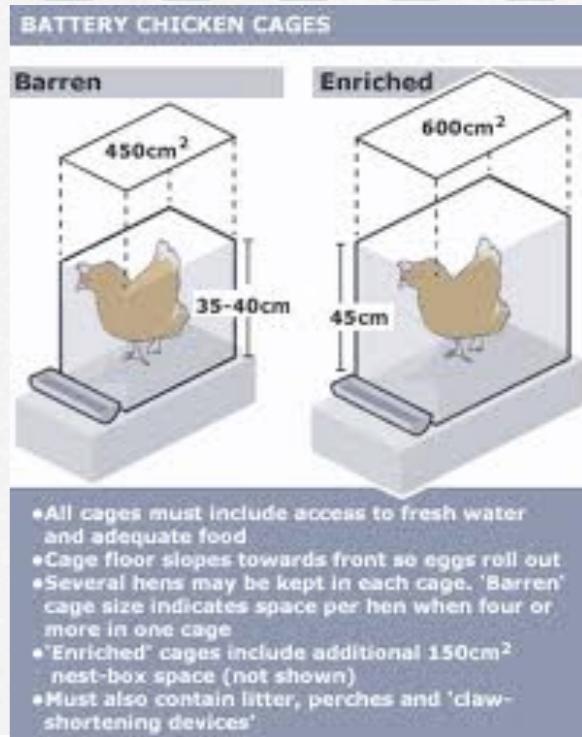


- Egg is an important product from laying hen and laying duck
- Cheap source of protein
- Egg consumption
  - Thai - 148 eggs/head/year.
  - European, American - 300 eggs/head/year
  - Japanese - more than 365 eggs/head/year



# Types of egg production system

- Battery Cages
  - Barren battery cages were banned throughout Europe from 2012
  - Enriched battery cages are still legally permitted
- Barn systems
  - Hens have freedom and space to move
  - Perches are provided for roosting
  - Nested boxes
- Free-range
  - Live in buildings like the barn system but have access to the outside through openings called popholes

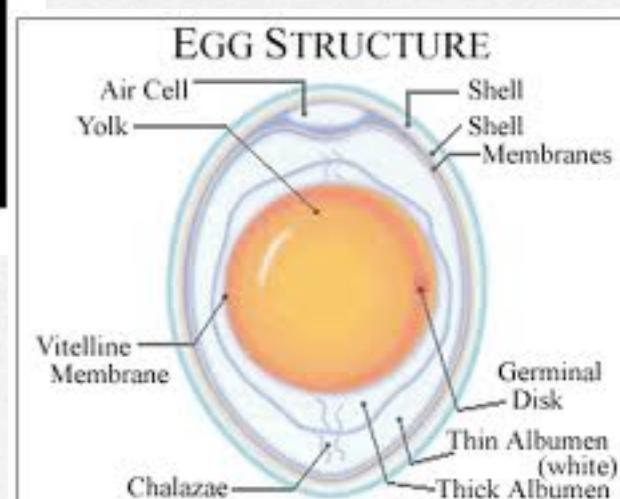




# Egg Composition



|                  | Percent | Water                    | Protein                    | Fat                      | Ash                   |
|------------------|---------|--------------------------|----------------------------|--------------------------|-----------------------|
| <b>Whole egg</b> | 100     | 65.5                     | 11.8                       | 11.0                     | 11.7                  |
| <b>White</b>     | 58      | 88.0                     | 11.0                       | 0.2                      | 0.8                   |
| <b>Yolk</b>      | 31      | 48.0                     | 17.5                       | 32.5                     | 2.0                   |
|                  |         | <i>Calcium carbonate</i> | <i>Magnesium carbonate</i> | <i>Calcium phosphate</i> | <i>Organic matter</i> |
| <b>Shell</b>     | 11      | 94.0                     | 1.0                        | 1.0                      | 4.0                   |



| Grade AA                                                                                                                                                                                                                                                | Grade A                                                                                                                                                                                                                                                                   | Grade B                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Egg content covers a small area. White is firm, has much thick white surrounding the yolk and a small amount of thin white. The yolk is round and upstanding.</p> |  <p>Egg content covers a moderate area. White is reasonably firm and has a considerable amount of thick white and a medium amount of thin white. The yolk is round and upstanding.</p> |  <p>Egg content covers a very wide area. White is weak and watery, has no thick white and the large amount of thin white is thinly spread. The yolk is enlarged and flattened.</p> |



**Haugh unit**