

Technical change in agriculture 1935-85:

*using Farm Management Survey data from
south-west England to explore processes of
technical change*

Paul Brassley, David Harvey, Matt
Lobley, and Michael Winter

University of Exeter

Volume of UK agricultural output

62

THE AGRICULTURAL HISTORY REVIEW

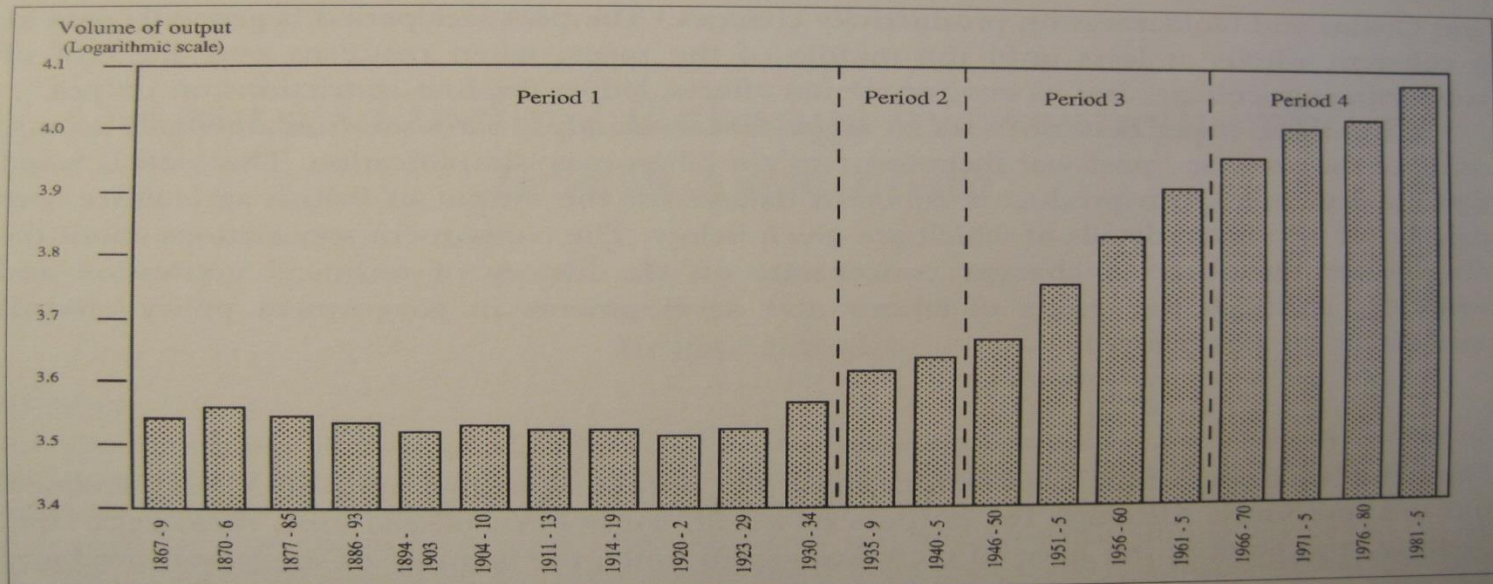


FIGURE 1. Changes in the volume of agricultural output in Britain, 1867-1985.

Source: See Table A4 below.

Growth rate peaked 1945-65

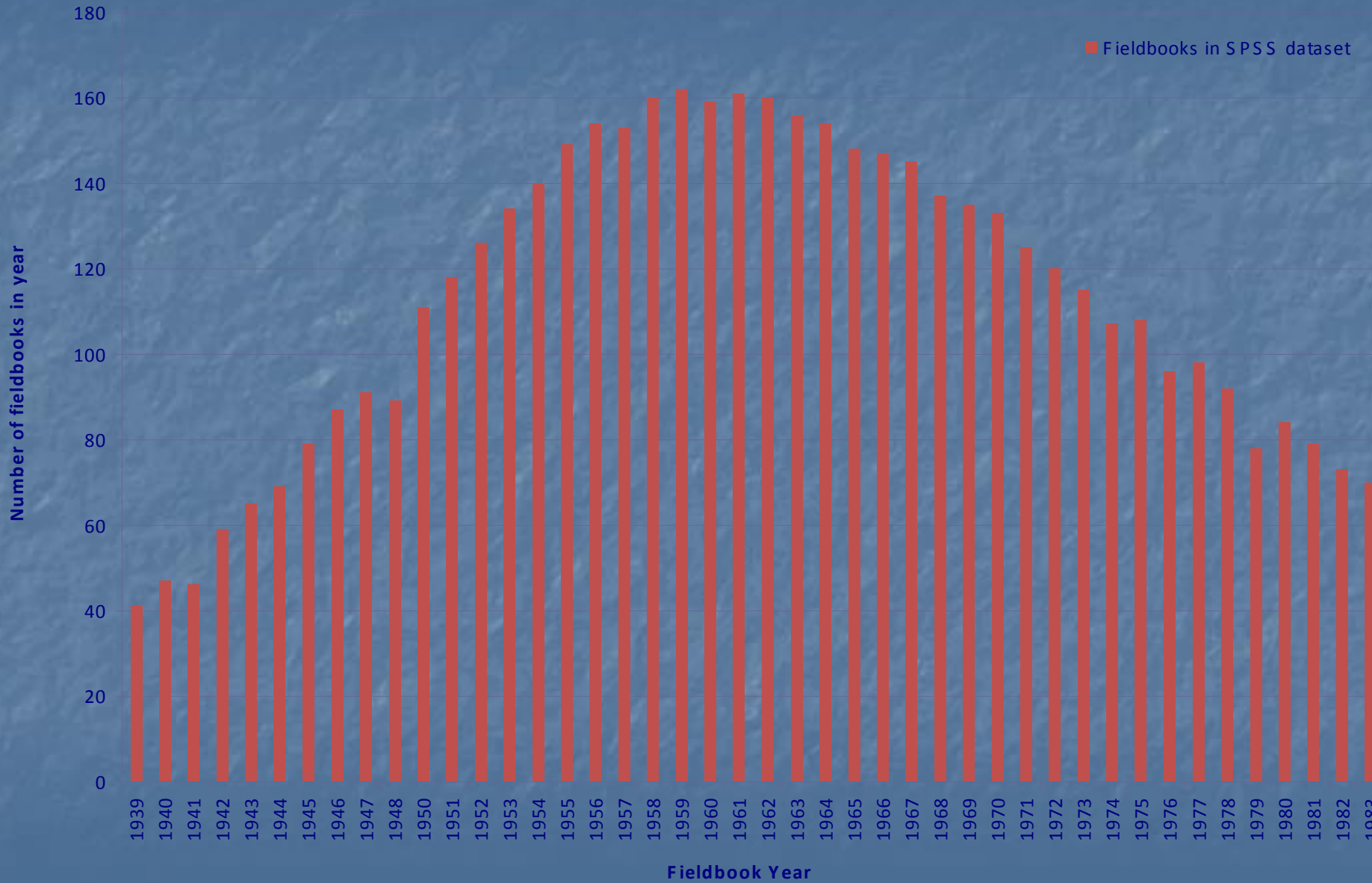
Output and productivity

- Federico (2005)
 - C19 agricultural growth by increasing inputs
 - C20 growth by increasing TFP
- Thirtle et al (2004) TFP growth rates
 - 1953-1984: 1.68%
 - 1984-2000: 0.26%

The Farm Management Survey

- Was *not* designed to explain technical change
- 4987 fieldbooks entered in dataset

Distribution of fieldbooks



Methodology

For each farm

Analyse accounts

Farm history

Oral history (for survivors)

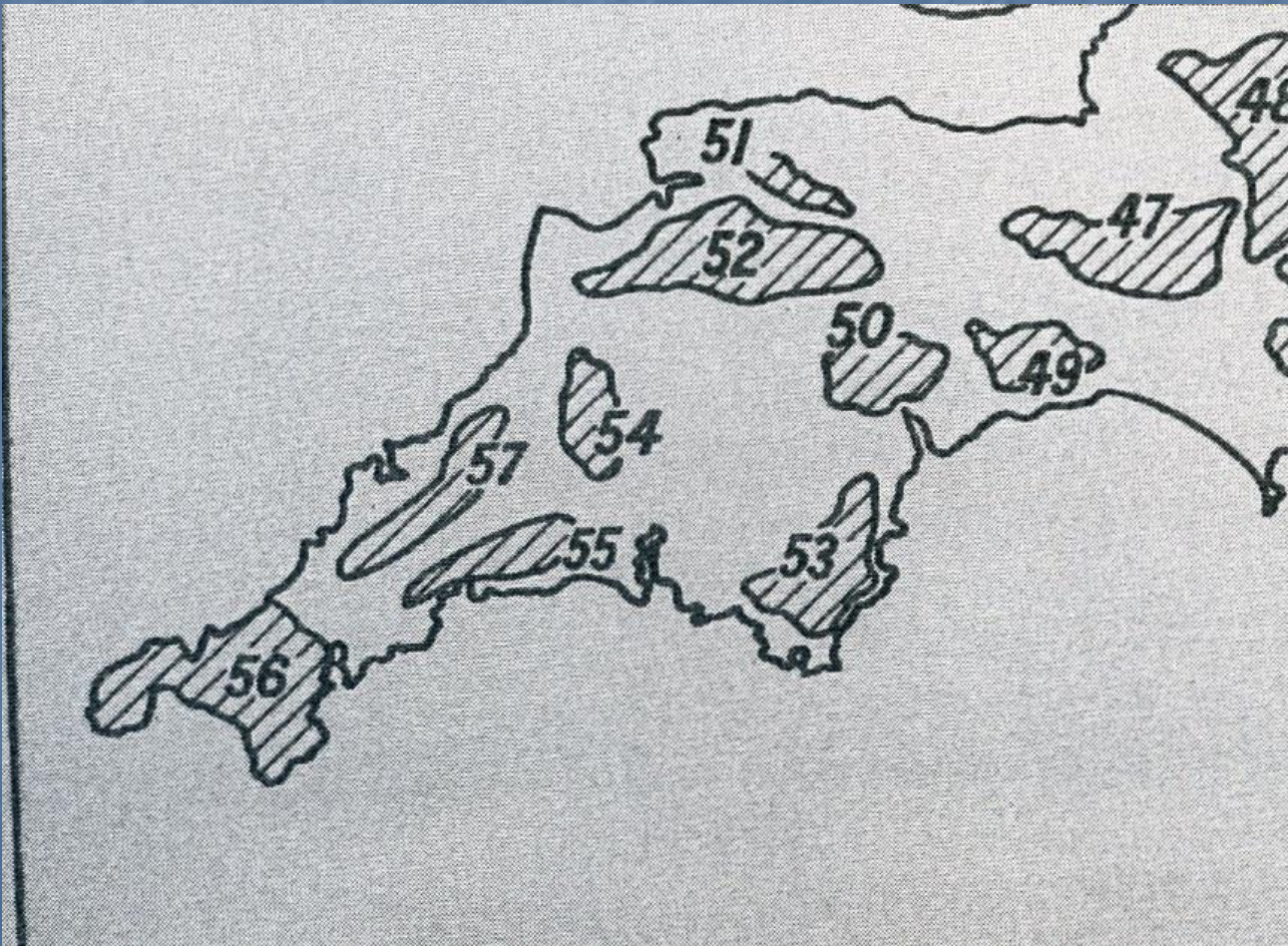
Analysing the accounts (2)

- Year
- Farm size
- Grass area
- Cereal output
- Other crops output
- Cattle output
- Sheep output
- Dairy output.....
- Fertiliser costs
- Pesticide costs
- Seed costs
- Concentrate costs
- Vet costs
- Labour costs
- Machinery costs
- Building costs

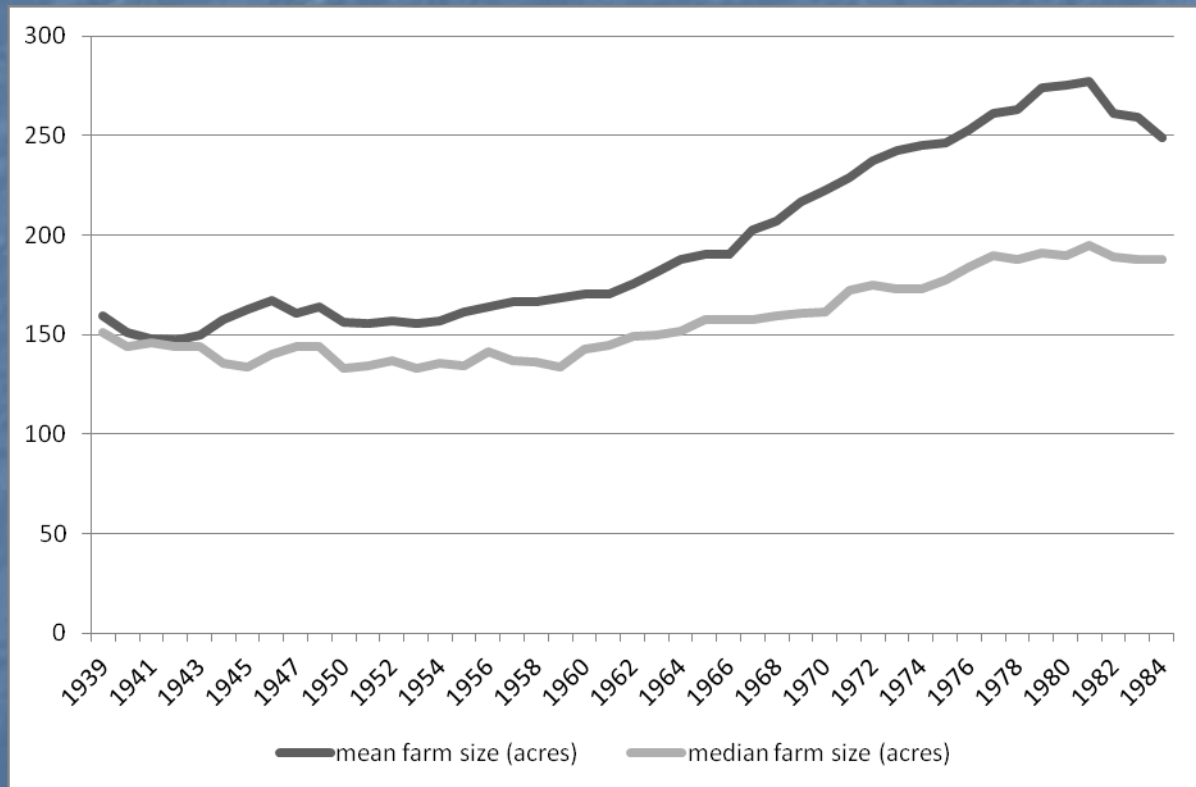
Comparison ratios

- Index of farm specialisation
- Output per £100 labour
- Output per £100 capital
- Real output per grazing acre
- Animal output per £100 concentrates
- Output per £100 total inputs

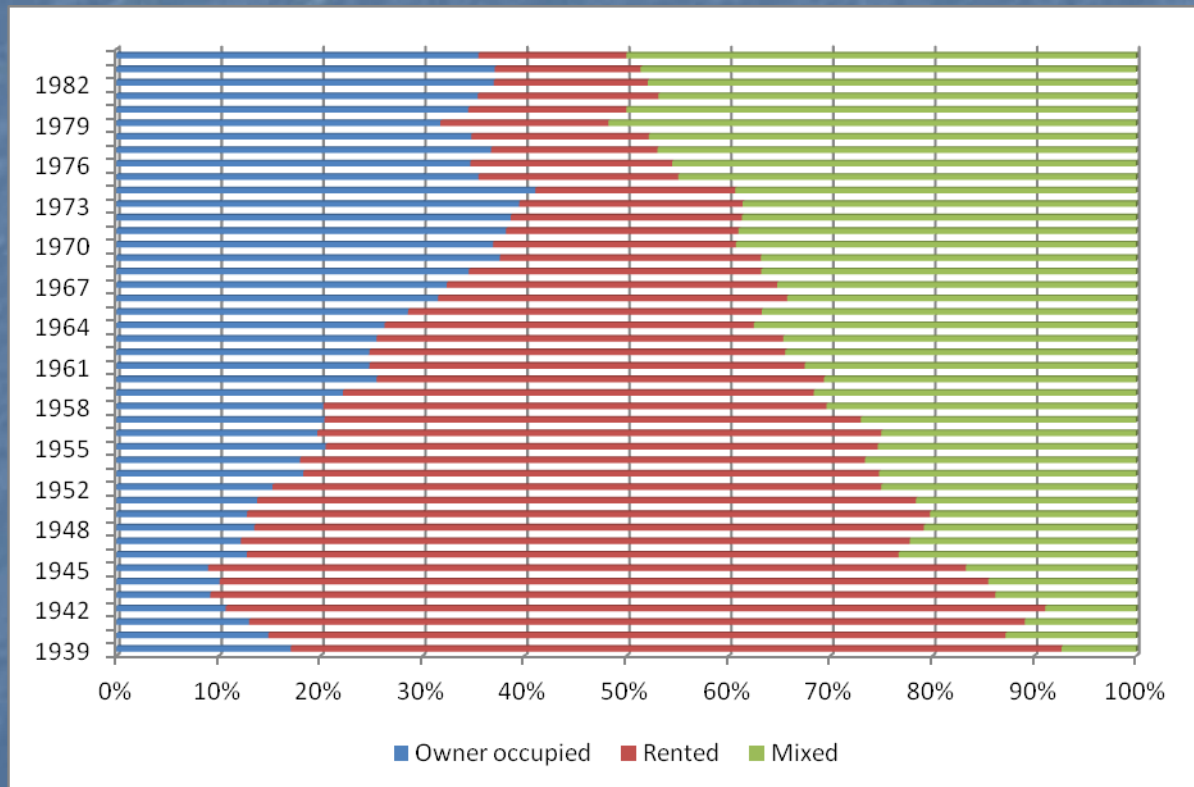
Where were the farms?



Farm sizes gradually increased



Fewer farms were rented

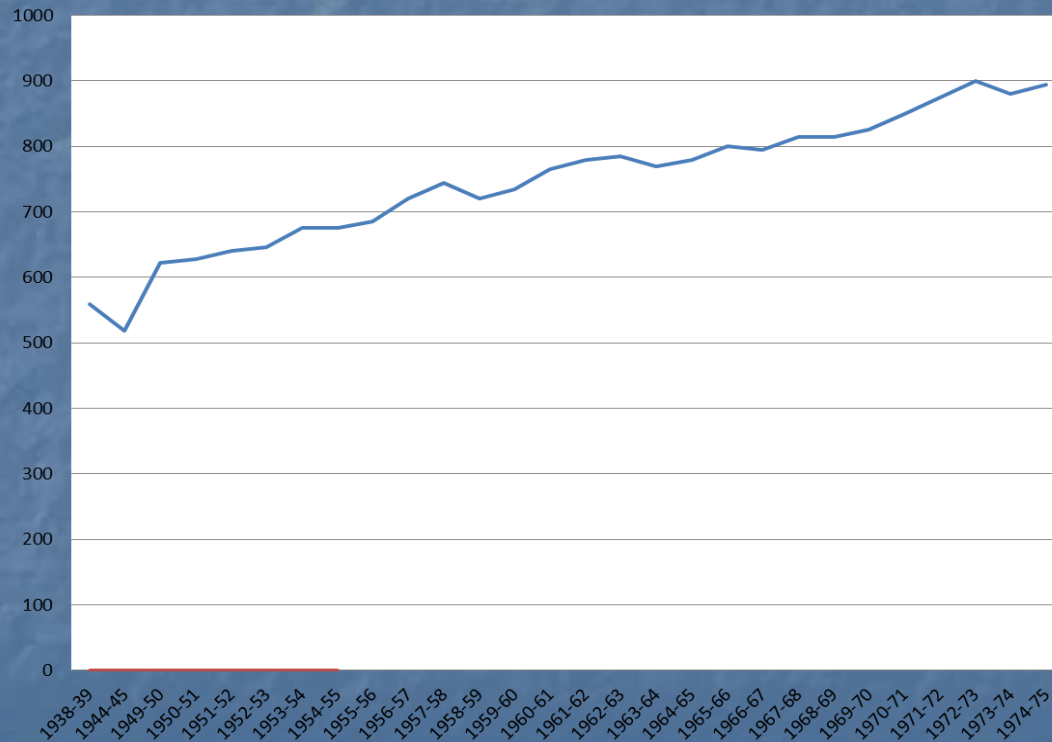


The big changes in dairying

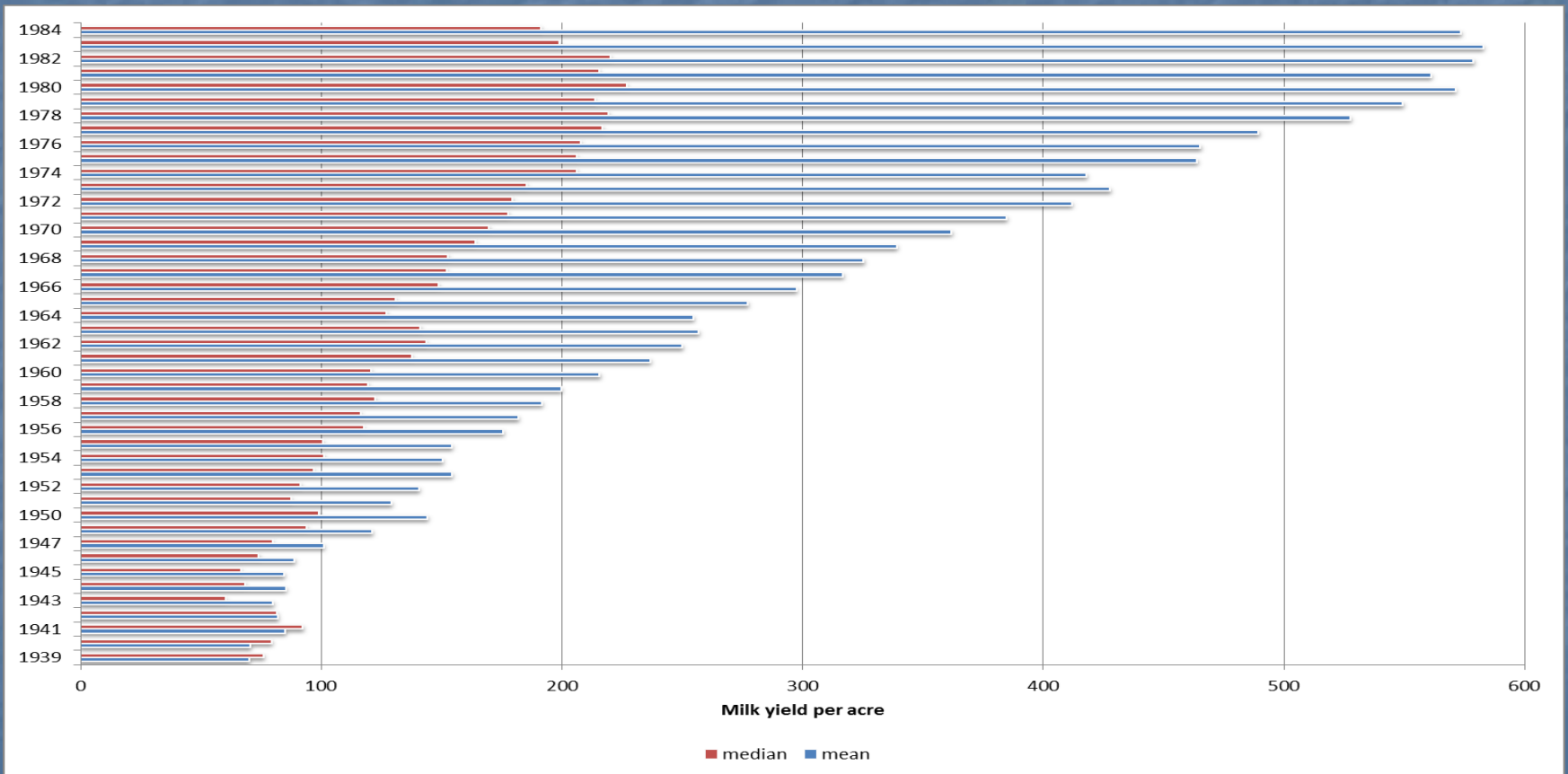
- More milk per cow
- More milk per acre
- More milk per farm

More milk per cow

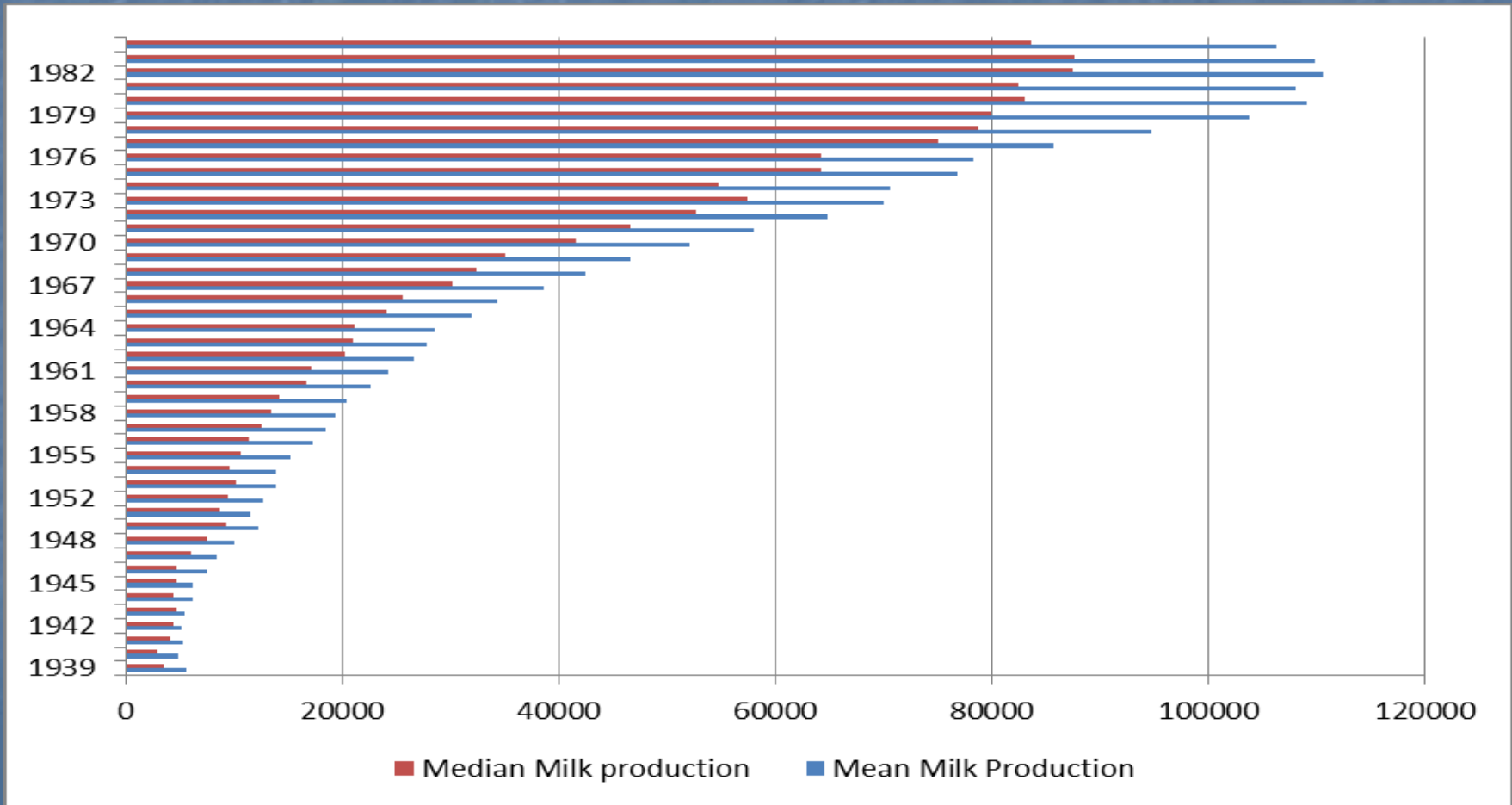
Annual Av. Milk Yield per Dairy Cows (gallons) England & Wales



More milk per acre



More milk per farm

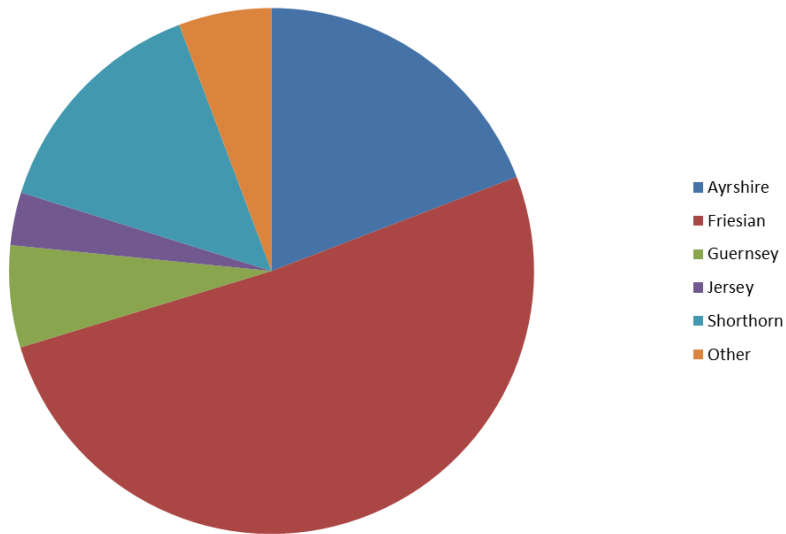


What produced more milk per cow?

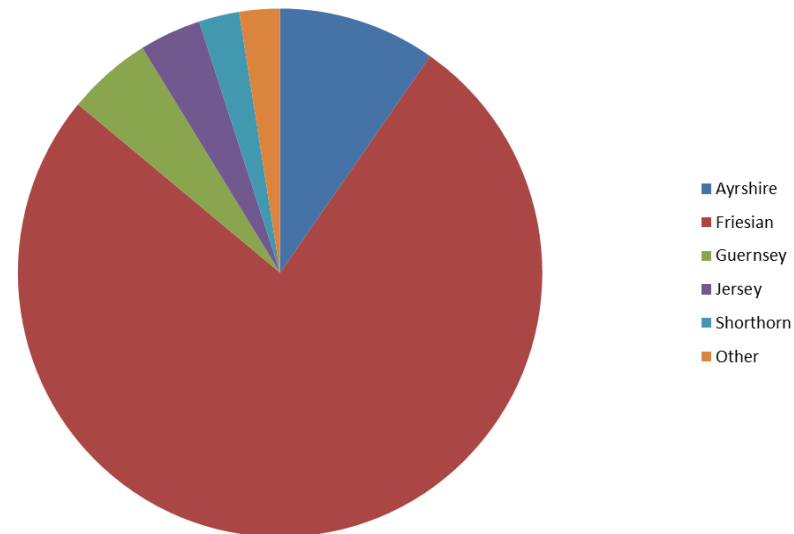
- Breed changes
- AI
- Feeds

Breed changes in England and Wales

Dairy Herd Breed Distribution England & Wales
June 1960

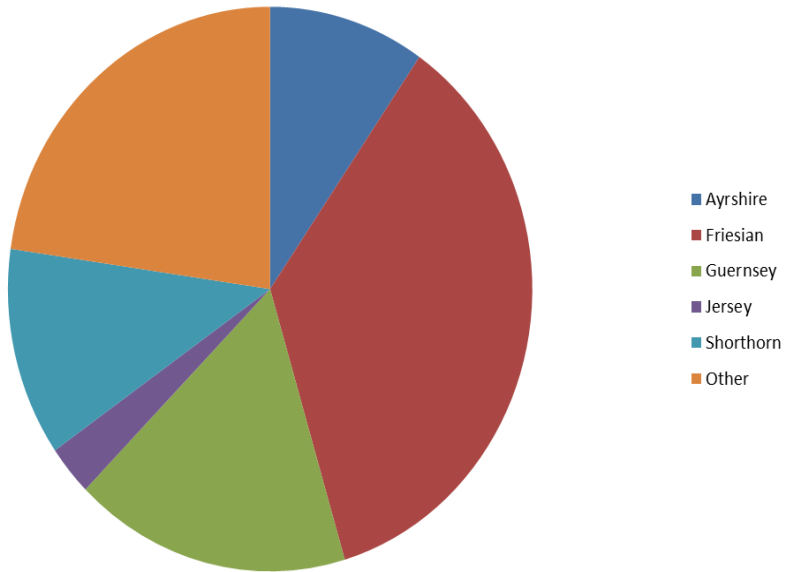


Dairy Herd Breed Distribution England & Wales
June 1970

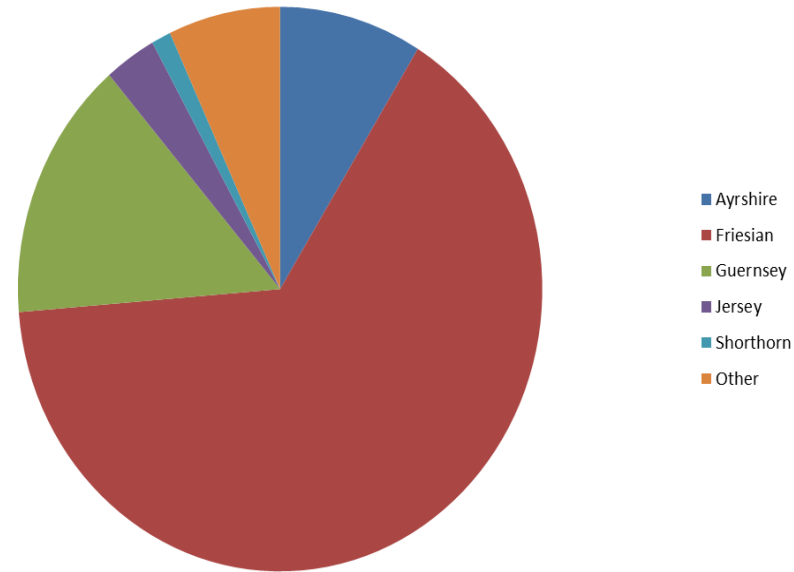


Breed changes in the Far West

Dairy Herd Breed Distribution Far Western Region
June 1960

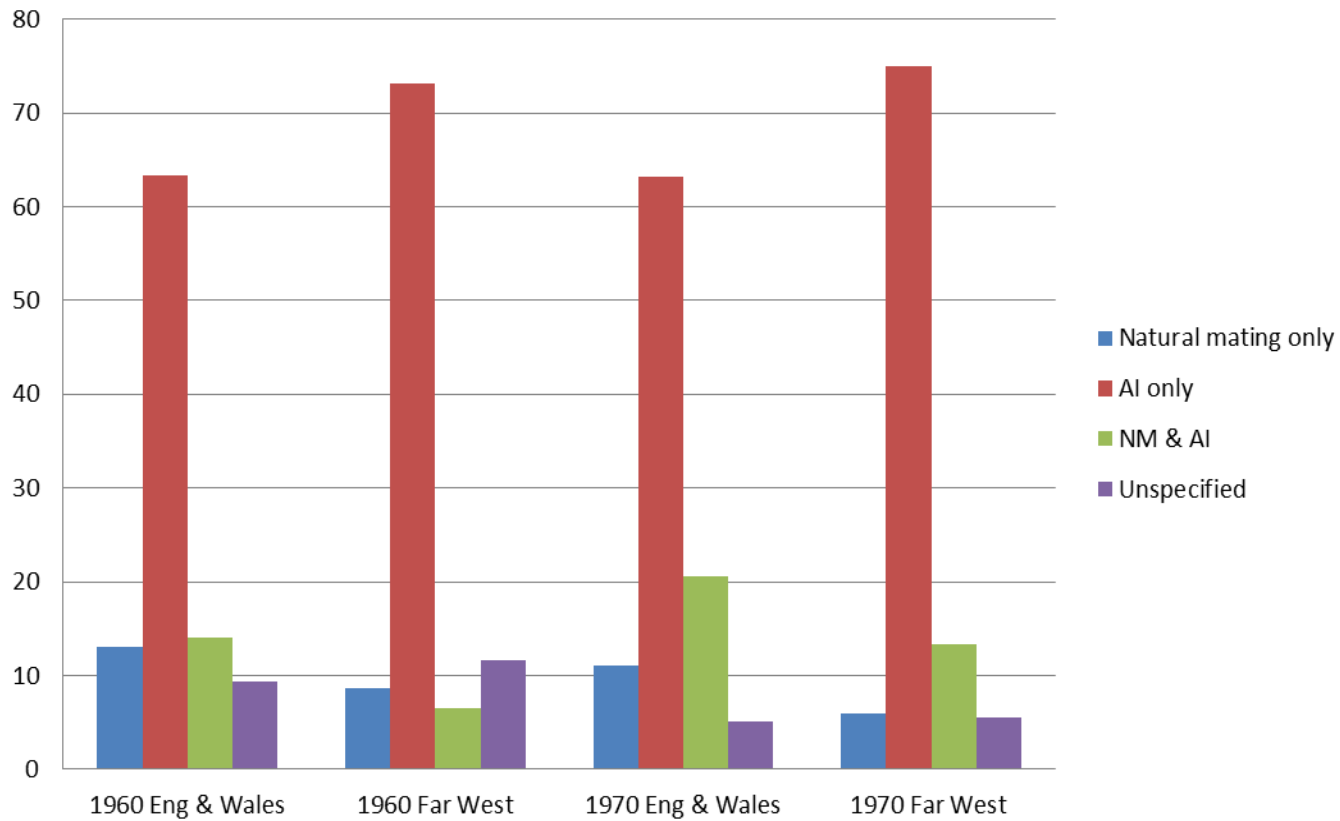


Dairy Herd Breed Distribution Far Western Region
June 1970

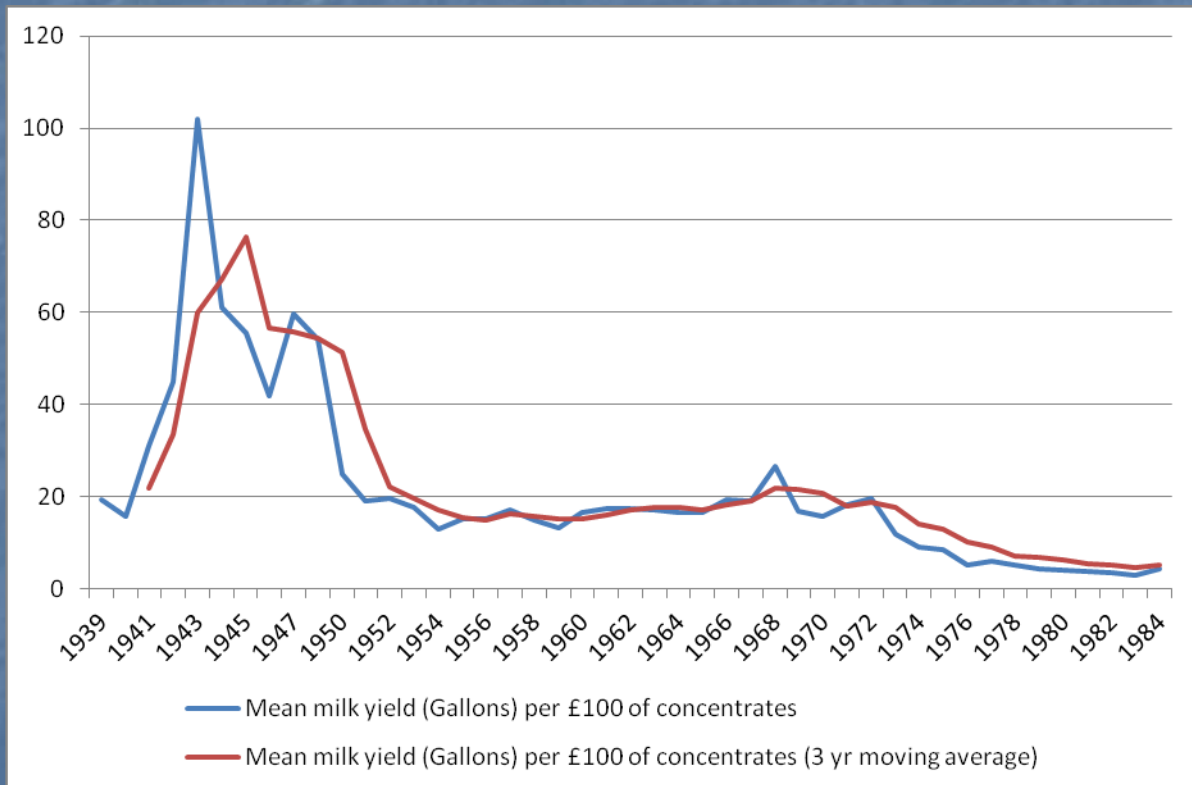


AI

Method of Mating in Dairy Herds



More purchased feeds



Increasing use of silage

- John Coleman – ‘Father made silage in the 1950s ... very hard work ... all hand work ... before the days of buckrakes ... it was about 1958 that people started using buckrakes’
- Paul Gluyas – ‘Hydraulics transformed materials handling. Hydraulic not hand-draulic’

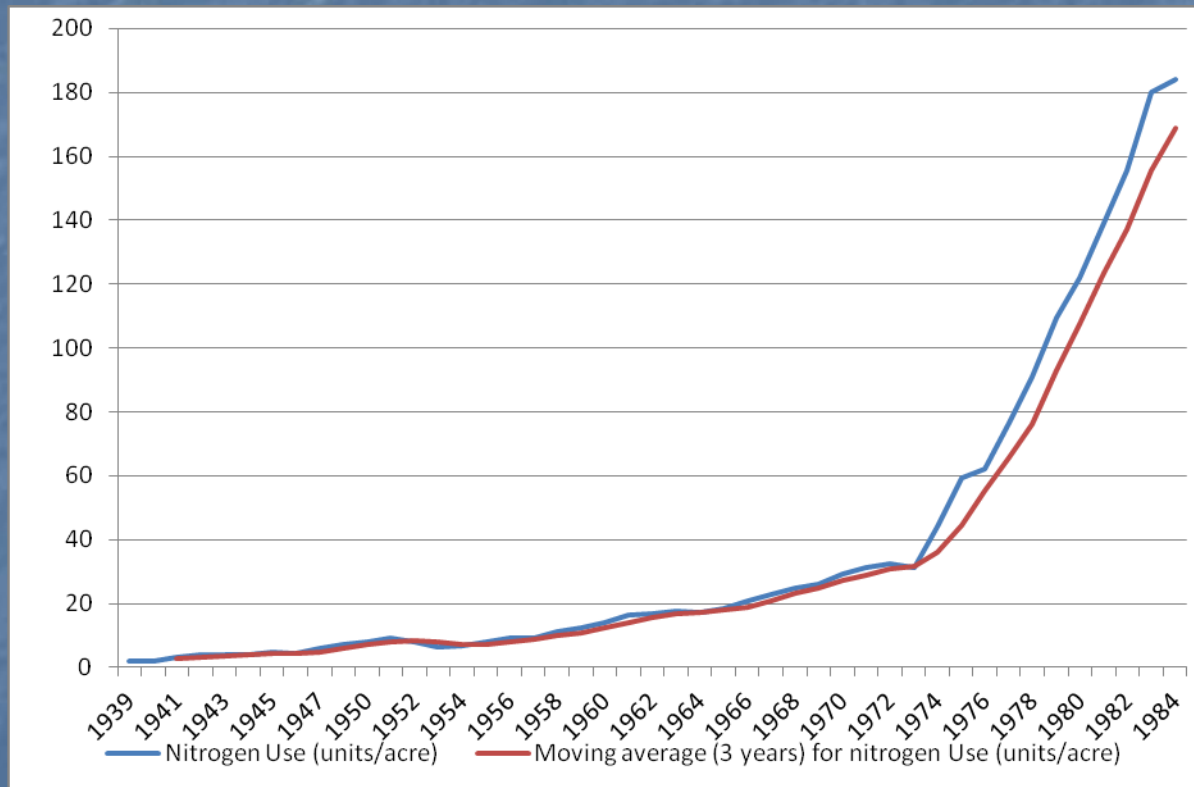
And silage quality

- Paul Gluyas - '... a lot more feed value in well-made silage than in well-made hay'
- Michael Horrell – '... if you had better quality silage the cow would eat more, and every kilogramme she ate would nourish her more...'

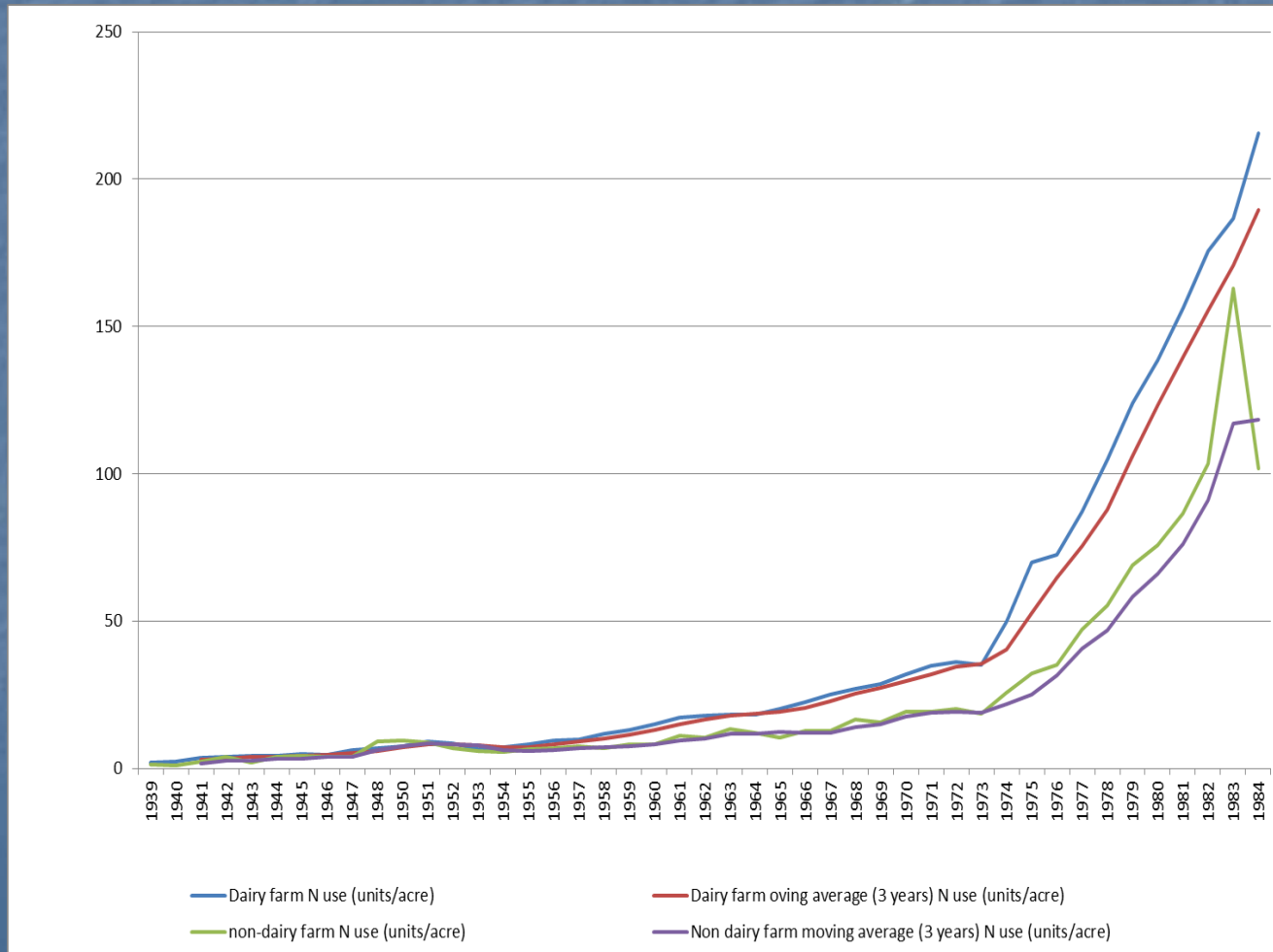
What produced more milk per acre?

- More fertilizer
- Better grass varieties
- Better grazing management

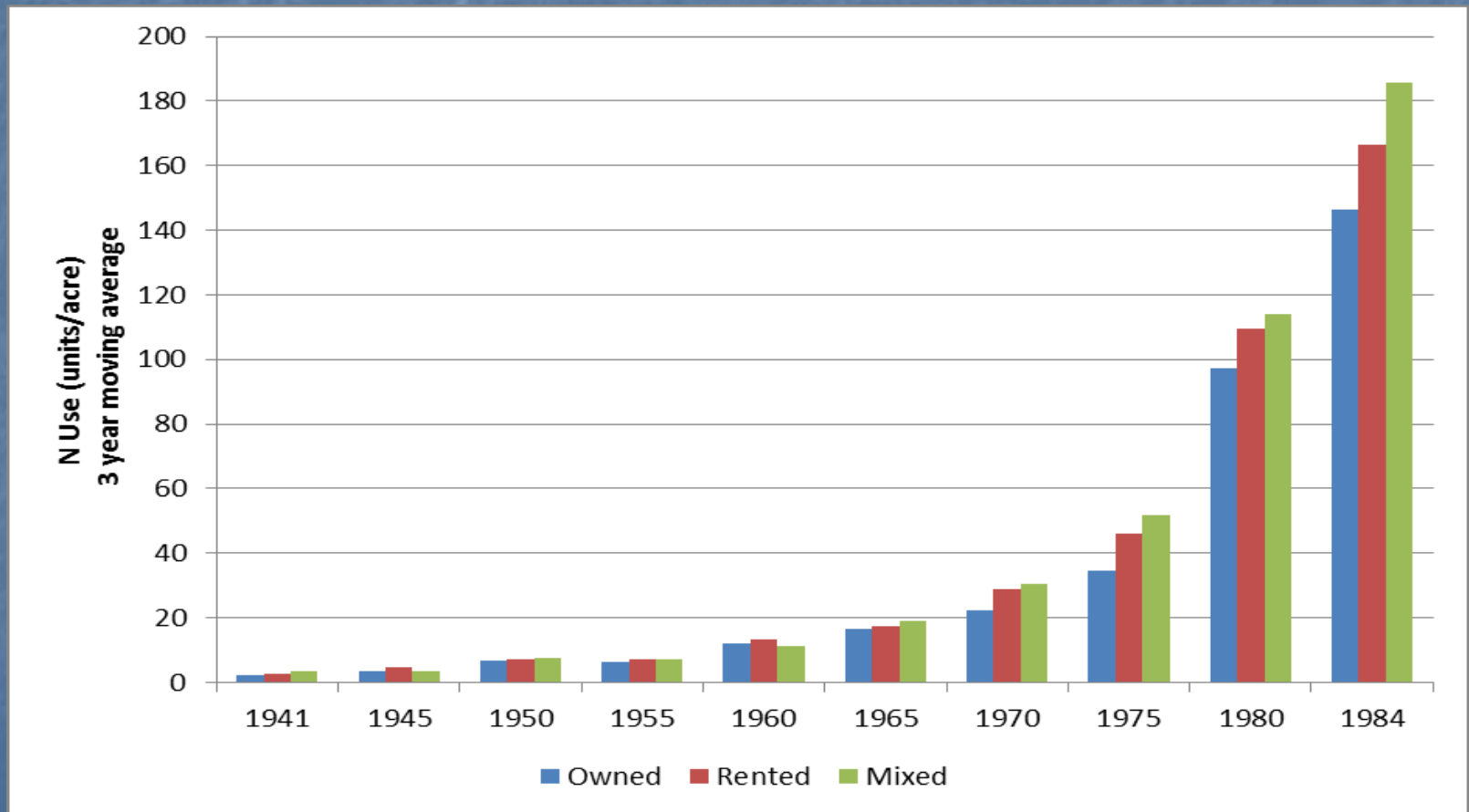
Changing fertilizer use



Dairy farms used more N than non-dairy farms



Mixed tenure farms used more Nitrogen



Grazing management and grass varieties

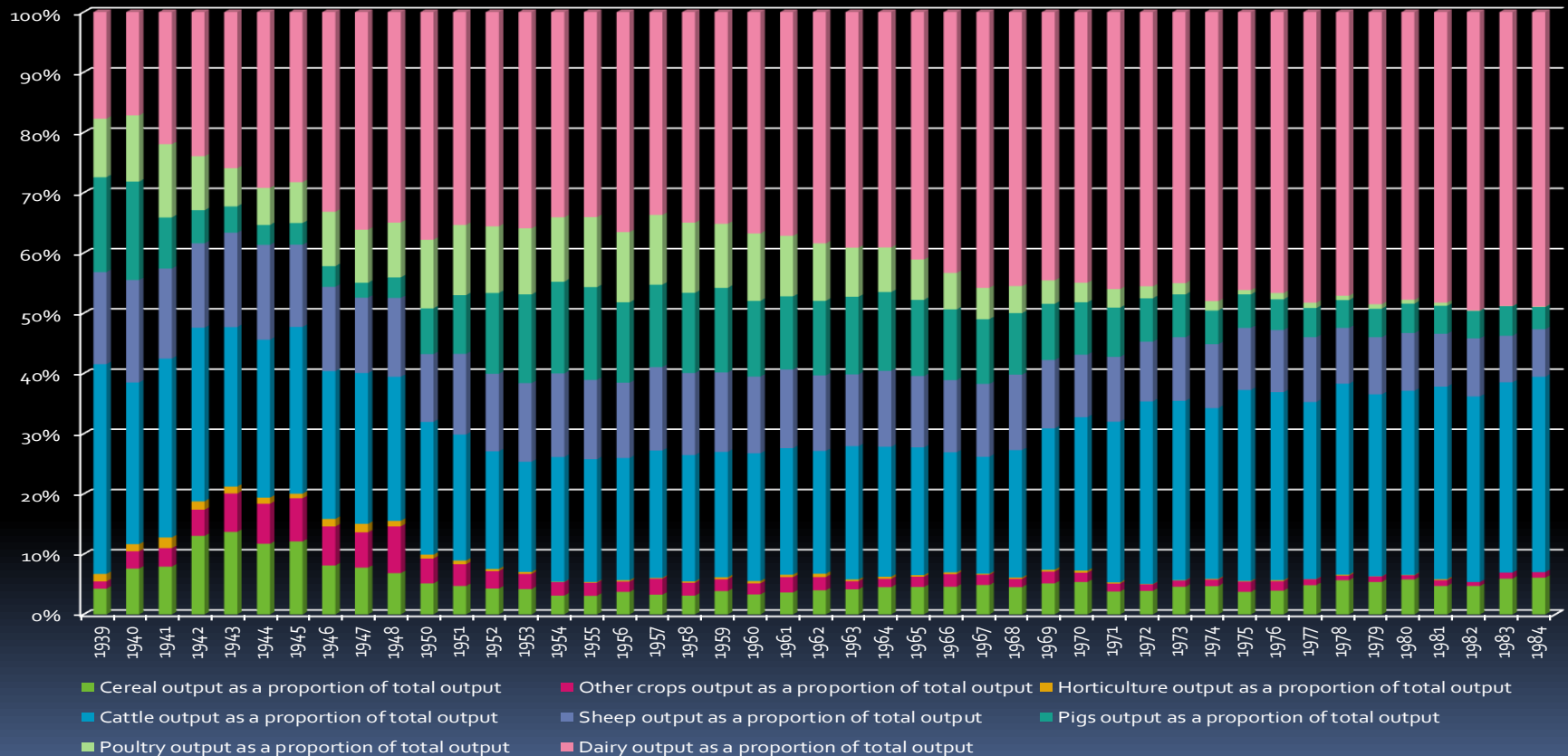
- Farm 744 – ‘we bought grass varieties by the advice of the seedsman’
- Farm 7/8 – ‘NAAS ... gave us advice on certain leys to use’
- But no mention of paddocks/electric fencing/forward creep grazing

How did farmers cope with more COWS?

- Parlours
- Bulk tanks
- Cubicles
- Slurry

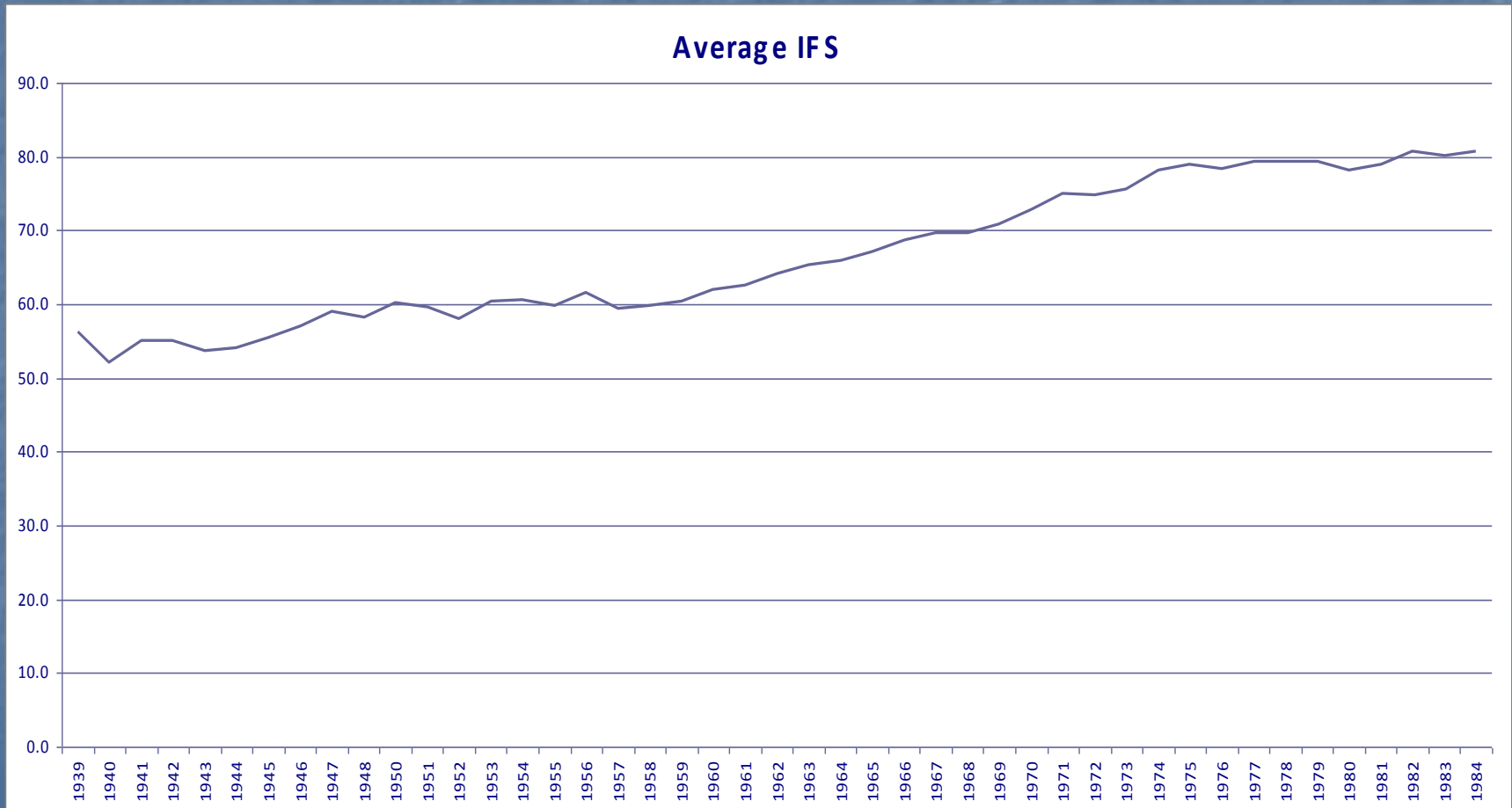
And specialisation.....

Farmers began to specialise from the late 1940s/early 1950s

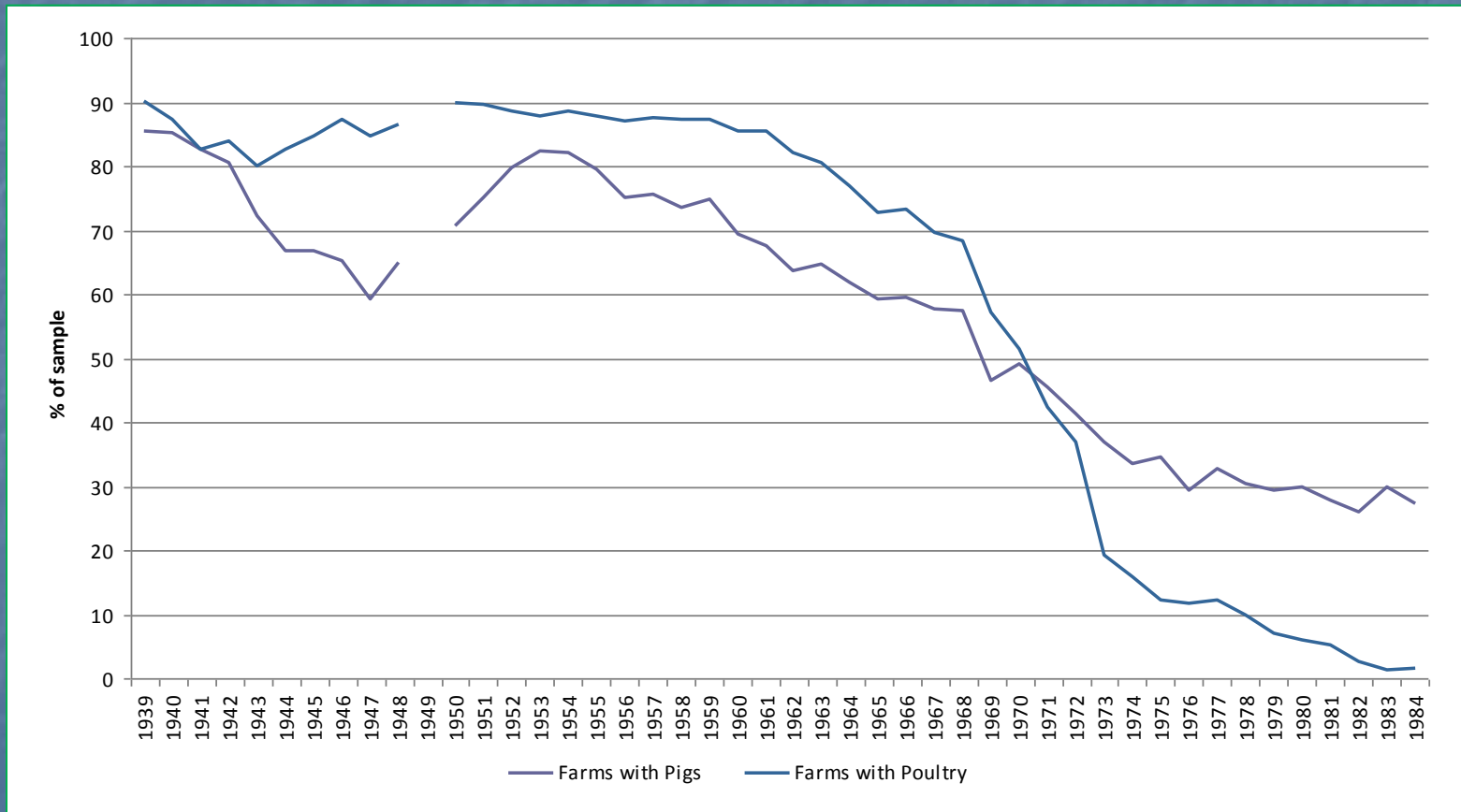


The importance of specialisation

$$\text{IFS} = [(E1/O1) \times 100] + 1/n [(O1-E1)/O1 \times 100]$$



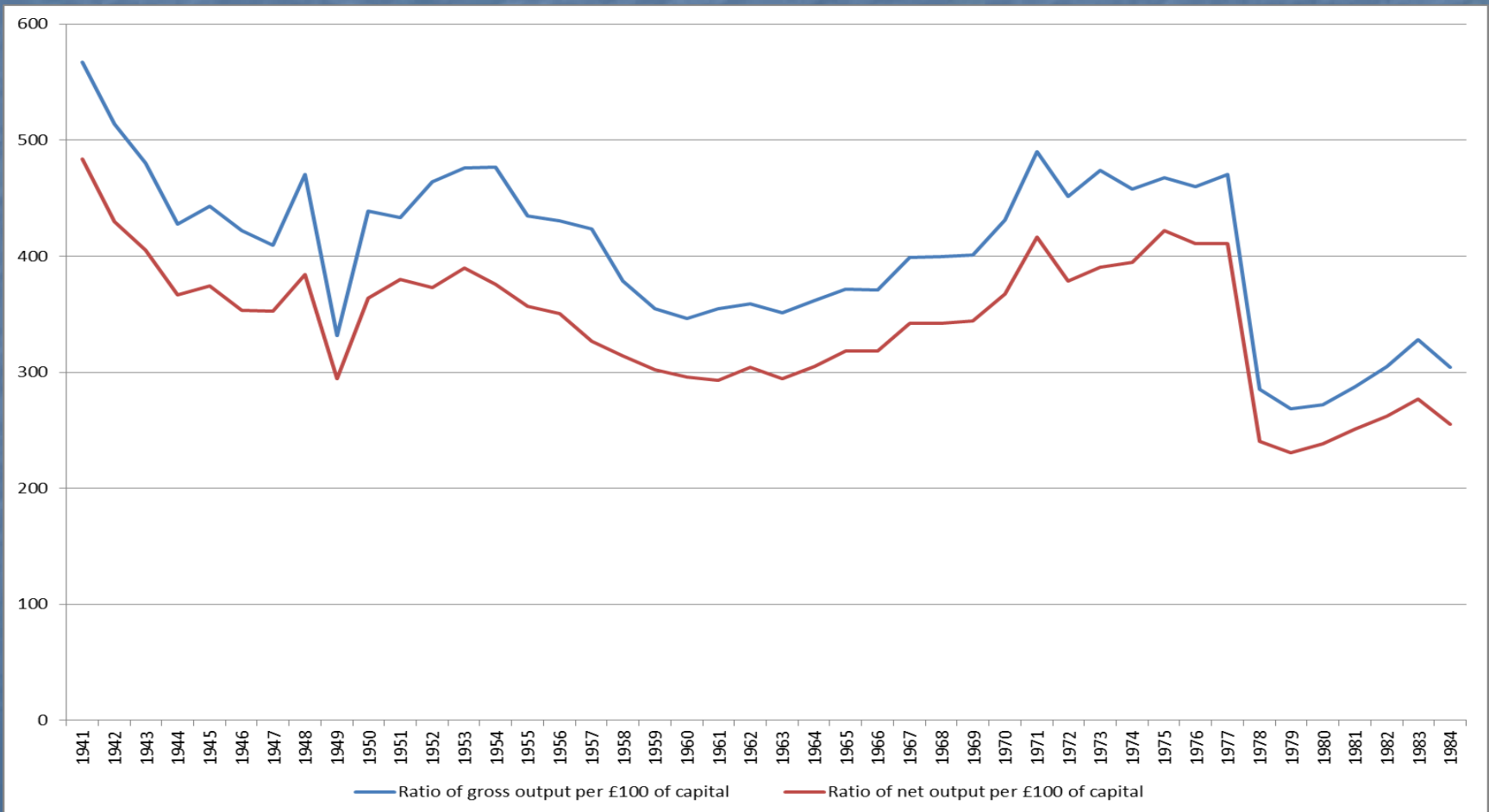
The main change was the disappearance of pigs and poultry



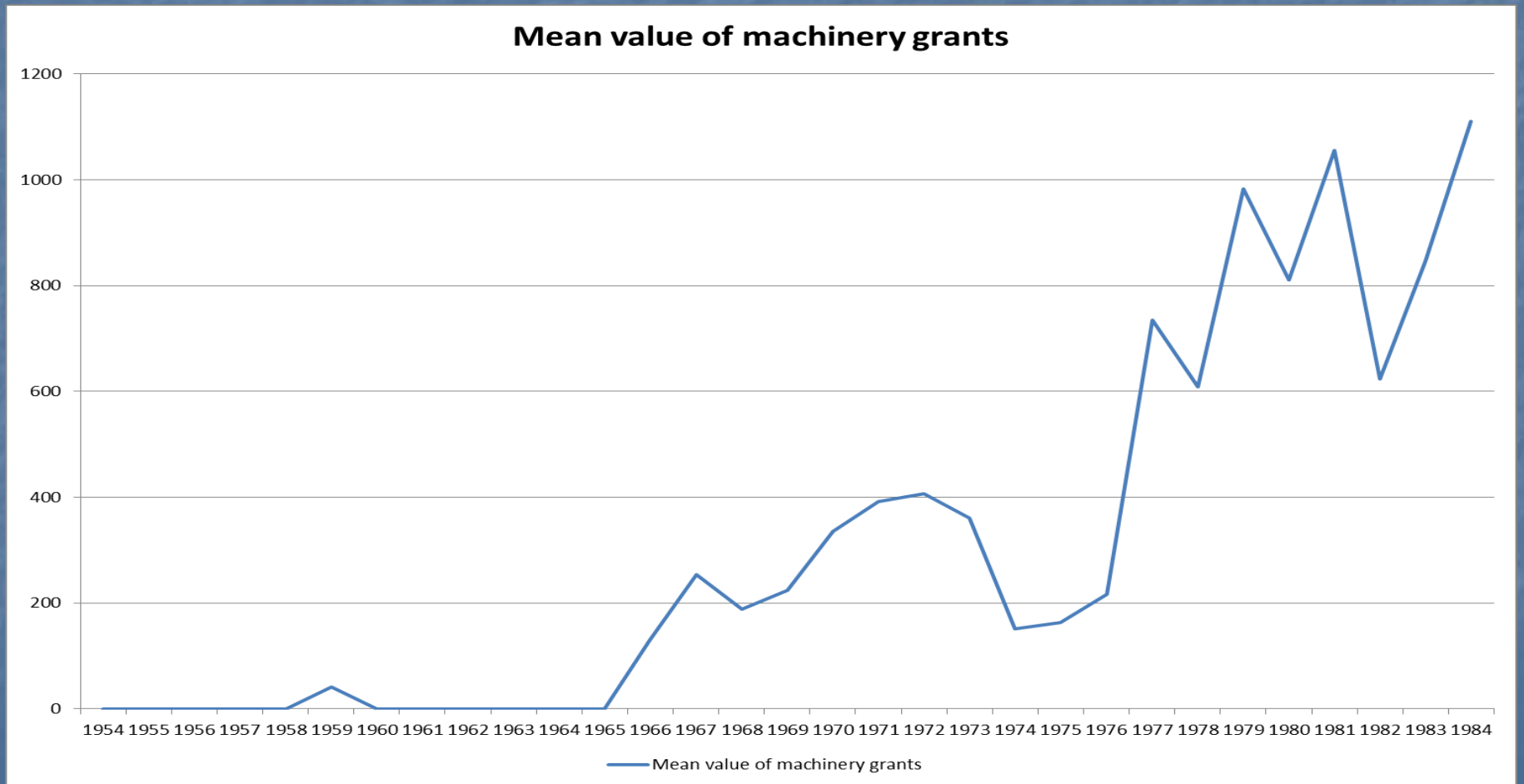
Capital inputs also increased

- Machinery
- Buildings
- Capital grants

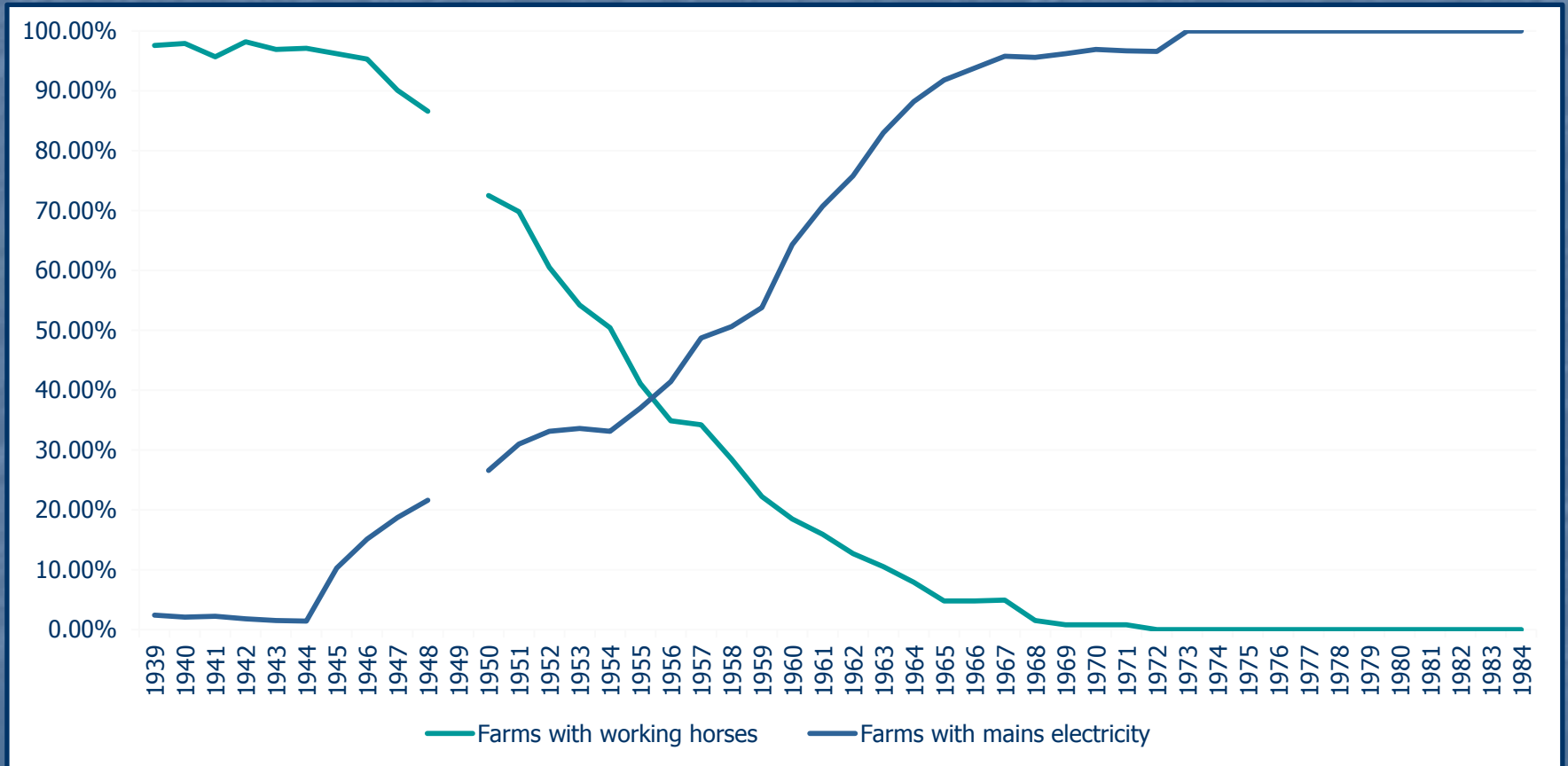
Output per £100 of capital invested



Grant aid increased



Tractors replaced horses and farms were electrified

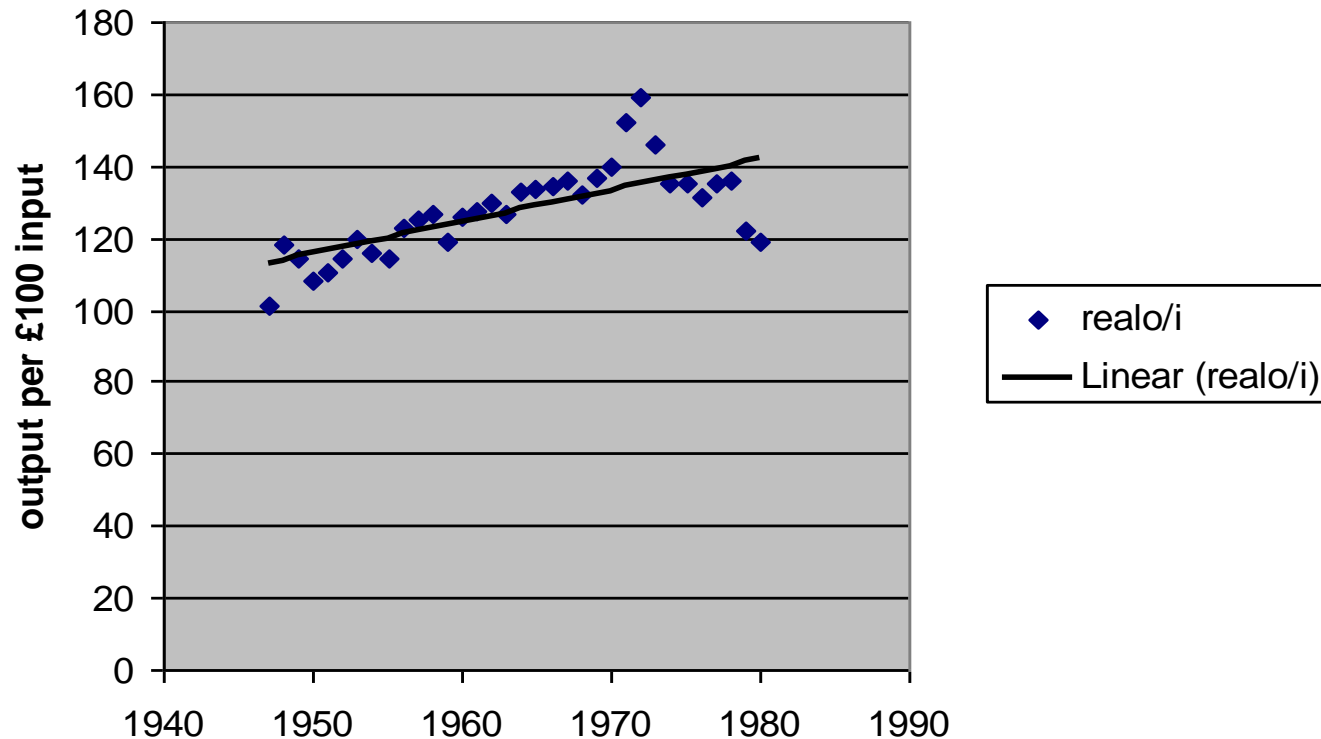


Labour use decreased

- Farm 2/7 (Dorset, 680 acres)
 - 1945 – 19 workers
 - 1984 – 6 workers

Initial findings – from the whole Devon and Cornwall survey

Graph 2: realo/i (1962=100)



Conclusions (1)

- Most dairy farmers made the same changes
- But at different times
- Mixed farms specialised
- These changes were impossible before 1939

Conclusions (2)

- How much was due to
 - agricultural policy
 - Inflation
 - Tenure changes
- The development of knowledge networks

