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THE EVOLUTION OF MECHANISED FARMING IN THE WEST LANCASHIRE REGION OF THE UNITED KINGDOM SINCE 1945

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Abstract

This paper critically examines the effects mechanised operations, in particular the replacement of the horse with the introduction of the tractor, had on the socio economic position of the rural population of West Lancashire. This study investigates how the history of West Lancashire made a significant contribution to understanding the transition from horse to tractor, in the post Second World War period; a period of time where the experiences of farming with both horses and tractors were common place. This academic piece of work draws on the personal experiences of farmers in conjunction with documented evidence, and critically examines the effects on both rural life and the farming industry. The data processed included the relationship of new tractor sales in comparison with the decline in working horses; an increase of 350,000 from 100,000 to 400,000 tractors nationwide in the 17 years following the war, during the same period the number of working horses declined to virtually zero; productivity increased and at the same time labour requirement on farms declined and it was during this period that the population nearly doubled.
Lancashire, situated in the North West of England, lends itself to a wide diversification in crops and land use with large urban populations to the south and east of the county providing a clear market for produce. The most productive land, located in the West Lancashire plain, comprises of light easily cultivated peat mosses, light alluvial and sandy soils (Grade 1 listed soil) which are ideal for intensive arable cropping. Fifteen per cent of the UK soil is categorised as grade 1; ninety four per cent of this fifteen per cent is located in North West Lancashire.
This report critically reviews the increase in tractor numbers and their role in the regions agriculture in comparison to the decline of manual labour, the decline in the use of horses and trends in farm size.

Key words: *mechanised operations, horses, tractors, urban population, intensive arable cropping, social trends, West Lancashire.*

INTRODUCTION

During the 1950's British farming practices became much more intensive as farmers shifted decisively and irrevocably away from the use of horses to tractors (Robinson, 2002). Post War agriculture needed to undergo a process of profound change. This progressive change became the extension of technological, organisational and economic rationality (Ilbery, 1986). This investigation aims to contribute to the understanding of this significant and remarkable nation-wide change through studying part of West Lancashire, establishing the chronology of the process and how and why it occurred. For the basic economic analysis of this study, farming has been looked at purely as a business activity, setting aside the romantic view of the countryside that ignores the realities of earning a living. However, it also considers the social consequences.

The change from horses to tractors was the fastest change, in farming practice, to occur in the history of agriculture. We, the investigators already knew the outcome of the challenge facing an industry using dated practices; the reasons behind the change and the impact on communities of British farmers remain obscure. Factors such as financial constraints and inducements, farm size and the existence of a rigid or dated attitude will all be considered in this study of decision making, as well as the effect the changeover had on the lives of West Lancashire farmers.

With the food crisis of the war years continuing, due to the lack of foreign exchange to pay for imports; during 1951 and 1952 British agriculture was being called on to produce £100,000,000 worth of extra food. This was a vital contribution to the nation's economic recovery after a devastating war that left the country nearly bankrupt. The

Government, of the day, felt the achievement of this target depended on the introduction of total mechanisation on British farms (Turner, 1948). It was expected, that by 1959, £60,000,000 annually would be spent on mechanising agriculture across Britain. This would represent up to £2.00 for every acre of cultivated farm land (Culpin, 1959). The critical state of the British economy justified this vast investment.

MATERIALS AND METHODS

According to Denscombe (2010), social researchers must always ask at the outset if the research is suitable, feasible and ethical. The obvious sources for agricultural statistics have been used to the full, however notoriously farmers have a very powerful inclination to reminisce suggesting that the best method of data collection would be oral testimony. Testimonials have been collected from 67 men and women with farming backgrounds and lifestyles this formed the backbone of the investigation; the suitability and ethical aspects of this approach must be considered here. Dr Stephen Caunce (1994) in his book Oral History and the Local Historian, stresses the importance of accurate depiction of working family life and states that 'many memories of small groups of people had been previously considered too unimportant to merit much attention'. The people interviewed, for this study, contributed a real life perspective of working farmland using horses and tractors in 1950's West Lancashire; this information could have not been gained in any other way and these memories are unique and personal and have been treated as such, and are becoming increasingly difficult to collect as time passes. Since this investigation one contributor has passed way.

All interviewees signed a declaration to express that they are happy for their conversations to be used in this way, anonymity has been respected where quotes have been included. Five interviewees provided particularly valuable testimony, and their words appear regularly in this document. Brief conversations with the interviewee's immediate family members and the public have been included even when not recorded. All the individuals, once established they had lived throughout the farming change were asked six key questions. This has allowed the creation of statistical graphs and charts to generate a picture of their lifestyles throughout the 1950s.

External reading around the subject and interpretation of memoirs and cross referencing the interviews with each other indicated that the information collected is factually accurate. Photographs and postcards from interviewees have also been used, with information as to the content added in captions with the correct accreditation. Maps, diagrams and tables are also used to assist the reader with the understanding and reasoning for this project. Articles from newspapers have been referred to throughout, the Preston Guardian now the Farmers Guardian was particularly useful as an additional source for pricing and local life stories.

RESULTS AND DISCUSSIONS

Why West Lancashire needed to change

The expense of the war left the country with severe economic problems. James Turner, National Farmers Union (NFU) President said in 1950 that recovery depended on the progress in agriculture. These problems were centred on the output per man hour which would lower the cost of stocks (ESSO 1948), and a nation-wide mechanisation was vital for that (Culpin 1959). The prime reason being the long standing dependence on the importation of a large percentage of the nation's food, hence the government pressure to reduce this import bill by £100,000,000. In addition, the population was growing, and extra food and jobs were needed every year. Between 1946 and January 1960 a labourer's standard working week was reduced from 48 to 45 hours before overtime rates had to be paid. As horsemen had to work a longer day on full pay to prepare their horses, employers faced a rise in the cost of caring for horses.

Lancashire's traditional commitment to cotton mills, mines and engineering had been revitalised by the war, but food production still required a long term solution. In Lancashire alone the population rose from 4.8 million to 5.1 million, and a good deal of the food production from West Lancashire was consumed locally.

Tractor power seemed the obvious way to increase productivity. The working rate of a machine is determined in order to enable the farmer to estimate probable work output comparable to the horse; this idea originated by manufactures to ascertain machine productivity
The problems of using horses had previously been accepted as inevitable, but a dramatic decline in numbers began after 1945. In 1900 there were 3.3 million horses in Britain; 2.6 million of these were working in agriculture with around 4% of this figure working in and around the Lancashire County. At the end of the 20th century the number of farm horses used in England was almost unaccountably low.

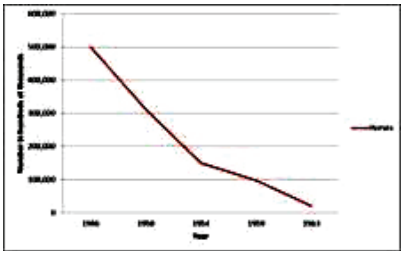

Figure . 1. Graph showing the post-war decline of horses used in British Agriculture

The distinct fall of working horses during 1950, 1954 and 1959 can be attributed to new developments in tractors, government subsidies and local people gaining an interest in tractors (Turner, 1948).

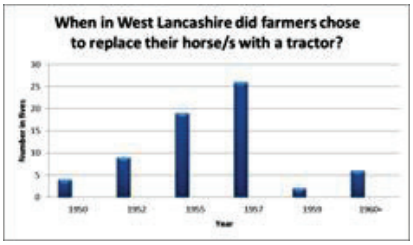

Figure 2. Graph showing when tractors replaced horses

The peak of change, evident in 1957 could be attributed to the governments' introduction of the Farm Improvement Scheme which encouraged new intensive methods, including land drainage, particularly vital to the farmers who worked the Longton Moss. They could also apply for new buildings, which helped them replace the stable and storage barns with workshops that had ramps and built in tool storage facilities.

Incentives for Farmers to Change

Change can be very difficult to implement in close-knit communities engaged in traditional work like farming, also, changes that require capital investment will inevitably strike a general reluctance to adapt, unless the gains are clear. It was easiest where it used and adapted skills that have been passed on from generation to generation (Kruger, 2011). Manufacturers and government officials had to create a general sense among farmers that the tractor really would make life easier, rather than something forced on them. A safety net such as payment plans that could be frozen to prevent them from going bankrupt made people more likely to change since they knew that 'they are not sentenced to something that may not work (Kruger, 2011)'. The management of this process required the government to commit to protecting farmers with substantial subsidies. Until 1939 farming received little support, and had little confidence. There was no direct attempt to assist them to purchase machinery. After the war, the experience of such severe food supply problems prompted the Labour government to promise that agriculture would see no return to such conditions, and that the British people would not experience rationing in the future (Labour Party, 1945). At the most basic level, farmers could effectively 'write off' the amount they paid for new machinery against tax as a justifiable business expense extremely quickly, as long as it was genuinely made use of. This was never a scheme in its own right, but that informality helped make it extremely effective (Tichetar, 1945). Formal grants and schemes were first set out in the Agriculture Act of 1947 to help farmers make a good living, but they depended on changing from horses to tractors. The National Agricultural Advisory Service (NAAS) was to encourage agricultural improvement and more productive mechanised methods, and operated without charge (DEFRA, 2006).
The New Food Services Scheme (NFSS) meant that all industry canteens, schools and British restaurants had to serve British produce, and this was promised to be in place by 1954 (Labour Party, 1945). This was good news for

West Lancashire farmers as Leyland Motors was then expanding rapidly to become one of the biggest wagon, bus and engine manufacturers in the UK, taking on 700-800 extra workers and contractors in the process (Leyland Trucks, 2011). Total staff numbers eventually rose from 10,000 to 25,000 people.

When diesel was first introduced (known as derv), fuel for agricultural tractors was subject to the same duty as that on petrol. In 1950-51 the Ministry of Agriculture operated a scheme of grants to farmers to offset the increase in petrol duty made in that financial year, providing flat rate payments according to the number of tractors used. Farmers were permitted to use diesel that was given a red colouring at the lower heavy oil rate for agricultural operations (Hylto-Foster, 1961).

A ploughing grant formed a large part of the Agriculture Act subsidy scheme introduced in 1952 (Dugdale, 1952). This set grant rates for ploughing up grassland to grow arable crops for human consumption (Nugent, 1952). £5.00 per acre was paid for grass land of up to four years old and a higher rate up to £30.00 for 2.5 acres of grassland that was up to 12 years old (Pretty, 1998). Governments prioritised the conversion of land over a certain age. West Lancashire was primarily an area of flat, good soils that had been extensively used for grazing beef cattle. The ploughing grant did not require the use of tractors but farmers wishing to purchase one could do so knowing they had a reliable top up on their gross income. Tractors also performed the ploughing quicker and once the government reached its target of 500,000 more arable acres, the ploughing grants would cease. South western counties had the greatest uptake of this scheme, but farmers in West Lancashire also seized this chance to gain extra money. The increase in the removal of horses shown in Figure 2, 1952 could be attributed to the ploughing grant.

The Introduction of the tractor.

The tractor was not a new invention in the 1950s. Attempts to use steam power dated back many decades, but always proved a costly and often an inappropriate, source of draught power in fields. Internal combustion engines were used more successfully in North America, and some of the newly manufactured machinery was shipped to the UK especially during the food crisis of the two World Wars; tractors could be used with horse adapted machinery for almost any powered task on the farm, thus providing a direct replacement for the horse.

Table 1. Table showing the comparison of tractors with horses

Positive Attributes of the Tractor	Negative Attributes of the Tractor
They were faster than the horse. Field work took less time and basic applications were completed quicker.	There was no standardisation of parts. Parts were machine specific and could be costly.
Tractors were less labour intensive. Labourers/farmers were able to sit down during an entire task. New systems that were being tested meant that they could adjust machinery from the seat thus saving on time and motion exercises.	They required regular maintenance such as servicing. They also required fuel and oil to run on a regular basis and this was both an expense and required cash at hand.
If work slowed down on a farm a tractor would not require any upkeep unlike the horse which the worker would have to continue feeding and require looking after.	Tractors had zero intelligence. They were machines. They could not be trusted or left while running in the fields if the labourer chose to look at another task.
To help farmers purchase tractors incentives were put in place, in the form of Government Grant Schemes and tax benefits.	They were not sustainable, or environmentally friendly. Not an issue in the 1950s, but after the war it could become a concern as fuel reserves were low.
The machinery previously used for horses could be adapted and modified for use with the tractor. Some modifications could be crude, but they were effective and provided a short term solution to purchasing new implements.	Tractors were much more expensive to acquire
Different tractor makes and models could change, improve and gain new developments to suit the operator's needs. A horse had to stay the same.	
Ferguson and Brown tractors had a system in place called the Power Take Off (PTO). This meant powered machinery could be powered at the rear of the tractor.	

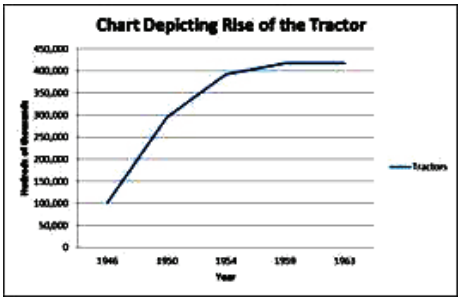

Figure 3. Graph showing rise in tractor sales

Figure 4 shows that in 17 post war years, the tractor had risen from a mere 100,000 across Britain to just less than 450,000 (HMSO, 1968). We must recognise that one tractor was the equivalent in power terms to several horses, as well as being the least expensive. When horse numbers had fallen to around 300,000, the number of tractors increased dramatically (HMSO, 1968).

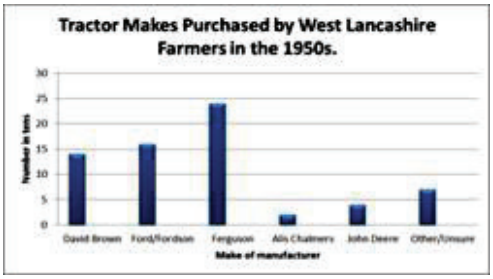

Figure 4. Chart showing tractor sales by make

The Three Point Linkage and Draught Control System, developed by Harry Ferguson and adopted by all other manufacturers, meant that the plough, cultivator or other implement, could be linked directly to the back of the tractor, and the working depth of the device be set at a certain range by hydraulic control, which could also be adjusted whilst on the tractor. The system transfers a proportion of the draught weight of the attachment onto the rear wheels of the tractor, thus allowing the tractor to take more weight than the horse. Old implements designed for horses were increasingly scrapped rather an adapted, a sign of a genuine new era (Melloy, 1984).

Between 1956 and 1958 tractors and self-propelled machines were the causes of 45.3% of agricultural fatalities in the UK (Matthews, 1986). Compulsory protective and preventative measures for tractors were slow to be introduced, starting as late as 1969, which may explain a lack of data on accidents before the 1974 Health and Safety at Work Act (Agricultural Safety, 1974).

As with motor vehicles, however, extra rules and regulations applied to operating tractors, though at first they were possibly not taken seriously and were of little concern to farmers and even college institutions. All tractor operators were required to update their skills especially if they were trying to gain an overall qualification in agriculture and legislation forced action to be taken.

Table 2 Table showing accident rates involving tractors in 1974

January	4%
February	8%
March	7%
April	13%
May	16%
June	10%
July	10%
August	7%
September	6%
October	9%
November	5%
December	5%

Table 3. Chart outlining the development of safety legislation

Risks	Preventative Measures
Power Take Off Injuries (near fatal, severe injury, amputation)	PTO guards became compulsory and required on every tractor. PTO injuries and fatalities 78% of the time involve the sole operator In 1985 PTO guards became interchangeable and allowed the attachment of the implement without fully removing the guards.
Running Over	Ensuring operators had adequate training and driving skills would prevent running over tractor driving qualifications could help by providing the training needed for safe vehicle operation.
Crush Injuries	Making sure that operator had adequate training and understood the moving parts on the tractor could prevent injury as a result of crushing.
Roll Over Injuries (fatal, severe injury)	In 1976 it was made compulsory to have a roll over protection system (ROPS) for hired employees. Statistics have proven that one in 10 operators will roll over a tractor in their career. From 1967 all tractors over 20 horsepower were sold with ROPS in place.
Falling Objects Injuries (fatal severe injury)	Falling object protection FOPS is aimed at protecting the operator from any falling objects. FOPS protection means that there either has to be a canopy or a frame over the operator for cables tractors. It was only made compulsory in 1989

The 1950s and 1960s proved to be a good time for the manual worker, substantial rises in wages were leading to unprecedented improvements, in standards of living and there was work for everyone who wanted it.

Casual workers were crucial to British agriculture, as work was primarily seasonal and in West Lancashire family members who helped out might not appear in either category. At the same time the number of full time male workers is in decline coinciding with a rise in the expansion of the manufacturing

sector, Leyland Trucks being a good example. However, female employment shows a rise, which can be contributed to changing roles within the agricultural sector.

Table 4. Table showing workers employed in agriculture in Britain

Year	Regular Male	Regular Female	Casual Male	Casual Female
1931	510,158	51,616	65,463	26,883
1940	427,830	40,092	58,362	42,119
1950	490,521	53,267	97,589	46,340
1960	393,402	52,667	42,295	35,071

After tractors arrived, staff inevitability had to change roles. The younger generation found this easier, and some older workers struggled, and possibly failed to adapt. If a worker failed to adapt or learn new skills they could be left surplus to requirements.

Overall, agricultural workers' numbers dropped throughout the 1950s. Most were aged between 20 and 65, and it was also this group that shrank most, dropping by 24,093 between the years 1955 to 1958. The 65's and overs dropped by nearly 5000. It is safe to assume that all the agricultural skills of staff above the age of 35 would relate to horsepower whereas younger people might have some familiarity with tractors. Horsemen were becoming redundant and refusal to adapt meant an increasingly difficult task of finding another un-mechanised employer. Around 10,000 horsemen were made redundant in the years 1956-57, replaced by 'skilled' individuals who had additional recognised qualifications, and the process could be a very callous one for man and horse (Landers, 2000).

In Lancashire the rates of pay were comparable to the rest of the country, basic pay for 45 hours/week would be enhanced by over time and weekend work; workers in the manufacturing sector were often paid at a slightly higher rate (Agriculture Wages Act, 1948).

The cost of purchasing a tractor was similar to the cost of employing a worker for a year and by replacing the horse, the "knock-on" effect meant less labour required and greater productivity thus reducing costs and at the same time increasing output.

Table .5 Table showing average agricultural rate of pay throughout Lancashire in the 1950s

Year	Wage per week
	£
1949/50	4.70
1950/51	4.96
1951/52	5,40
1952/53	5.68
1953/54	6.00
1954/55	6.24
1955/56	6.64
1956/57	7.05
1957/58	7.45
1958/59	7.78
1959/60	7.92

Table 6. Costs of purchasing a tractor

Tractor Make and Model	1945	1950	1955	1959	1965
Ferguson Petrol	£235.00	£325.00	£395.00	£460.00	£525.00
Ferguson Diesel	£310.00	£480.00	£525.00	£610.00	£675.00
Fordson Diesel	£310.00	£380.00	£425.00	£465.00	£535.00

There was also depreciation to contemplate when a farmer purchased a new machine. It is not clear whether farmers were aware of depreciation when they purchased tractors or realised the loss in value a tractor can have from the minute it is purchased, this led to a change in managerial skills, operational costs and the value of assets.

Once West Lancashire farmers accepted the realisation for change they had to decide what precisely needed to be done. According to Cooke and Slack we must ask if farmers were actually making plans or were they problem solving? Herein lies the problem that there are many steps into decision making which will ultimately solve the problem that has occurred in the first place.

West Lancashire farmers were not compelled to mechanise, even though the country would struggle if they opted out, so they felt they controlled their own destiny and survival. This means that the theory of empowerment provides a very useful mechanism for understanding farmers' actions. The government made mechanisation easy and rewarding, which meant farmers did not see giving up the older ways as failure. Official training schemes were implemented to maintain support with the National Proficiency Tests Council (NPTC) formed in the 1930s and taking responsibility for education, training and safety standards in agriculture. Workers were offered many recognised qualifications to boost

their employability, help raise their wages and earn respect. Traditionally if a person was taking part in a qualification such as a degree the educational establishment would pay for their additional qualification. However, if the person was already employed it would be up to them to pay for their training and tests. If they were fortunate enough employers would offer to pay for them, but in many cases as there was no way of ensuring a worker, employment out of season it seemed pointless for them to pay for it.

CONCLUSIONS

This period of study has proved to have been one of the important eras in the history of agriculture in North West Lancashire and the United Kingdom:

- A major change had been successfully implemented.
- Tractor power raised productivity by a factor of four.
- Tractor power reduced labour costs.
- Engineering skills replaced horsemanship.
- Industrial development absorbed the majority of redundancies on farms.
- The introduction of mechanisation led to a different strategy for farm business management.
- Financial reward proved to be the main motivating agent behind the change.
- An increase in female and part-time labour as male workers sought better job opportunities in the expanding industrial sector.
- Farm workers' wages and working hours underwent a change in order to attempt to stem the drift of farm workers into the industrial sector.
- The tractor and mechanised agriculture led to the development of formal training courses.
- The National Proficiency Test, povided nationally recognised skills awards for a whole range of agricultural tasks.
- A rise in machinery related accidents led to a rise in legislation.

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AGRO-FORESTRY AND CLIMATE CHANGES